

## Submission 42 - Australian Manufacturing Workers' Union

The Australian Manufacturing Workers' Union made submission 4 and 37 to the inquiry into the Future of Australia's naval shipbuilding industry in the 44th Parliament.

This document is intended as a supplementary submission to the original submissions 4 and 37.

All submissions received in the 44th Parliament can be accessed via the following link:

[http://www.aph.gov.au/Parliamentary\\_Business/Committees/Senate/Economics/Naval\\_shipbuilding/Submissions](http://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Economics/Naval_shipbuilding/Submissions)

## **The Future Sustainability of the Australian Naval Ship Building Industry**

The AMWU believes that it is vital for Australia's future security and prosperity that we maximise the jobs, skills and economic growth that can be created through government investment in the strategically vital naval ship building industry over the next 30 years.

This will only be possible if Australia seizes the opportunities presented by defence procurement spending to ensure Australia's strong and growing ship building industry and its highly skilled workforce is integrated into new projects from the very beginning.

The scale of the security and economic benefits from the full integration of Australian's manufacturing sector into the global naval ship building supply chain cannot be understated. Using commonly adopted measures, a fully-integrated local industry including design, construction and maintenance would give a spill over effect to the Australian economy would be around \$16.85 billion from the submarines alone.

To achieve these benefits, the federal government must develop a Sovereign Capability Strategy that identifies the skills and expertise that are critical to our national security and which provide the greatest economic benefit to the nation.

In the long-term this approach will keep costs down, lower risk and allow for continuous improvement during the lifecycle of our submarines and surface vessels.

The detailed report upon which this submission is based is attached for the information of the Committee.

### **Local content and integration into global supply chains**

It is important that the Australian Government build in contractual requirements for Australian involvement for future submarine and ship building projects. For example, it is important that future partners be required to located design offices in Australia, transfer IP to Australia and have a substantial Australian industry participation plan. This will ensure that defence procurement spending helps to build a competitive Australian industry capability as well as sovereign capability.

This will help to build Australian skills at all parts of the production life-cycle and allow the local industry to develop expertise over time. This will lower cost and reduce risk and allow Australian forms to integrate themselves into international supply chains.

Local involvement in development of new IP will enable Australian entrepreneurs to commercialise new ideas outside defence applications, potentially created more opportunities for growth.

### **Meeting our unique requirements**

The number of true off-the-shelf procurements that can be made by Australia decreases dramatically as the complexity of our requirements increases. Given the unique geographic and strategic situation that Australia finds itself in, the ability to work with overseas suppliers to ensure that the products we receive suit our needs will continue become more and more important.

By encouraging the growth of a strong domestic ship building industry from the ground up, we will be able to ensure that the RAN gets the ships and submarines that they need, at a fraction of the long-term cost.

Given the importance of networking and interconnectivity in the modern battlespace, it is vital that Australia's ships and submarines are able to work together flawlessly. A strong domestic ship building industry ensures that Australia is not entirely reliant on military-off-the-shelf designs which may cause unforeseen compatibility problems in which may limit our operational effectiveness.

Local expertise will also make Australia a better customer – better able to define what it wants when it goes to market, and more technically adept at ensuring that we get what we want from our relationships with foreign prime contractors.

### **Designing procurement to deliver sovereign capability**

Australia must have the ability to ensure, under full national control and without reliance on any direct foreign assistance, the execution and sustainment of national security operations. This will require:

- Sufficient numbers of highly capable and competent staff
- Defence systems with the required capabilities and operational availability
- Domestic capabilities to support and sustain these defence systems

The extent to which industry is critical to sovereign capability is not always fully understood. Without local industry expertise, it is impossible to properly sustain all of our key defence assets.

To deliver a sovereign capability, the federal government needs to map out the supply chains required to support naval development and sustainment. Once this is done, the firms within it should be classified and supported based on their importance to our sovereign capability. This will allow the government ensure that vital skills and expertise are available when they are needed. It will also help governments to identify existing gaps in our capability and work with industry to support firms by upskilling workers and providing access to capital equipment.

### **Conclusion**

The Australian ship building industry is a strong and growing industry that already plays a vital role in defending Australia. With the support of government to maximising local involvement in naval ship building, it can provide the sovereign capability that Australia's future security relies upon.

By ensuring that Australia's next generation of ships and submarines are designed, built, maintained and sustained by skilled and experienced Australian workers, the government can deliver a dividend to Australian industry and to the Australian economy. This investment the Australian ship building industry will allow it to integrate into the global supply chain and deliver jobs, economic growth and a more secure nation for a very low cost.

## Submission – The future of Australia's shipbuilding industry

### Executive summary – Key points

The AMWU seeks to maximise the number of Australian jobs that will be created through the substantial naval defence procurement that Australia is embarking upon over the next 30 years. These jobs will be filled by highly skilled workers whose expertise will play a key role in the building, maintaining and sustaining Australia's submarines and surface vessels.

It is critical that the benefit from Australian industry participation and the subsequent spillover effects for the Australian economy are realised. To achieve this, it is vital that the government ensure that Australian industry involvement is included in the contracts with foreign primes.

### Development of Contracts Relating to Naval Ship and Submarine Building

In relation to the Future Submarine Project, the contract that is signed with DCNS for the Shortfin Barracuda Block 1A must encourage and require where practical DCNS to open up and transfer its expertise and intellectual property into the supply chain of Australian firms. In addition, the government should develop a sovereign capability strategy that includes:

- Identifying the competencies that the government wishes to designate as required for sovereign capability;
- Identifying the Australian firms that will be required to hold these competencies;
- Ensuring the transfer of both know-why and know-how to these firms from foreign primes;
- Ensuring that this competence is both maintained and developed throughout the operational life of the Shortfin Barracuda Block 1A;
- Establishing suitable reporting requirements for DCNS in relation to sovereign capability building, local content, and spillovers into the Australian economy;
- Establishing appropriate measurements for the reporting of Australian content in the Shortfin Barracuda Block 1A by measuring local content as Australian value added plus input less any overseas input;
- Investing in making Australian firms “digital supply chain ready” and ensuring that local digital infrastructure does not become a barrier for these firms participating in the digital supply chain;
- Ensuring that all design and build activities are executed in Australia under Australian control grounded in reasons of national security, sovereign capability, and national economic benefit.

### Introduction

The Australian government has a clear responsibility to participate in the planning and execution every part of its naval defence procurement. It is vital that a long-term view is adopted to ensure that the country gets the largest benefit from this spending. This begins with the structure of the contracts, continues with decisions around local content requirements in the design and build phase and includes the repair, maintenance and sustainment of the finished submarines and surface vessels. Taken together, the total spending on all of these activities over the next 30 years presents a huge opportunity to deliver significant security, economic and industrial advantages for Australia.

To get the best out of our defence procurement spending, Australia must maintain a higher degree of technical knowledge of how to how to manage build, maintain, repair and upgrade activities. We must also ensure that all the relevant skills are captured, maintained and built upon to deliver continuous improvement throughout the vessels' lifecycles.

Developing a sovereign capability for high tech systems (like submarines and surface vessels) requires changes to manning, employment, skill requirements, training, logistic support and management. Australia must acquire the ability to perform the full design, development, test and evaluation functions for both the construction phase and for the operational life of our vessels, some 40-50 years.

Having had a long history where we have not maintained a sovereign capability for all of our naval assets, it is imperative that the learning from the mistakes made in the Collins acquisition are not repeated in the Shortfin Barracuda Block 1A project.

If Australia's future submarines are built overseas with no little or no capability in Australia for through-life-support, the RAN will have to go back to the country of origin for any form of service, upgrade or modification, which may not always be possible.

Intellectual property should be managed both through Government to Government agreements and through commercial agreements. Protections and instructions for use must be made clear in the agreements, including end-user agreements. It is not necessary to own the IP, but to have unfettered use, to modify and develop it to improve our vessels through their operational lives.

With sensitive technologies, including those owned and controlled by Governments, a Government to Government agreement must be reached. In the case of sensitive technical data exchange, very strict rules for access need to be in place and an Australian owned Government Business Enterprise like ASC is ideally placed to protect this type of data.

### **The development of contracts relating to naval ship and submarine building**

Three of the fundamental contractual requirements on France as a partner to Australia in the Shortfin Barracuda Block 1A project is that they must have a design office in Australia, transfer IP to Australia and have a substantial Australian industry participation plan. This plan will help build competitive Australian industry capability as well as sovereign capability.

These features must be built into the procurement process if the government wants to accomplish the defence objectives of self-reliance for our island continent, while also achieving the optimal balance between value for money and sovereign capability.

Without a local design capability, Australia will be increasingly reliant on military-off-the-shelf purchase for our military equipment. Moving down this route will, over time, dilute Australia's sovereign defence industrial capability. This will undermine the ability of industry as well as the capabilities of the defence force and reduce Australia's sovereign ability to adapt, integrate and improve equipment.

There is a frequently articulated, but erroneous, view that the advantage of off-the-shelf procurement lies in avoiding development costs. However, off-the-shelf products usually require compromises in performance, characteristics, cost of ownership and sovereignty. The advantages to the end-user are shortened delivery times, possible use of established training systems and other user operational support equipment. The downside is that desired modifications may not be possible or affordable, especially as reliance on off-the-shelf procurement will result in a declining Australian defence industry with the associated reduction in sovereign capability.

Two examples from the UK can be used to exemplify the above:

- The ASTUTE class submarine, despite its delays and cost over-runs, is estimated to be cheaper than an off-the-shelf acquisition of a similar submarine from the USA when all economic effects are taken into account. This in addition to the sovereign capability benefits.
- The Nimrod R replacement and REAPER, have systems that will be controlled fully by FMS and ITAR regulations. Neither provides value to UK industry, nor do they stimulate investment in research.

An over-reliance on off-the-shelf procurement will act as a disincentive for the Australian defence industry to invest and develop the next generation of products, as it is extremely difficult to sell defence equipment on the global market without the support of your own country.

The number of true off-the-shelf procurements that can be made decreases dramatically with the increase in system complexity, technological complexity and uniqueness of requirements. This leads very quickly to a situation where many off-the-shelf procurement solutions either require heavy modification, or simply fail to meet our requirements. It is also worth pointing out that it is quite common for off-the-shelf procurements to, through modification requirements, end up having a higher cost than that of a specifically developed solution.

It also has to be remembered that procuring off-the-shelf actually means buying from someone else's shelf which can lead to problems:

1. None on the shelf: The supplier is out of stock, no longer produces the product, has been taken over by some else with different priorities, or the supplier may no longer be around.
2. Monopoly provider, out of stock: The supplier may have to priorities its own domestic defence customer and has no spare capacity to serve us.
3. Monopoly provider, change of mind: For strategic, diplomatic or legal reasons, suppliers may no longer be willing or able to sell products, parts or services for our material which would severely limit our operational capability.
4. They don't make them like they used to: This can cause unforeseen compatibility problems in interfacing complex systems and hence limiting operational efficiency and effectiveness

The learning from the mistakes in other submarine projects, as well as other relevant programs, should be incorporated in the way the Shortfin Barracuda Block 1A project is executed<sup>1</sup>.

As the types of naval defence procurement projects being considered by the government vary, so should the contracts that underpin them. The dimensions that impact the optimal contract type are:

- Uncertainty around the product (this is high for the Shortfin Barracuda Block 1A and low for small calibre ammunition): The risk here is that the product as designed does not meet the client's needs or that it is unknown how the product will perform once built
- Uncertainty around the process (this is high for the Shortfin Barracuda Block 1A and low for small calibre ammunition): The risk here is that the process does not deliver the product as designed.
- Situational and Contextual Complexity (this is high for the Shortfin Barracuda Block 1A and low for small calibre ammunition): The risk here is that the client's needs change from what was originally envisaged, or there are multiple stakeholders with different or unclear needs or that the context is highly dynamic and will likely change over time.
- Ability of customer to contribute (this is low-medium for the Shortfin Barracuda Block 1A and high for small calibre ammunition): The fundamental risks here is that the client is unable to contribute and hence have provided the wrong specification that is only discovered too late in the project.

The conclusion from the literature is that the contract form chosen must be relevant for the product uncertainty, process uncertainty, complexity and customer contribution situation.

### **The design, management and implementation of naval shipbuilding and submarine defence procurement projects in Australia**

Australia must have the ability to ensure, under full national control and without reliance on any direct foreign assistance, the execution and sustainment of national security operations, this is known as "Sovereign capability". This will require:

- Sufficient numbers of highly capable and competent staff
- Defence systems with the required capabilities and operational availability
- Domestic capabilities to support and sustain these defence systems

The extent to which industry is critical to sovereign capability is frequently not realised in the public debate. Without local industry expertise, it is impossible to sustain operations.

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<sup>1</sup> see e.g. Commonwealth of Australia, 1992; Hall & Markowski, 1996; Commonwealth of Australia, 1997; 1999; McIntosh et al., 1999; Hartley, 2001; Woolner, 2001a; 2001b; Thomson & Harrington, 2002; Arena et al., 2005a; 2005b; 2005c; Birkler et al., 2005a; 2005b; Bush, 2005; Kelton, 2005; Mitchell, 2005; Schank et al., 2005a; 2005b; Gregory, 2006; Markowski et al., 2008; Mortimer, 2008; Skinner, 2008; Yule & Woolner, 2008; Australian National Audit Office, 2009; Wylie & Markowski, 2009; Woolner, 2009; Birkler, 2011; Birkler et al., 2011a; 2011b; 2011c; Briggs, 2011; Bushell, 2011; Coles, 2011; Davies & Thomson, 2011; Rizzo, 2011; Schank et al., 2011a; 2011b; 2011c; Coles et al., 2012; Morris, 2012; Birkler et al., 2013; Byers & Webb, 2013; Hughes, 2013; Stewart & Ablong, 2013; Australian National Audit Office, 2014; Coles et al., 2014; Senate Economics References Committee, 2014; Birkler et al., 2015; Hause & Hallett, 2016; Ritchie, 2016



As an island nation, Australia's submarine systems are one of, if not the most important advanced complex defence system. One of the fundamental requirements on France as a partner to Australia in the Shortfin Barracuda Block 1A project is that they must have a design office in Australia, they must transfer IP to Australia and have a substantial Australian industry participation plan.

This must be built into the procurement process and be reflected in the final contract if the government wants to accomplish its defence objective of self-reliance for an island continent, while achieving the optimal balance between value for money and sovereign capability.

The requirements on France in the Shortfin Barracuda Block 1A project is that France work to ensure that Australia develops the sovereign capability to design, engineer, build and maintain the people, platform and infrastructure required for the Shortfin Barracuda Block 1A. This is the only way to ensure self-reliance and protection of the nation's fighting forces.

In order to build the industrial capability necessary for maintain sovereign capability Australia must:

1. Map out the existing supply chain where the product is produced overseas (for example, for the Scorpène-class and the Barracuda-class submarines in France).
2. Once the supply chain is mapped out, for each firm designate it as belonging to one of three categories:
  - a. Category A: firms providing input that falls within the domains designated as sovereign capability critical for Australia. For each of these firms a corresponding Australian firm must be identified and designated as the recipient of the relevant IP (both the "know-how" but even more importantly the "know-why" which necessitates the participation in the relevant project from day 1).
  - b. Category B: firms that provide non-critical input that is available from multiple suppliers. Here a normal tendering process can be used to select the Australian supply chain participants .
  - c. Category C: firms to provide critical complex system, sub-system or component input that will never be manufactured in Australia. For these firms a security of supply agreement will have to be reached requiring them (or not as the case may be) to establish themselves in Australia with the capability to contribute to the sustainment throughout the operational life of the vessels.
3. Establish suitable reporting requirements for sovereign capability building (by supplier auditing), local content (this needs to be done in a way that avoids the Australian shell company approach so common in the mining industry and also in the Collins project) and spillovers into the Australian economy (a best practice example of this latter reporting is the one required by the Swedish Defence Procurement Agency (FMV) of SAAB in the Swedish JAS Gripen project)
4. Establish and implement an ongoing strategy for securing sovereign capability as relates to naval defence procurement throughout the operational life of the vessels. This will necessitate:

- a. A contractual structure between the provider of the IP and the recipient of the IP that allows the recipient to provide input on a higher and further developed capability level than it received originally – for example, during mid-life upgrades.
- b. Budgeting for study and prototype projects that can be commissioned by the government from any critical sovereign capability holding firm so that its capacity and capability is maintained in temporary periods of low utilisation.

#### **The utilisation of local content and supply chains;**

The intent must be to maximise local content in the supply chain. This must be real local content that engage local workers and provides them with skills and experience to perform at a high level. In previous projects, local content requirements were met by defining Australian Industry contents as work performed by an Australian company or business that was incorporated in Australia. This allowed for work undertaken overseas was classed as local content where the supplier operated through an incorporated Australian company.

This outcome can be avoided by measuring local content as Australian value added plus domestic input minus any overseas input.

The Australian supply chain must also be made project ready which means a substantial upskilling of the potentially participating firms plus providing them access to suitable capital equipment.

This approach should be included in the implementation of the 2016 Defence Industry Policy Statement. In this document it states “the existing Priority and Strategic Industry Capability policy will be replaced by a Sovereign Industrial Capability Assessment Framework to improve the identification and management of the sovereign industrial capabilities that develop and support our ADF capabilities.” We look forward to seeing the operationalisation of this framework in a way that maximises the opportunities for Australian Industry, while ensuring good value for money when the value of sovereign capability and economic spillovers are taken into account.

#### **The integration of offshore design work and supply chains in Australia;**

All the design and build work relating to submarines and surface vessels should ideally have to be executed in Australia because:

- It would enable Australia to control and manage the security of the design and performance data of its submarines and surface vessels which is crucial for our national security.
- Only if the design for these projects is executed in Australia and under Australian control will Australia get access to sensitive US military or industrial information
- In order to gain insight into the “Know-Why” it is imperative that all key suppliers participate in the design phase of the these critical projects. This will also make the development of sovereign capability both easier and cheaper.
- In relation to the Future Submarine project, Australia requires a regionally superior submarine which means that as much of the technology in the submarine as possible needs to be developed (or further developed if it is already in existence) domestically or if deemed necessary in cooperation with other key partners in the submarine domain.

These requirements are based on key lessons that the industry has learned from the Collins project and they must be taken into account. Having Australian industry participation in the supply chain from the beginning of the design phase and a clear strategy for handing over both know-why and know-how capability to both Australian Industry and the RAN are key steps in managing the cost and risk of the project in both the short- and long-term.

#### Opportunities for flow-on benefits to local jobs and the economy

Several studies outline the economic spillover effects of large and complex defence projects for the host country. If these projects are well executed, the economic benefits from advanced and complex defence systems routinely exceed the development costs of these systems because:

- The realisation of such projects requires a large number of technical problems to be solved. These projects therefore become broad-based technology drivers that generate a flow of technology spillovers. These spillovers predominantly originate during the product development phase. That is one of the major benefits from avoiding military off-the-shelf purchasing, as this provides little or no economic benefits. Similarly, if all development work is done overseas there will be little or no opportunity for innovation and entrepreneurial endeavor.
- There will be no new products better and more sophisticated than those demanded by sophisticated and competent customers. Without competent customers who understand what is possible, and the know how to put what is possible to use and the willingness to pay to get what they want, these types of products will not be developed. When it comes to complex and sophisticated products such as military systems, customers often contribute user knowledge. Defence Science and Technology Group's ability to provide relevant scientific advice and innovative technological solutions is also clearly important here.

Spillovers become available to industry at large in proportion to the local entrepreneurial capacity to identify and realise opportunities for commercialisation. They can then be converted to economic benefits to the nation.

Property rights to intangible assets (such as intellectual property) play a role both in stimulating the development of spillover-rich products and services and in commercialising those spillovers. Hence broader economic value created can be supported by policies directed at enhancing the entrepreneurial capacity in this sector of the economy.

The benefits that can be realised from these projects through entrepreneurial activities require a strong advanced manufacturing sector with the capacity to create, identify, and commercialise successful projects.

For public goods and services such as national defence, government is the representative customer of the underlying private demand of its citizens for defence services. Correctly done, the government gets a double benefit, because it is also the main beneficiary of the social value created by the spillovers. The use of public procurement can act as industrial policy, without compromising quality or cost, if it is done effectively.

The spillover effect created by advanced manufacturing is potentially very large. As an example, the JAS 39 Gripen combat jet development program has generated (in the Swedish economy) over and above the opportunity costs, an additional spillover multiplier in the order of at least 2.6 times the original development investment during the period from 1982 through 2007. This means that an average investment per year of 0.17% of the Swedish GNP, in the Gripen case, has generated a return to society of 0.43% of GNP annually. Swedish society has, in effect, paid nothing for the development of the aircraft and still received significant benefits in return.

Publicly available data identifies a considerable underinvestment in private R&D. This suggests there is a unique opportunity to drive growth in the economy through advanced public procurement of spillover-intensive projects, reinforcing the fundamental importance of projects such as the development and production of advanced and complex defence systems.

Public procurement is directed at acquiring public goods and services that are privately demanded but would otherwise not be supplied. The economic complexity of advanced defence systems is much higher than Australia's average economic complexity and hence would contribute to raising Australia's economic complexity with the associated increase in the ability to generate economic benefits and increased national prosperity.

The idea that government spending creates a multiplier effect for economy benefit was based on the economic theory of John Maynard Keynes. Economic multipliers can be calculated for three distinct areas of the shipbuilding industry's overall economic impact:

1. Direct impacts: employment and activity in the sector itself.
2. Indirect impacts: employment and activity supported down the supply chain, as a result of a sector's companies purchasing goods and services from suppliers.
3. Induced impacts: employment and activity derived from spending made possible by the direct and indirect impacts.

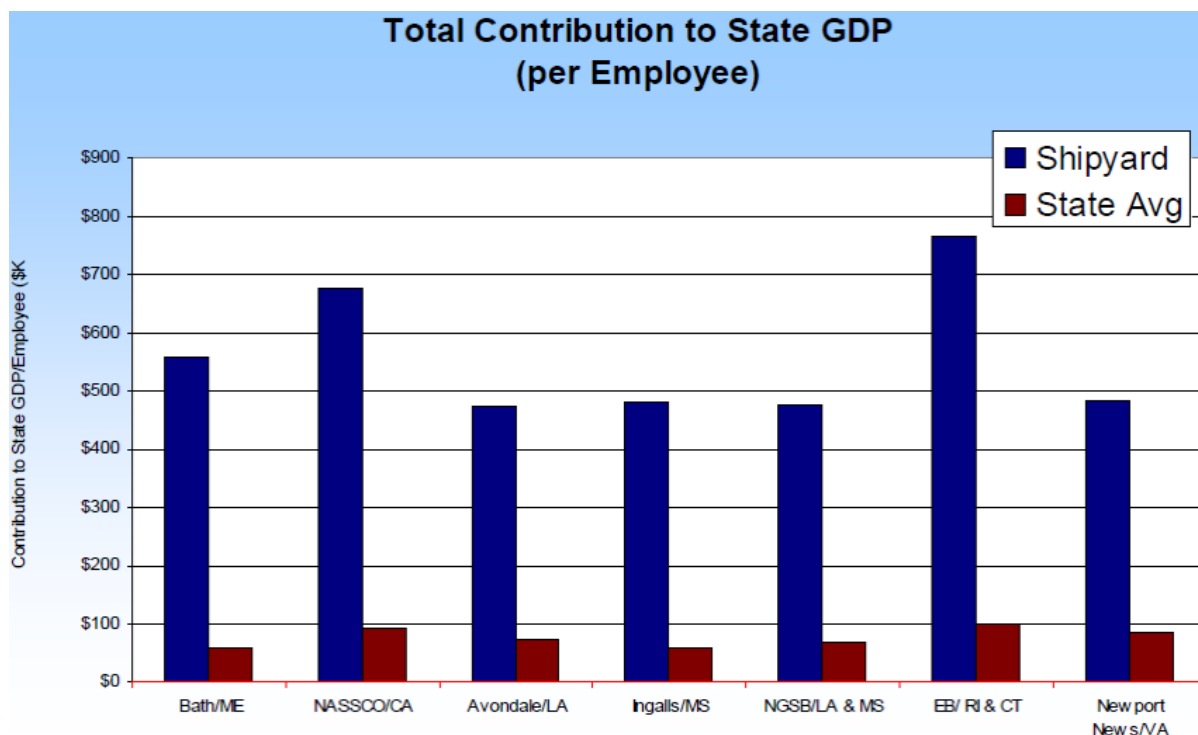
Diverse studies for the whole aerospace and defence sector evaluate the employment multiplier effect (of items 1 and 2 above) to between 2.2 and 2.4 (Duran et al., 2012). Estimations from the USA suggest an average employment multiplier of 2.36 for the US defence industry as a whole, where this multiplier effect is slightly higher (2.96) for the manufacturing of Military Land vehicles (Deloitte, 2012).

Based on US data Meyers (2010) estimates the direct economic impact of an additional \$100 Million Output from different sector as:

<b>Sector</b>	<b>Purchases made by the sector in order to produce its final output (M\$)</b>	<b>Value Added (M\$)</b>	<b>Indirect effects (M\$)</b>	<b>Type 1 multiplier</b>	<b>Induced impact (employment and activity supported by the consumer spending of those employed in the sector or in its supply chain) (M\$)</b>	<b>Type 2 multiplier (based on an average everything included tax rate of 35% and an average marginal propensity to save of 7%, resulting in a marginal propensity to consume of 93%)</b>
<b>Automobile manufacturing</b>	74	26	97	<b>2.7</b>	71 – 242	<b>3.4 – 5.1</b>
<b>Aircraft manufacturing</b>	65	35	69	<b>2.3</b>	34 - 168	<b>2.7 – 4.0</b>
<b>Armored vehicles &amp; tank parts manufacturing</b>	60	40	60	<b>2.2</b>	20 - 140	<b>2.4 – 3.6</b>
<b>Shipbuilding and repairing</b>	57	43	52	<b>2.1</b>	9 - 118	<b>2.2 – 3.3</b>
<b>Offices of physicians, dentists, health care practitioners</b>	35	65	25	<b>1.6</b>	0 - 20	<b>1.6 – 1.8</b>

After carrying out a literature review, the RAND report (Birkler et al., 2015) determined that the economic multiplier effect is around 1.7 in Shipbuilding which, as can be seen, is lower than the values of Meyers (2010).

This multiplier effect is underpinned by US data that indicates that a shipbuilding worker contribute more to GDP than an average worker (Wright & Fields, 2009).



Meyer also looked at the employment multiplier in shipbuilding is 1.45 and 1670 employees needed to generate \$100 million of output. This aligns with the findings of Australian studies:

Program	Prime employment (Approx.)	Subcontractor employment	Employment multiplier	Multiplier for total employment effect in the economy	Source
ANZAC	1225	1335	1.52	2.85	Ironfield (2000); NIEIR (1989)
The Mine Hunter Coastal project	1800				Commonwealth of Australia. (2013)
AWD	1800	1200	1.4		Commonwealth of Australia. (2013)

To this needs to be added that the spillover from R&D activities is substantially higher than the spillover from construction and maintenance activities. Building on Eliasson's numbers for the Swedish Fighter project an economic multiplier of 3.6 can be conservatively assumed for the design phase of the fighter plane and since the design phase of a submarine is more complex a higher multiplier can be expected. Similarly, a lower multiplier can be expected for the design phase of a surface vessel. These claims are also supported by the study by ACIL Allen Consulting (2015).

This means that using costs of recent and planned US naval construction projects with the Shortfin Barracuda Block 1A project added (US\$) the following table can be constructed

<b>Program</b>	<b>R&amp;D expenditure (including the design phase) (\$US bn)</b>	<b>Average unit production cost (\$US bn)</b>	<b>Economic spillover from R&amp;D (multiplier 2 for surface vessels and 4 for submarine)</b>	<b>Economic Spillover from Build (multiplier 1.7) per unit</b>	<b>Number of units to be built</b>	<b>Total value to the economy of spillover less actual or estimated costs given everything produced in country (\$US bn)</b>
<b>DDG 1000 Destroyer</b>	7	3.3	14	5.61	3	14
<b>CVN 21 Aircraft Carrier</b>	4.6	10	9.2	17	3	26
<b>Virginia Submarine</b>	7	2.5	28	4.25	48	105
<b>Littoral Combat Ship</b>	2.1	0.65	4.2	1.11	40	21
<b>Shortfin Barracuda Block 1A</b>	0.7 (est)	1.3 (est)	2.8	2.2	12	13

The value to the Australian economy of the spillover effects is a function of the share of the input and value added done in Australia. If all the work is done in Australia, the total spillover effect would be \$US13 billion (or \$16.85bn in Australian dollars).

If proportion of work is reduced, then the spillover effect is similarly smaller. For example, if 20% of the construction work is done in Australia and the design and R&D is done in France this estimated value of \$US13bn will be reduced around \$US 1.6 bn. This emphasises the importance of ensuring Australian content, not only from a sovereign capability perspective, but also from an economic perspective.

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