

Submission to the Economics References Committee: Developing and Delivering Australia's Sovereign Naval Shipbuilding Capability

References:

- A. https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Economics/Navalship_building
- B. https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Economics/Navalship_building/Terms_of_Reference

1 Overview

1.1 Purpose of Submission

1.1.1 This submission is made by Gibbs & Cox (Australia) Pty Ltd for the purpose of assisting the Committee in its deliberations concerning Australia's sovereign naval shipbuilding capability.

1.1.2 The submission focusses on the following terms of reference:

- a. Item B: progress of the design, management and implementation of naval shipbuilding and submarine defence procurement projects in Australia.
- b. Item E: the implementation of Australian Industry Capability Plans.
- c. Item F: the utilisation of local content and supply chains.
- d. Item G: the transfer of intellectual property and skills to Australian firms and workers.
- e. Item I: opportunities and multiplier effects to local jobs and the economy.
- f. Item J: Any related matters.

2 Expertise to Assist Committee Consideration

2.1 About Gibbs & Cox (Australia) Pty Ltd

2.1.1 Gibbs & Cox (Australia) Pty Ltd is a wholly owned subsidiary of Gibbs & Cox Maritime Solutions, Incorporated in the United States, which recently reached its 90th anniversary as an independent naval architecture and engineering company.

2.1.2 The Company is expert in all aspects of the detailed design of major surface combatants, including that of the USN's primary surface combatant, the Arleigh Burke Class.¹

2.1.3 Gibbs & Cox has been associated with the Royal Australian Navy (RAN) for over 60 years. The company is presently supporting the Commonwealth through provision of above the line advanced engineering staff support to the Hunter Class Frigate Program (SEA5000), The Attack Class Future Submarine Program (SEA1000), and the Arafura Class Offshore patrol Vessel Program (SEA1180).

¹ An interview with the CEO of Gibbs & Cox can be found at this link. It covers in detail the current capabilities of the company. <https://www.marinelink.com/news/gibbs-cox-historic-ship-designer-turns-471964>

2.1.4 Only information available in the public domain and can be inferred from that information has been used in the preparation of this submission.

2.1.5 Gibbs & Cox (Australia) Pty Ltd has its office in Manuka, Canberra, ACT.

3 Addressing the Terms of Reference

3.1 Item B: Progress of The Design, Management and Implementation of Naval Shipbuilding and Submarine Defence Procurement Projects in Australia

3.1.1 Gibbs & Cox strongly supports having positive involvement by knowledgeable senior members of government in delivering these very high cost, complex and difficult defence programs. At some point, this attention might be necessary to manage issues which are of a significance requiring careful consideration of future directions within the context of the overall policy direction government wishes to pursue.

3.1.2 The Government's policy objectives for the naval sector are set out in the Naval Shipbuilding Plan². In part these objectives include:

1.30 Delivering the Naval Shipbuilding Plan will result in a national approach to the delivery of affordable and achievable naval capability through a sovereign Australian industrial base that is reformed, secure, productive and cost-competitive.

1.31 Achieving this objective will result in future Australian Governments being able to plan and execute: the design, construction and sustainment of future fleets of major surface combatants and minor naval vessels; and the acquisition, construction and sustainment of submarines (designed in conjunction with an international partner) in Australia.

3.1.3 As is amplified below, being able to design a warship brings to the fore not only the knowledge required to undertake this very difficult task, it provides the RAN and Australia's industry the greatest opportunity to develop and meet solutions for the navy's requirements, as well as sourcing them from within the Australian industrial base.

3.1.4 In this context, gaining the ability to manage the design of the future submarine, as is now being pursued, is strategically very important for Australia. Experience will indicate whether moving beyond this stage of accomplishment will bring economic and operational benefits to Australia.

3.1.5 Australia presently sources the designs for its major surface combatants from foreign nations and suffers the significant offshore spends and support implications of the foreign supply chains so incurred. An Australian naval design capability will invigorate and draw on a substantially expanded Australian supply chain and unlock the full potential of the Government's naval sector investment to support Australian manufacturing. This establishes a range of interrelated benefits as set out in Figure 1.

² Department of Defence, *Naval Shipbuilding Plan*, 2017.

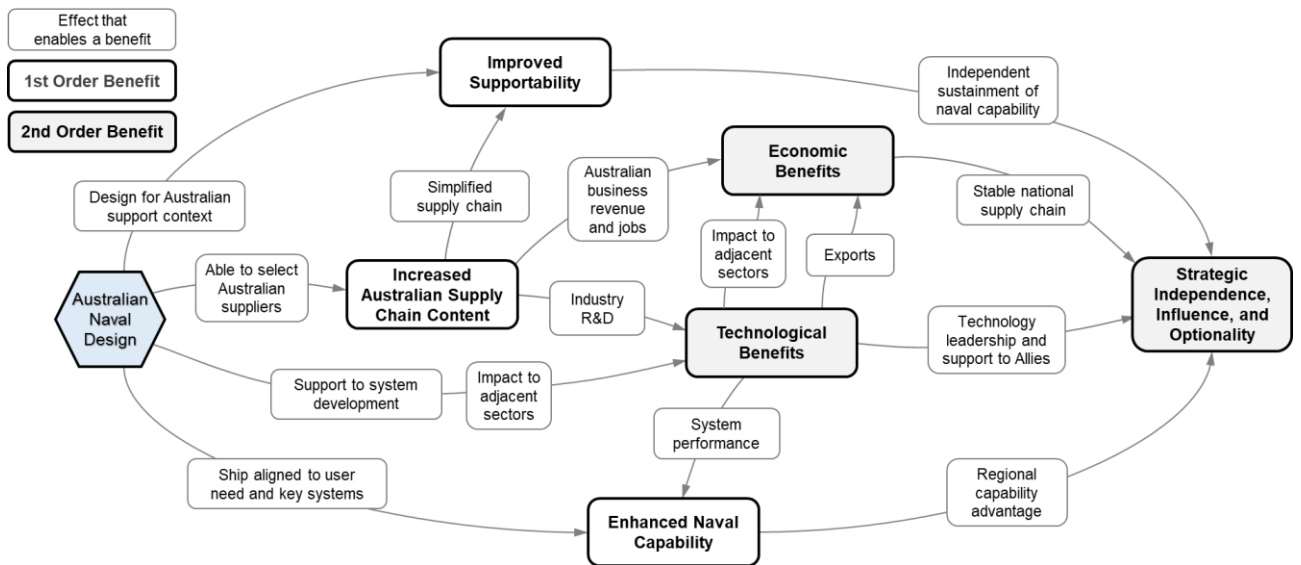


Figure 1: Inter-relationship of technological, economic, capability and strategic benefits of an Australian naval design capability

3.1.6 There are thus many national benefits with economic implications to be accrued through having reached that degree of technical independence. In order for Australia to attain these benefits in the long term, commencement of planning and resource allocation in the short term is required, particularly if such a design capability is to be initiated through the current Hunter Class Frigate design activities.

3.1.7 Notwithstanding, the development of a naval design capability is a long-term proposition and can require an entire ship class life cycle to mature. The development of this design capability is intended to be realised substantially through the Hunter Class Frigate program. This program is well into the design phase but as yet there does not appear to be any clear planning in the public arena which indicates how this activity is being used to leverage the development of an Australian naval design capability. It is important that more active planning is initiated and communicated at a whole-sector level to set out how this capability will be established. This planning is necessary to enable:

- a. Current and near-future naval acquisition programs to plan how to incorporate and engage with the developing naval design capability to support program delivery.
- b. Industry to know how to invest in and engage with naval design to support the Commonwealth's goals.
- c. Key delivery stakeholders to be held accountable for implementation of measures that support development of a credible, trusted Australian design capability.

3.1.8 A clear national plan for the development of this important national strategic capability should be able to be developed and published by mid-2021.

3.1.9 Knowing how to design a world class complex naval warship requires investment in people and skills, and opportunities to exercise those talents on real problems. It is a time-consuming task to build this national capability, but it must be planned, resourced and managed.

3.1.10 Recommendations:

- a. The economic and other benefits of growing an Australian capability to fully design a conventional submarine be investigated more thoroughly at an appropriate time in the future.
- b. A plan be developed, resourced and publicly promulgated by Q3 2021, and monitored for Australia to achieve the stated policy objective of having the ability for sovereign warship design.
- c. The work associated in development of the plan should address options to bring such a capability to fruition in a manner which recognises the known and likely design challenges to be faced through continuous naval shipbuilding programs (see paragraph 3.6).

3.2 Item E: The Implementation of Australian Industry Capability Plans

3.2.1 Without effective implementation of industry capability plans, there will be no assurance or visibility that the policy objectives of the government are being achieved. Those plans are necessarily focussed on delivering capabilities as they are understood in the present time frame, which may not fully meet future needs. Reassessment of such plans over time would be useful.

3.2.2 The preceding discussion concerning Australia's naval design capabilities are also relevant to this item of the committee's consideration. A warship design activity is defined by the supply chain it draws from. The resulting design is substantially defined by the capabilities of that supply chain and the capabilities and characteristics of the systems used in the design. However, current industry capability planning does not recognise the importance of warship design in enabling or defining the supply chain, or to ensure that activities lead to that outcome as was previously articulated.

3.2.3 Recommendation:

- a. Major surface combatant design be recognised as a national sovereign capability priority and that future Australian Industry Capability plans lead to this outcome and articulate its impact on industry capability.

3.3 Item F: The Utilisation of Local Content and Supply Chains

3.3.1 A major policy outcome of scaling up the naval industry is to maximise Australia's potential for its industry becoming primary suppliers to this sector. The Hunter frigate program represents a clear opportunity for Australian industry to become skilled in providing high quality products capable of being installed in those ships as constructed. If deemed acceptable, those suppliers could become now, or eventually, part of BAESystems' supply chain for ships of the Royal Navy and the Royal Canadian Navy, which are acquiring the same basic ship.

3.3.2 This is an excellent opportunity and is deserving of considerable government oversight to ensure that no chance for Australian industry to participate in the Hunter program is forgone.

3.3.3 The medium to longer term benefit of upskilling Australia's industry and exercising direction over source selection choices made for the Hunter program, is that it positions Australia to

better meet the needs of the RAN in the future. While the intent is to develop a world standard industrial capability, there is the potential that a cost premium may need to be accepted in the nearer term where confidence exists it is manageable in the future. There is a risk and cost associated with the development of the Australian naval supply chain, which is the entry price that must be paid to transition from a substantially dependent naval power, to a substantially independent naval power. This risk and cost must be balanced against the ongoing strategic risk of a substantially dependent naval capability, and the lost economic and technological opportunities of a weakly-realised Australian naval supply chain.

3.3.4 Significant choices are always made on primary equipment at very early stages of the warship design process. Such critical choices bound the overall capability and, to a large extent, the eventual total cost of the program. The ability to control the design at the earliest stage of the total design process therefore imparts the greatest potential for incorporation of local content, and through that, for Australian industry to directly export high quality equipment associated with the same design or adapted for other designs requiring similar equipment.

- a. Arguments can be justifiably made that these concepts will change the design and increase the cost of a ship. However, increasing our national content requires commitment via careful review and planning to limit unforeseen risks in execution and cost.
- b. Enacting this in the early phase of a ship's design is far less complicated than later in the ship's life. Targeting system by system, then a batch or flight upgrade, will well position Australia to become self-reliant for future fleet upgrade programs.

3.3.5 Successful foreign naval surface ship development programs (e.g. Japan, Korea, Turkey, Spain) use a progressive development approach to control these costs and risks by balancing capability advantage with program risk and cost. This can be achieved through:

- a. Introducing capabilities at the right maturity level.
- b. Setting clear timelines for introduction of capabilities.
- c. Balancing capability ambition with cost management.
- d. Contracting small build batches with major design updates between batches.
- e. Aggressive deferral of proposed engineering change to the next batch.

3.3.6 Recommendations:

- a. That the Australian industry content of the Hunter frigate program be proactively managed to maximise its value to the program; if necessary, accepting a cost premium where it can be demonstrated as valuable.
- b. The ability to design warships be recognised as maximising Australia's industry to supply equipment to ships constructed in Australia, which also raises the credibility of Australian industry to be internationally competitive in meeting such requirements for other potential customers.

- c. Both these means (indigenous content and indigenous design) can be achieved by planning for the deliberate introduction of specific Australian content in lieu of foreign, leveraging indigenous industries in support of achieving national aspirations, with an eye on competing as a world class supplier.
- d. Setting out a clear surface ship capability development pathway which provides the Navy, the combat system development community and the ship design community with guidance on what systems and capabilities are targeted in what timelines. This approach stabilises technology development and program risk while still supporting aggressive capability targets to support regional technology superiority of the RAN. Such plans may need to remain protected.

3.4 Item G: The Transfer of Intellectual Property and Skills to Australian Firms and Workers.

3.4.1 The transfer of IP and skills to Australia is a critical item. Without their achievement, overall success of the government's policies for continuous naval shipbuilding program cannot be fully achieved.

3.4.2 The scope and scale of the government's program has fundamentally changed the dynamics of the naval industrial workforce. Previously, the skills required of a workforce varied as the program matured, eventually morphing into one primarily focussed on support services. This will no longer be the case.

3.4.3 The nature of BAE Systems' contract with ASC Shipbuilding, as it is understood, is that it will transfer skills to ASC Shipbuilding for the Hunter frigates to be constructed and supported through their service lives. Transfer of IP and skills by BAE Systems, whilst important, of itself will be insufficient to meet the overall needs of the RAN and industry.

3.4.4 The RAN's Hunter frigates are being heavily modified by replacing their UK combat systems, weapons and aviation capabilities by those sourced from the US and Australia. It can be expected that future warships will be similarly equipped – regardless of the origin of their design. These changes, such as installation of Aegis and its future versions or replacement, will have significant ramifications for the design of any warship, and will be present for their full-service life. Support from companies with expertise in designing warships and integrating the combat systems being adopted by the RAN into its ships will be required to ensure this is done in the most effective manner. UK designers have not worked with US combat systems to the same extent as is required by the RAN. It is therefore to the benefit of Australia to have a means of drawing upon US warship design expertise.

3.4.5 Support from US warship designers with this expertise, which could also be used as a source of advanced training and transfer of skills to Australia, is currently being prevented by US regulations. As a normal procedure, US government contracting authorities stipulate that no foreign personnel can work with US naval designers. Application of that policy by US authorities fails to recognise the deep defence alliance relationship that exists between the two countries. It is also unbalanced in that highly skilled US citizens are currently working, to Australia's benefit, in Australia's major naval programs. Australia needs skilled and experienced people and the consequence of the

US policy is to inhibit how quickly Australia can grow its workforce. It also prevents the sharing of know-how between the two nations in an area of endeavour that has the potential to grow more important to both.

3.4.6 Warship design is a complex task whereby many operational and engineering considerations must be integrated. While the combat system typically receives the major attention in terms of cost, technological modernity and performance, it is the platform that provides the essential services, protection of the crew and sustains the overall capability of the ship to fight and win. The platform also physically demonstrates Australia's national power and interests through their presence in foreign localities when needed.

3.4.7 Design of a warship needs deep expertise in both the platform and combat systems elements.

3.4.8 Recommendations:

- a. The importance of working closely with the US for shipbuilding matters, including warship design, be recognised as having high value to Australia, but that the relationship from Australia's perspective is unsatisfactory.
- b. Action be taken to persuade the US that its policy of preventing Australian citizens working on US warship design programs is not in the mutual interest of both countries, and that the policy be relaxed for Australia.

3.5 Item I: Opportunities and Multiplier Effects to Local Jobs and the Economy

3.5.1 Opportunities and multiplier effects can be achieved through an overall increase in the value proposition of the naval enterprise. Exports of major warships are unlikely in the short term, but with a long-term view there is no reason why Australia could not replicate the success of Britain, France, Germany and Spain in achieving such an outcome. Virtually all naval designing nations have achieved some export sales. Such an outcome requires a proactively managed approach.

3.5.2 An economic study published in support of the US Department of Transportation's maritime industry estimated 2.5 additional jobs are created by every maritime job.³ These effects easily correlate to the Australian economy.

3.5.3 Remarks made in earlier items are germane to this item, as are those in paragraph 3.6.

3.6 Item J: Any Related Matters – Implementing a Sovereign Design Plan

3.6.1 An essential step to realising many of the industrial and naval capability benefits associated with continuous naval ship building will be for Australia to develop its own sovereign capability for warship design.

³ Maritime Administration, 'The Economic Importance of the US Shipbuilding and Repairing Industry', November 2015, <https://www.maritime.dot.gov/sites/marad.dot.gov/files/docs/resources/3641/maradeconstudyfinalreport2015.pdf>.

3.6.2 The Minister has earlier noted that a sovereign design capability would be achieved by the conclusion of the frigate build⁴ which, because of the longevity of these programs, means by the mid-2040's. By that time however, Defence and government will already have been required to make a combination of near and medium term choices requiring significant warship design skills to provide expert advice concerning:

- a. changes to the batch designs of the Hunter frigates as they are adapted with equipment modifications and lessons are learned from earlier deliveries,
- b. choices on modernisations for the Hobart Class,
- c. timely choices concerning replacement of the Hobart Class as they reach the limits of their operational lives, and
- d. be well advanced on deciding what will replace the Hunter Class.

3.6.3 By near and medium term, this submission suggests that the time frame is from the present day to about 10 years hence.

3.6.4 Long term thinking is therefore essential if Australia is to maximise its economic return from these programs. To do so requires it to minimise or remove its dependence upon foreign warship designs and equipment suppliers to the greatest extent possible, and in the earliest timeframe possible.

3.6.5 While recognising that ASC Shipbuilding will necessarily need its own design skills, the Commonwealth will need access to its own independent advice concerning cost/capability analysis etc to conduct its planning with confidence. Such arrangements are normal in countries with sophisticated naval industrial environments as is being created in Australia, which provides for the most expert advice to be incorporated in decision making processes.

3.6.6 Creation of Australia's sovereign naval design capability will necessarily require collaboration by a wide range of participants, who collectively satisfy the needs of the government, and hence the RAN. Some would include Navy Capability, Navy Engineering, CASG, DSTG, ASC Shipbuilding, combat systems companies, and specialist reputable world class designers of modern surface combatants. Others might include industry associations as appropriate, as well as having a close relationship with the existing Centre for Defence Industry Capability (CDIC).

3.6.7 The working model being suggested here is comparable to the approach taken by the UK Ministry of Defence in partnering with industry to support its naval programs – known as the Naval Design Partnership.⁵ In the Australian context it could be known as the Australian Naval Design Centre (ANDC). In overall terms:

- a. The ANDC could be established based on a commercial management model, possibly

⁴ Department of Defence, 'Joint Media Release - Prime Minister, Minister for Defence, Minister for Defence Industry & Minister for Finance - The Hunter Class - Defending Australia and Securing Our Shipbuilding Sovereignty', Text, 29 June 2018, <https://www.minister.defence.gov.au/minister/marise-payne/media-releases/joint-media-release-prime-minister-minister-defence-minister-1>.

⁵ QinetiQ, 'QinetiQ Signs Naval Design Partnership Contract', 7 May 2008, <http://www.defense-aerospace.com/articles-view/release/3/93937/uk-sets-up-joint-naval-ship-design-office.html>.

under the management of a lead contractor, and reporting into CASG, probably under FAS Ships and perhaps jointly with Head Navy Capability, who would set governance and other requirements for the entity.

- b. Personnel from the various participants in Defence and industry would be assigned, posted, or contracted into the organisation as applicable in order to support the required labour profile with the associated knowledge and skills.
- c. Funding for ANDC would be sourced primarily from CASG project offices and/or Navy, for whom the ANDC is providing design services. Commercial participants such as ASC Shipbuilding and other specialist design partners would be funded through appropriately structured strategic contracts with CASG, managed under FAS Ships.
- d. The Centre would likely have two physical centres: with whole-ship design work conducted in Canberra for the evaluation of requirements and conceptual design development, transitioning to Adelaide for functional design through to production.
- e. Intellectual Property management would be a key issue requiring early resolution and agreement by its members.

3.6.8 A high-level working representation of ANDC is provided at Figure 2.

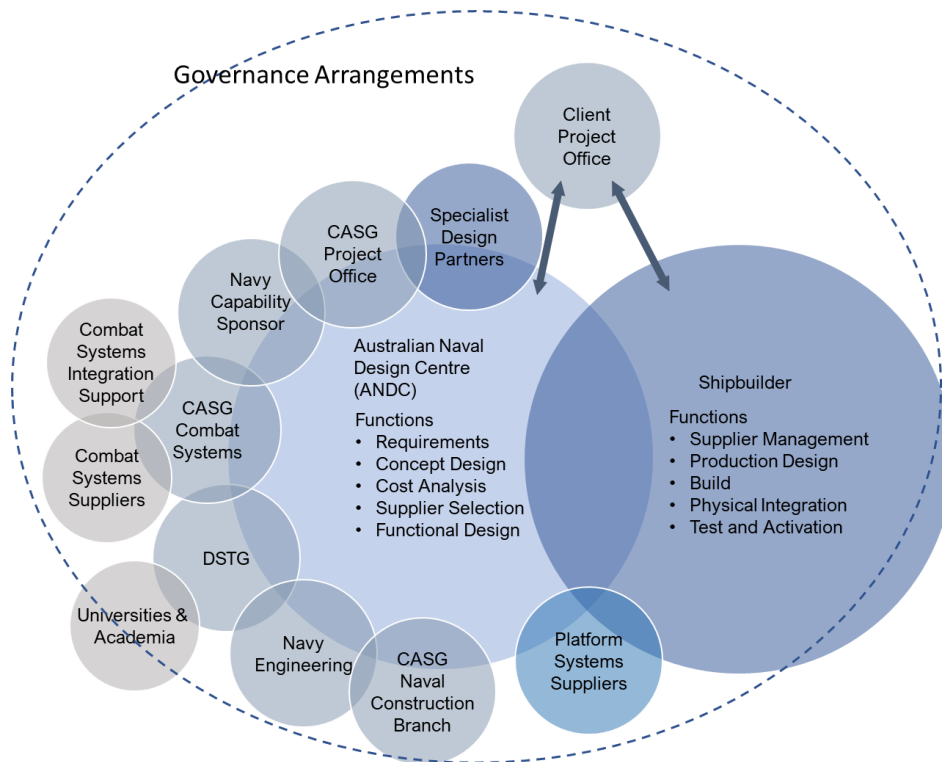


Figure 2: High Level Working Representation of ANDC

3.6.9 Development of an Australian sovereign naval warship design capability is assessed as being entirely possible to in a timely and efficient manner from Australia's resources, and progressively growing naval skills. The earliest possible implementation should be considered in

order for the Hunter Class Batch 1, 2 and 3 design activities to transfer optimum developmental benefit to Australia's naval design capability.

3.6.10 Recommendations:

- a. Australia's intent to become capable of designing major warships be specifically recognised as a sovereign Defence industrial capability and for it to be reflected in the appropriate Defence industry plans.
- b. Development of sovereign warship design capabilities be given a priority which recognises the multiplicity and timing associated with warship design requirements facing Australia through its adoption of continuous naval shipbuilding.
- c. Involvement of a wide range of potential collaborators/stakeholders be sought to refine how a sovereign design capability can be established, and in what time frame. Such consideration should involve formation of a collaborative Australian Naval Design Centre.
- d. High level monitoring of progress toward achievement be exercised as considered appropriate.