Saab Systems Pty Ltd
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Our Ref. 000BOM001

The Secretary
Senate Foreign Affairs, Defence and Trade References Committee
Suite SG.57
Parliament House
CANBERRA ACT 2600

Senate Committee of Australian Shipbuilding

Dear Dr Dermody,

Saab Systems respectfully submits the attached paper as input to the subject investigation by the Senate Committee. We understand that this becomes a confidential Committee document. When and if the Committee intends to publicly release this document, Saab has no objections.

Yours sincerely,

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Submission on Australian Shipbuilding

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Prepared for Senate Foreign Affairs, Defence and Trade References Committee

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1 Introduction

1.1 Purpose

The Senate Foreign Affairs, Defence and Trade References Committee will consider the economic viability of building major naval vessels in Australia. This paper has been prepared by Saab Systems Pty Ltd in response to a specific request by the Committee Secretary (References [1]and [2]) and is intended to highlight the benefits of local construction to the design, development and support of mission critical combat systems.

1.2 Scope

The terms of reference of the Inquiry point to questions about the industrial capacity to build and refit large vessels over the long term and the cost benefits of doing so. Given the timing, this inquiry is primarily examining whether the amphibious ships (Defence Project JP 2048) can be viably constructed in Australia.

The terms of reference are: (in simple terms)

- Can Australia build large ships on a sustainable basis?
- Comparison of Australian shipbuilding costs versus foreign shipyards.
- Comparative cost of maintaining repairing and refitting large vessels when built in Australia or built overseas.
- Broader economic benefits of construction in Australia.

A shipbuilding task involves the construction of a hull and the integration of a combat system (see definitions in section 5.1) that work together to achieve the ship's mission. This response will concentrate on the economic and defence technology benefits to naval combat systems and combat systems integration. Being highly advanced electronic systems with a large component of software, the combat system of a combatant ship e.g. a frigate will cost 50-70% of the cost of the completed ship. The combat system of an amphibious ship will be a much lower – a value of perhaps 10-20% of the total cost. This still makes the development and integration of the combat system a fundamentally important consideration for whether Australian based shipbuilding should continue and in what form.

2 Discussion

2.1 Outline

The ability to design modern warships is not a skill that has any real footing in Australia except for the partial ability of Austal to modify their civil passenger vessels for an amphibious role. Warship design is likely to remain an offshore activity. Australia has long experience in shipbuilding and in the past 25 years has established a successful combat systems design, development and integration capability.

The real success of warship construction comes from the close collaboration of shipbuilder and combat systems integrator. Without both entities working closely together and of course closely with the customer, the project has little chance of success.

In the context of this response, there are four alternatives which have been tried in Australia:

1. Both shipbuilder and combat systems integrator are based in Australia. This was the case for the ANZAC Ship Project and the Minehunter Coastal project.

2. Both shipbuilder and combat systems integrator located overseas. This was the case for the four Guided Missile Frigates built in the 1980s.
3. The shipbuilder is located in Australia but the combat system is designed and delivered from overseas. This was the model for the Collins submarine.
4. The shipbuilder is located overseas and the combat system is developed in Australia. This model is frequently employed for ship upgrades like the Oberon submarine upgrade in the 1980s and more recently the FFG upgrade.

Alternative 1 delivered superior outcomes in terms of performance, budget and schedule.

2.2 Saab Systems Experience

Saab Systems is a company of Swedish origin that has been operating in Australia since 1990. Throughout its time, it has concentrated on the defence software systems business; specifically on command and control systems for the Navy and the Army.

The first business won by Saab Systems was as a subcontractor to the Australian shipbuilder Amecon (now Tenix Defence) for the ANZAC class ships. A very close association has continued with naval shipbuilding, repair and upgrade ever since. One of the principle contracts of the company today is the Master Alliance Contract for the ANZAC class ships in which Saab Systems, Tenix Defence and the Defence Materiel Organisation are Alliance partners. Consequently Saab Systems has a close association with shipbuilding and repair in Australia.

The ambition of the ANZAC Ship Project was to construct general purpose frigates for the Navy. Previously, Australia had acquired designs from overseas and built them to print with only small changes however Australia was to be the sole operator of this design of ships so there was a very strong commitment to accomplishing the project with no cost or schedule overruns and to ensure economic supportability throughout the life of the ship class.

The outcome of the ANZAC Ship Project was extremely successful. The ships were built on time and to budget with all capabilities achieved. There were spin-off benefits to the Australian economy and to approximately two thousand participating Australian companies that have been well described in the Tasman Asia Pacific study into the ANZAC Ship Project [3].

The ANZAC Ship Project established the Saab company in Australia and gave it the foundation on which to broaden its activities throughout defence which have led to $1.1 billion of business. Through employing 300 staff and successful operations in domestic and export contracts, the company has made significant contributions to the Australian economy.

2.3 Broad Economic Benefits

2.3.1 Ship Project

The construction phase of a warship is quite long (7-15 years) and the development phase of its combat system is also relatively long. In the case of the ANZAC ship the development phase was five years to the initial delivery and a further year before that ship was commissioned into the Royal Australian Navy.This was despite that fact that the combat system was a derivative of an existing design which already had some 70% of the required functionality.

Because of the very high cost of combat systems, Australia prefers to base its requirements on existing designs with preferably a limited amount of modifications or tailoring for the specific Australian requirements. No other country in the southern hemisphere develops combat systems and no other country has a national security situation quite like Australia. Thus modification and tailoring of a foreign design will be necessary to some degree to perform the required functions.

In shipbuilding, the economies of scale improve gradually with each additional hull ordered. For software based components such as combat management systems and systems integration, the vast majority of the cost and time is spent on the first ship. Thus there is only a small additional cost for each additional hull ordered. For ships in service, the cost of supporting the software components for one ship is almost the same as the cost of supporting many ships. Thus the number of ships in a class is not a significant consideration for software based components.

The difference between Australian and foreign based support is illustrated by what happened in the initial stages of the ANZAC ship Project. The cost of foreign engineers in Australia was around twice the cost of Australian engineers. Over the life of the ship, this difference could be as much as one third of the cost of the original system. This is the differential cost only and does not include the cost of actual repairs or services.

2.3.2 Business Considerations

Companies are motivated by economic profit and are deterred by business risk. The business case to continue with a business in the Australian defence market is strengthened by a continuing achievable program – specifically a naval shipbuilding and systems integration program. So the Board of any business will continually review the stability and predictability of future business. If the Government shows a regular pattern of swapping to overseas procurement, the foreign owned companies are going to reconsider whether they should maintain particular skills and investment in Australia. Furthermore, in a reassured business environment, success in domestic programs can lead to exports from Australia.

Large projects (characteristically shipbuilding and aerospace projects) encourage international companies to set up in Australia, to transfer their technology to Australia, to invest in further technology development and to employ Australians to benefit from this technology investment – both as engineers (and related staff) and as users of the technology.

These companies go on to sustain the technology providing a world class service and Australian oriented support for Australian military forces and spin-offs to civil and dual use technologies.

When ships are built and their ship and mission systems are integrated in Australia then the various sub systems and other components are bought in Australia and the people expert in their manufacture and support are resident in Australia. When is comes to re-supply of these components or modification for needs which will inevitably change over time, then this support is more readily available in Australia.

2.4 Reuse of Australian Industry Capability

Having made the step of demanding Australian industry participation in the ANZAC Ship Project and having paid a premium so that foreign companies and technology was invested into Australia, the obvious step is to reuse that investment. The Tasman Asia Pacific report [3] stated that thousands of Australian companies participated in the ANZAC program. Many of them were foreign companies making an initial commitment to establishing a business in Australia.

Several facilities were created for the development and introduction of the ANZAC combat system into the Navy. These consisted of:

- Computer systems development facilities and defence-accredited secure premises,
- Investment in building and infrastructure able to support the development and safe management of defence systems,
- Creation of specialised integration and test sites,
- Training of engineering and support staff,
- Establishment of configuration control and product support regimes, and
- Establishing of liaison with suppliers, and partners necessary to maintain the requisite support.

The Government is planning for the two amphibious ships under project JP 2048. The main role of these ships is to carry a large Army contingent (Battalion Group size) with all their vehicles and support. The role of a combat system in such a ship is important but not as complex as in the Air Warfare Destroyer. So this represents an opportunity where a readily available Australian-based combat system offers great value for money. There are also economic reasons arising from common training and common support with that of the ANZAC class and military reasons to select a system already optimised for Australian conditions. This argument stands even if the hulls of these vessels are built offshore but as explained previously, the best outcome is if the hulls and the operational equipment including the combat system are assembled, tested and delivered in the one place.

The cost of supporting an additional instance of the ANZAC combat management system in the two amphibious ships will be a small amount compared to the cost of establishing a support facility for a new combat management system or worse still one supported overseas.

An additional benefit is the cross connection of technology between the two classes of vessels using near identical combat management systems. Something developed for one class e.g. capability to utilise Australian intelligence information can be readily and inexpensively incorporated into the second class of ships. This cannot be achieved if the amphibious ships and ANZAC ships do not have a nearly identical combat management system.

2.5 Strategic Significance

In a regular Defence publication on the defence needs of industry [4], it was stated in the Maritime Systems tables (page 47) that integrated combat and platform systems were of strategic importance for the following aspects of activity: R&D focus, project management, systems integration, and other development functions. If these priorities remain true, it supports the need to still design and develop integrated combat systems in Australia. This assessment reconfirms the Price Report (written in 1990) which states that command and control systems and systems integration are strategically important defence industry capabilities.

3 Conclusions

Large shipbuilding projects are beneficial to the nation, the Navy and the industry participants. They affect many more businesses than just the shipbuilding companies and in respect of combat systems they are important for the following reasons:

- Combat systems are an essential part of large naval vessels and in cost terms are generally a large proportion of the construction phase and an even greater proportion of the follow-on support phase.
- To maximise performance, the integration of ship and combat systems is best achieved when the engineers working on each part are closely linked both geographically and in their approach to the task.
- The best outcome for the customer will be achieved when the systems selection, integration, test and delivery is performed by companies who are Australian based, understand the customer and the operational environment and who themselves have an ongoing stake in the outcome.
- Because the fighting capability of the ship is determined by its combat system, the capability and the operational style used by the combat system should be developed and managed locally. It follows that both combat system designer and shipbuilder should be Australian based.
- The greatest cost of a warship is the cost of support and upgrade provided during its working live. This can only be economically provided from Australian based organisations and their origins needs to be during the construction and initial delivery phase.
- It is only by local construction that fledgling Australian companies can get a kick-start. Saab Systems was one of these fledgling companies back in 1990 and it is now in its 16th year with a wide range of operations and a large workforce making significant contributions to the Australian economy.
- The long term economic outcome is that Australian based support for the life of a ship is much cheaper than foreign based support or introduction of a new development or support facility into Australia.
- Through defence projects, the Australian Government has created a number of important defence industry capabilities. These continue to support and where necessary upgrade the country's naval capabilities in a way that could not be achieved so cost effectively with vessels built and supported offshore.
- Many successful companies have continued to work in Australia providing an ongoing conduit for global technology into Australia and giving Australians the experience that hones world-class skills.
- Reuse and/or development of an Australian based combat system would be lower cost than modification of a foreign one and support from an Australian company is not only less expensive, it maintains skills and challenges for Australian engineers and capitalises on infrastructure and capability bought by the Australian Government.
- There will be occasions when then the level of capability sought or specific technologies required make it necessary to use foreign systems developers e.g. the combat system in the Air Warfare Destroyer. However this reiterates the importance of seeking Australian based sources of supply for the band of requirements that do fit within Australian companies' capabilities.

4 Reference documents

4.1 Non-Saab documents

Ref	Identifier	Date	Title
[1]	Senate Committee	8 March 2006	Inquiry into the scope and opportunities for naval ship building in Australia
[2]	Senate Committee	16 November 2005	Inquiry into the scope and opportunities for naval ship building in Australia
[3]	Tasman Asia Pacific	February 2000	Case study of the ANZAC Ship Project
[4]	DAO	June 2000	Defence Needs of Industry 2000
[5]	ACIL Tasman	November 2004	A Profile of the Australian Defence Industry

5 Definitions

5.1 Definitions

Definition	Description
ANZAC Class	The class of naval frigates built 1990 – 2006 in Melbourne.
Combat management system	This system provides the command control element of the ship's combat system. It enables all the elements of the combat system to work harmoniously together and compounds the total systems' effectiveness.
Combat system	This is fighting component of a warship comprising the sensors, weapons, communications and combat management system which controls these elements.
Combat systems development	The systems engineering tasks encompassing requirements, design, production, integration, testing and delivery of a ship's combat system.
Combat systems integration	This is the task of interconnecting all elements of a combat system and ensuring that the data input and output and the performance of each element is compatible and complimentary.
Support	Activities which come after the ship is in service which enable the ship's capability to be sustained. This includes repair, refurbishment and upgrade of hardware and software systems to maintain some degree of parity with potential adversaries.

6 Revision record

Date	Issue	Author	Description of Revision
31 March 2006	1.0	Mark Proctor	Initial Issue