



25 November 2014

## **AUSTRALIAN BUSINESS DEFENCE INDUSTRY**

### **SUBMISSION TO THE SENATE ECONOMICS REFERENCES COMMITTEE INQUIRY INTO THE FUTURE OF AUSTRALIA'S SHIPBUILDING INDUSTRY**

#### **PREAMBLE**

This submission to the Senate Economics References Committee Inquiry into the Future of Australia's Shipbuilding Industry is made in addition to a submission to Part I of the Inquiry.

This document is consistent with a submission by Australian Business Defence Industry (ABDI) to the Defence White Paper (DWP) 2015. This consistency recognises that shipbuilding exists within the broader context of defence industry capability and is not a stand-alone consideration.

At its DWP 2015 submission ABDI advocated the need for a conceptual framework for defence industry policy based on three "framing and guiding principles" (the external view) and three "industrial themes" (the internal view). The proposed framework is designed to provide a structure within which defence industry can grow over the longer term in a manner aligned with the attainment of national strategic goals. The resultant local defence industry capabilities would therefore be most relevant to prevailing and emerging strategic circumstances. This broad principle, and that shipbuilding is an exemplar within the conceptual framework, was highlighted in the introductory comments by ABDI to the Committee at the public hearing in Newcastle on 08 October 2014.

The key aspects of the conceptual framework are outlined below, and diagrammatically represented in Figure 1:

#### **Framing and Guiding Principles**

- Strategic Alignment
- Indigenous Industry as a Capability
- Creation of the Current and Future Investment Environment

#### **Industrial Themes**

- Mitigation of Strategic Risks
- Maximise Domestic Economic Activity
- Innovation

In addition, in order to have relevance, the defence industry policy needs to be linked to real world activities through a number of Fundamental Inputs to Industrial Capability (FIIC). These FIIC are:

- In-country facilities
- Skilled and Available Workforce

- Access to Intellectual Property and Design Information
- Sustainable workflow
- Access to Capital
- National Infrastructure

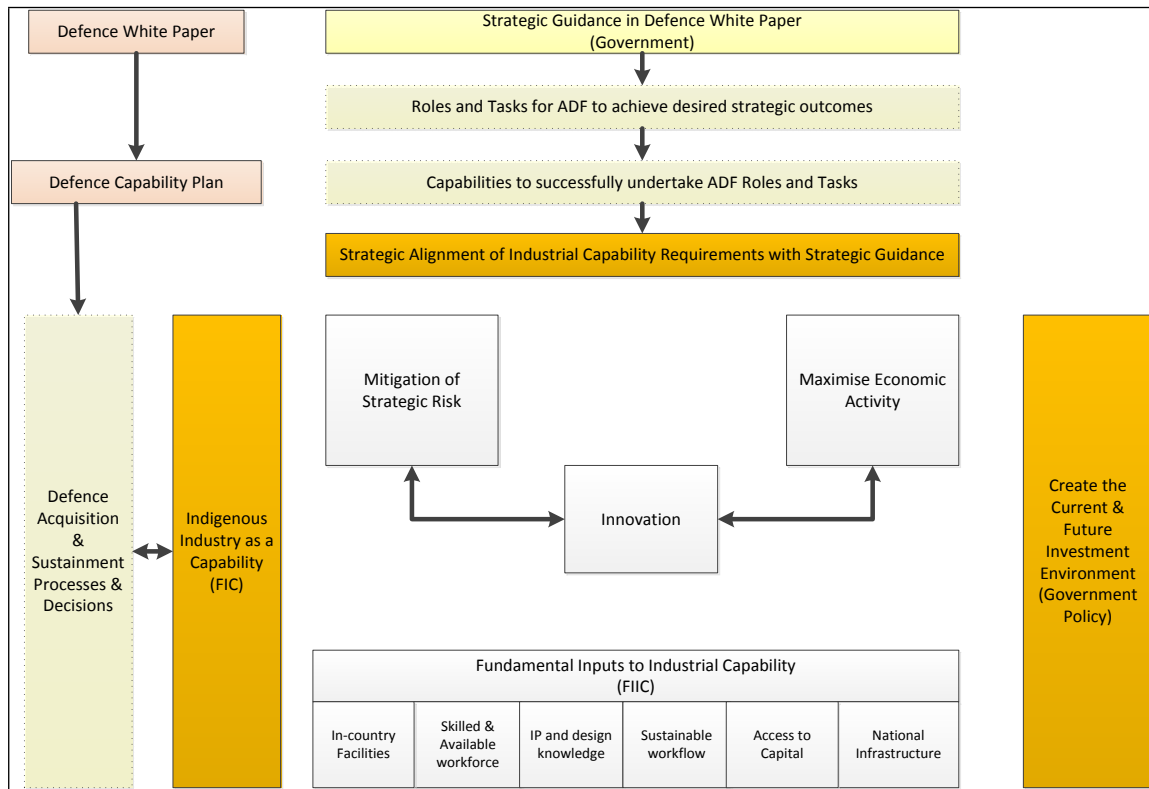


Figure 1 – Conceptual Framework for Australian Defence Industry

The direction, size and sustainability of the Australian shipbuilding industry has been the subject of debate for many years, and the overall challenges facing this sector were exacerbated with the award of the Air Warfare Destroyers (AWD) to ASC in South Australia in 2007. This decision created additional shipbuilding capacity in an already stressed and fractured market.

Naval shipbuilding in Australia has been characterised by a stop-start nature that does not facilitate the long term development and sustainment of capability and capacity, results in repeated investment to obtain basic skills and infrastructure, inhibits the ability of industry to work towards and attain world's best practice, and may not provide the Royal Australian Navy (RAN) with the best outcome. The *Anzac Ship Project*, the last serious foray into naval shipbuilding, is widely considered to have been a success and demonstrates the potential for Australian naval shipbuilding to be cost competitive and to deliver a quality product given the right circumstances<sup>1</sup>.

ABDI is not associated with any one Australian region, and receives no funding from Government; either Federal or State. The ABDI position is therefore advanced with the view to building the

<sup>1</sup> See for example Tasman Asia Pacific report *Impact of Major Defence Projects: A Case Study of the ANZAC Ship Project*, February 2000, or similar commentary at <http://www.australiandefence.com.au/C99AF1D0-F806-11DD-8DFE0050568C22C9> , and [http://www.ausmarinetech.com.au/anzac\\_ship\\_project.html](http://www.ausmarinetech.com.au/anzac_ship_project.html).

defence industry capabilities that Australia needs to have, rather than one that is constructed to address political imperatives.

The submission will separately consider surface ships and submarines. The submission will focus almost exclusively on aspects related to the mitigation of strategic risk, but it acknowledged that there will be economic arguments that may also be compelling. The work undertaken by Professor Goran Roos on the benefits of advanced manufacturing and shipbuilding is relevant to this overall discussion.

## **SURFACE SHIPS**

The ABDI submission to DWP 2015 extends the concept of Priority Industry Capabilities (PICs)<sup>2</sup>, introduced in DWP 2009, and places the mitigation of strategic risk at the centre of defence industry capability considerations. This risk-based approach is considered to best develop and maintain an industrial capability that the country needs for strategic reasons. It is again reiterated that all defence-related industrial activity should be undertaken in Australia if this can be done at an acceptable price as this brings benefits over a range of considerations, including skills development, innovation, and overall economic activity.

The situation vis-à-vis the strategic nature of naval shipbuilding in Australia is however confused. Neither DWP 2013 nor DIPS 2010 lists naval shipbuilding as a PIC although it has been included at the lower level of Strategic Industry Capability (SIC)<sup>3</sup>. Moreover, the ability to repair, maintain and upgrade naval ships does not rate a mention as either a PIC or a SIC. The closest one gets in this regard is the listing of *ship dry-docking facilities and common user facilities* as a PIC. In itself, this PIC listing is somewhat nonsensical given that the mere existence of the facilities does nothing to ensure that they are able to be utilised in a manner that would result in repaired, maintained and/or upgraded naval ships.

The current utilisation of the PIC/SIC concept in current defence industry policy is therefore limited in its ability to contribute to the debate regarding required industry capabilities. The conceptual framework as developed by ABDI and centred on the need to focus indigenous defence industry capability on the mitigation of strategic risk, is considered to provide a better platform for consideration of industrial priorities and will be used in this submission to investigate naval shipbuilding issues.

Successive DWPs have highlighted a number of naval tasks required of the ADF in order to achieve the strategic outcomes sought by the Government. These tasks include, *inter alia*, to deter adversaries from conducting attacks against Australia or attempting coercion; to achieve and maintain air and sea control in places and at times of our choosing in our approaches, to deny or defeat adversary attacks and protect key sea lines of communication; to deny adversary forces access to forward operating bases or the freedom to conduct strikes against Australia from beyond

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<sup>2</sup> PICs are defined as “those industry capabilities which would confer an essential strategic capability advantage by being resident within Australia, and which, if not available, would significantly undermine defence self-reliance and ADF operational capability”. DWP 2009 para 16.21. The PIC concept was subsequently repeated and retained in the Defence Industry Policy Statement (DIPS) 2010, and in DWP 2013.

<sup>3</sup> *Building Defence Capability: A policy for a smarter defence industry base*; Commonwealth of Australia, Canberra; 2010 (Defence Industry Policy Statement 2010) para 4.12 indicates that a SIC is a capability that has the potential to become a PIC.

our maritime approaches; and to project power by deploying joint task forces in the Indo-Pacific region and support the operations of regional partners when required<sup>4</sup>.

These tasks require the surface force to be both available and relevant to the prevailing threat environment. This necessitates the ability for the local industry to repair, maintain and to upgrade naval ships. The latter industrial ability is fundamental if we are to take advantage of technological advancements or to counter developments made within an opposing force. Knowledge of the design, the ability to utilise and amend the associated intellectual property (IP) as necessary, and the ability to integrate and test systems is therefore of critical importance.

What is not so clear cut is the strategic necessity to build naval ships in-country.

In order to provide a consistent workflow for the various skills employed in building naval platforms such as frigates, and to escape the stop-start nature that has previously plagued naval shipbuilding in Australia, ships would need to be constructed in a parallel process providing a ship every 15-18 months. This rate of effort has the following implications and considerations with respect to the determination of whether the shipbuilding activity is linked to strategic risk:

- In the event that a naval ship was sunk and required replacement the conflict would need to continue for at least 18 months for the build to have any relevance on overall force structure.
- In order to use the local capability to surge the force structure prior to conflict occurring, the Government would need effective warning time and decision-making in excess of 18 months.

In addition, and as intimated by the Defence Materiel Organisation (DMO) at a previous hearing of this Committee, there is also the important issue of whether Defence can acquire ships of appropriate capabilities from the international market into the future. ABDI is not in a position to provide definitive commentary on this issue.

In order to better understand the detail of strategic risk as it applies to a naval platform, the ship has been considered as comprising the Systems and Sub-systems as detailed in Figure 2 below, namely:

- The Platform
  - Structure – the hull and associated fittings
  - Services – fuel, light, power, water, etc
  - Mobility – engines and systems associated with movement
  - Habitation – that associated with having people live/work within the platform
- Platform Management System
- The Operational System
  - Sensors – the detection and input of information sourced externally
  - Data Management – the manipulation and display of information, and associated command and control
  - Communications – the movement of information, both internally and externally
  - Effectors – weapons, decoys and other systems where action is taken on processed and manipulated information

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<sup>4</sup> Defence White Paper 2013, paragraph 3.42.

Figure 2 displays a coloured-coded view of impact of the overall Platform, Operational System and Platform Management System, and the Sub-Systems on the mitigation of strategic risk - in the order green (low risk), yellow (medium-low), orange (medium-high) and red (high).

The aim of this approach is to illustrate those activities and sub-systems associated with the building and maintenance of naval ships where strategic risks are high, and thus the consequent industrial capability needed in Australia to address these risks.

	Platform				Platform Management	System			
	Structure	Services	Mobility	Habitation		Sensors	C2	Comms	Effectors
Design (1)	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Knowledge of Design	Red	Red	Red	Red	Red	Red	Red	Red	Red
Build/Manufacture (2)	Yellow	Yellow	Green	Green	Yellow	(3)	Yellow	Yellow	Green
Systems Integration	Red	Red	Red	Red	Red	Red	Red	Red	Red
Test	Red	Red	Red	Red	Red	Red	Red	Red	Red
Repair/Maintain	Red	Red	Red	Red	Red	Red	Red	Red	Red
Upgrade - SW	Grey	Grey	Green	Green	Yellow	Red	Red	Red	Yellow
Upgrade - HW	Red	Red	Green	Green	Yellow	Red	Red	Red	Yellow

(1) To be involved in the design process

(2) To be involved in the build of the overall system, or of the sub-system components

(3) At the system level this is an integration task, not a build task

**Figure 2 – Depiction of Strategic Risk associated with Shipbuilding**

Figure 2 shows that highest strategic risk is associated with having knowledge of the design, and the ability to undertake systems integration, test, repair and maintenance and the upgrade of operational systems rather than in the build aspects. This is not a surprising result. In addition, in a general sense, there are higher strategic risks associated with the Operational System rather than the Platform *per se*.

Naval shipbuilding would be linked to high strategic risk in the following circumstances:

- If shipbuilding provides essential skills for the conduct of upgrade activities;
- If it is not possible to acquire suitable platforms from offshore in the necessary timeframe;
- If strategic warning time is sufficient to build additional ships prior to conflict occurring; and/or
- If the length of any conflict exceeds the time to build additional ships.

## SUBMARINES

Submarines are strategically important to Australia through their contribution to sea denial operations, intelligence gathering, interdiction of shipping, and the covert insertion of special forces. The power and utility of submarines in all their operational roles is based upon their ability to remain undetected. Stealth is therefore an essential requirement.

The stealthiness of a submarine is intimately linked with noise – flow noise from the hull, radiated noise from internal systems and propellers, noise generated by crew activities, and noise reflected from hostile sonar systems. All aspects of submarine design, build, maintenance and operation must therefore be undertaken with the impact on stealth as a primary consideration.

The focus on stealth therefore implies differences in the determination of strategic risks when compared to surface ships, and the way in which the ability to undertake various industrial activities impact on the mitigation of these strategic risks.

One other important factor distinguishes the strategic nature of submarine building from that of surface ships – the requirements. The Australian submarine requirements are unique, requiring operational characteristics not present in internationally available designs. Significant design effort will therefore be required of any current design to provide submarines suitable for Australian operations. This situation is unlikely to change over the longer term meaning that an ongoing design capability will continue to be required. The presence of such a design capability in Australia is therefore of ongoing strategic importance.

Application of the same matrix structure as above for submarines provides the risk diagram as shown below at Figure 3. Differences to the surface ship example are apparent due to the potential impact of sub-systems upon overall platform stealth characteristics.

	Platform				Platform Management	System			
	Structure	Services	Mobility	Habitation		Sensors	C2	Comms	Effectors
Design (1)									
Knowledge of Design									
Build/Manufacture (2)						(3)			
Systems Integration									
Test									
Repair/Maintain									
Upgrade - SW									
Upgrade - HW									

(1) To be involved in the design process

(2) To be involved in the build of the overall system, or of the sub-system components

(3) At the system level this is an integration task, not a build task

**Figure 3 – Depiction of Strategic Risk associated with Submarine building**

Figure 3 shows the following with respect to considerations of submarine-building in Australia as a function of strategic risk:

1. Involvement in the overall submarine design, although not necessarily of the individual systems fitted within the submarine, is strategically important;
2. Detailed knowledge of the design, including access to the design, software code and intellectual property for all fitted systems is critical if Australia is to have control over its upgrade options; and
3. Upgrade of hardware systems is of higher strategic risk than in surface ships due to the potential impact on overall stealth characteristics.

## SUMMARY

Economic aspects of shipbuilding and submarine building, and the benefits of undertaking these activities in Australia rather than buying from offshore, have not been considered in this submission but are an important factor that needs to be consideration. Professor Goran Roos has undertaken significant work in this field and should be consulted for his input.

Naval ships and submarines are strategically important platforms for Australia. The ability to repair, maintain and (importantly) upgrade these platforms in Australia is a fundamental requirement. These activities require a detailed knowledge of the platform and system design, and access to all IP and associated software.

Under certain circumstances the construction of these platforms in Australia may also be critical for the mitigation of strategic risks.

ABDI **recommends** that additional research be undertaken to determine the nature of the link between ship and submarine building and the maintenance, repair and upgrade of these platforms, particularly in regard to infrastructure requirements, and workforce and skills issues.