



## **International Maritime Conference**

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### **SPEECH NOTES FOR MANAGING DIRECTOR AND CHIEF EXECUTIVE OFFICER STEVE LUDLAM**

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Thank you for that kind introduction and for extending me the opportunity to share my thoughts on Australia's most important maritime project yet – the Future Submarine.

I consider myself privileged to be able to couple a submarine perspective from both hemispheres, having spent 35 years working for Rolls-Royce in Britain's submarine industry, with a newly-formed Australian perspective, as a result of my current post heading Australia's national submarine capability – ASC.

I appreciate the challenging task I have been entrusted with, as well as the unique perspective it affords me, and am delighted to be able to share my thoughts with you today.

#### **Defence White Paper**

In May 2009, the Australian Government released its *Defending Australia in the Asia Pacific Century: Force 2030* white paper, developed to guide all aspects of its defence policy.

In addition to setting out and explaining the ADF's priorities, the paper overwhelmingly endorses that Australia's defence policy should continue to be founded on the principle of self-reliance in the direct defence of Australia and in relation to our unique strategic interests.

Some of the headline acquisitions tasked in the white paper include: 12 future submarines, three air warfare destroyers, eight large frigates to replace the ANZACs, twenty offshore combatant vessels, 24 new combat helicopters, six new heavy landing craft and 1,100 new combatant vehicles.

Back in 2008 a group leading experts on submarine design and operation advised the Government that there is no military off the shelf option which will provide the capabilities which Australia requires. As a result, Australia's future submarine will be, of necessity, a developmental project.

While we believe in the Kinnaird process, we also believe that the nearest, accessible design which meets Australia's capability requirements is the Collins Class submarine. Therefore, Collins represents the lowest risk starting point of the development of a new design.



The advice of these experts informed the Government's thinking about the requirements for Australia's future submarine capability, which was subsequently reflected in the 2009 Defence White Paper.

Following the 2010 Federal election, the Government advised Defence that it remains committed to implementing the white paper, including the acquisition of 12 future submarines.

Today, a debate rages about whether those 12 submarines should be designed and built in Australia, designed and built offshore, or represent a combination of these alternatives.

### **Uninformed Commentary: Submarine Requirements**

You could be forgiven for questioning Australia's capability in this regard.

Uninformed contribution to the debate about Australia's future submarine capability, and indeed about the current Collins Class submarines, continues to undermine this important topic.

Regrettably, most contribution is absent of any careful research and analysis, not to mention submarine expertise, that should, frankly, underpin any opinion on this issue.

To me, the argument for building the next generation of submarines in Australia continues to be disregarded by commentators, discarded in favour of arguments that focus on the best cut price deal for a submarine bought off the shelf which, with certain exceptions (principally nuclear power), will not meet the likely capability requirement.

A worrying perception exists that a submarine is a commodity, like steel or cement – as long as the item can travel underwater and can be called a 'submarine', then it is fit for purpose.

As many of you in this room today would know, a submarine is, in fact, one of the most complex pieces of military equipment in existence, the design of which involves wicked trade-offs between range, capability and stealth.

Because of these trade-offs, submarines are carefully designed for the particular roles they are to perform, together with equal regard for the geographical environment in which they are to operate in.

The argument to buy from overseas is based on the fact that there are submarines manufactured around the world that might come close to handling Australian conditions.

But these can be discounted for a variety of reasons...

The current French, Spanish and German models all seem to be good submarines, but all have a dived displacement of around 2,000 tonnes – less than two-thirds of the Collins Class.



All four submarine classes, the export versions that is, are considered small coastal submarines that carry fewer weapons and have less growth potential than is ideal.

Importantly, we have learnt from our Collins experience that Australia needs margins in size, space and power to give ability, throughout the life of a submarine, to upgrade without major refits. Fundamentally, the European designs cannot offer this.

In addition, they have half the crew size and capacity of a vessel such as one of the Collins fleet. And, they are not intended to travel long distances.

### **Uninformed Commentary: Collins**

Extending from the debate about what submarines are required, the prominent public voice seems to be telling us that Australia is not capable of such projects; that we lack the skills to achieve a massive engineering feat of this kind, and that such engineering requirements are seemingly too complex for our defence industry.

In essence, these comments criticise our existing technical capability.

It is well known that an evolved version of the locally built Collins Class submarine is among those models to be considered for Future Submarine.

Some would argue that the performance of the Collins submarines casts a shadow over this candidate.

We hear a lot of media hype about the “troubled Collins Class”, which makes it difficult to appreciate the sort of work which has, and continues to be, undertaken here in Australia.

While Australia had previously developed submarine technology to upgrade the Oberon Class’ fire control system, prior to the establishment of ASC, there was no Australian experience in designing or building submarines. There was no place to build them and no equipment to build them with. The capability had to be developed from scratch.

The Collins Class is unique. Australia is the only country to have built the class. The contract was placed in 1987 and the sixth submarine, HMAS Rankin, was completed in 2003. A first-of-class capability delivered in 16 years!

While this means that the Navy received a submarine with the features it wanted – long endurance, very quiet, shock resistant and stealthy – there was a price to pay for this privilege.

It means that we couldn’t seek advice and guidance from other navies because no one else operates them. Australia established and now maintains its own submarine capability.

And, all of this comes at a cost.



It's got to be remembered that, unlike an F/A-18 fighter jet or the Space Shuttle, no prototype was developed. Thus, there was no opportunity to fully test the first boat, HMAS Collins, and iron out the inevitable difficulties.

It follows then that the Commonwealth, and for that matter ASC, did not have a deep understanding of the challenges and intricacies of the design that we should have had before construction progressed to the sixth and final boat.

I believe that the difficulties encountered in the Collins program bolster an argument in favour of building a body of knowledge on what is needed for future generations of submarines.

But more about lessons learnt from Collins later.

I constantly remind myself that building submarines is hard, really hard.

An admiral in the United States Navy once remarked that a nation's technical and industrial capability can be measured by its ability to design and build military submarines.

So, Australia is part of a handful of nations, including the US, the UK, Japan and France, with this capability.

Australia has proven that we have a hard cadre of experience, dedicated and professional people who can construct a new class of submarine. This team is proving on a daily basis that building naval ships and submarines, and maintaining them, can be done.

The problem with uninformed commentary about Collins and, indeed, Australia's submarine capability in general, is that untrue, negative remarks are enthusiastically quoted, quickly cementing these untruths as fact. And so the notion that building the submarines is an unnecessary expense receives further confirmation in the wider community.

### **Future Submarine: Opportunities for Australia**

We in Australia cannot afford to let the unique opportunity of building a new class of submarine pass.

Without a doubt, the future of Australia's defence industry can be well and truly assured by the Federal Government's promise to construct the next generation fleet of submarines in Australia.

While the economic effect of this program can be difficult to quantify at this early stage, we can use the Collins Class submarine build program as a guide to better understanding the potential effect SEA 1000 will have across the country.

To give you an idea of the sheer complexity of building a submarine: each Collins boat contains around 500,000 parts. In comparison, a car has 17,000 parts and a Boeing 777 has around 100,000 parts.



Each Collins Class submarine also has 75km of cable and 25km of pipe.

It requires 2,500,000 personnel hours to build each submarine, while in comparison, only 36 hours are required to assemble a car and 50,000 hours to assemble a Boeing 777.

To support the Collins Class submarine construction program, ASC relied on an extensive local, national and international supply chain that included 1,600 vendors, 150 subcontractors and four major labour pool providers.

Throughout the 16-year build, ASC managed over 2,000 individual contractors, 1,250 of which were Australian companies.

Under the Submarine Build Contract, ASC was required to support a minimum seventy percent of Australian industry content for the platform, which was a very challenging objective at the time.

Furthermore, in 1987 – when construction commenced – there were only 35 Australian companies with ISO 9000 quality accreditation.

Largely on the back of both the Collins Submarine and ANZAC Frigate projects, that number grew to over 1,500 by the year 2000; truly nation building!

As a result of investment in Australian industry, ASC surpassed the seventy percent contracted requirement and achieved 73.5 percent Australian industry involvement during construction of the fleet.

Many of the Australian companies that helped achieve this impressive statistic not only survived the end of the build phase, but have gone on to thrive in Australia's defence industry. In fact, today ASC sustains a higher Australian industry content percentage in our submarine maintenance – absent of any set targets.

Independent of any Australian industry targets, our suppliers are competitive, innovative and efficient, and were able to demonstrate value for money to pave the way for their involvement in submarine maintenance.

Furthermore, some of the R&D and technologies developed for Collins have gone on to be used in other important applications.

For example, R&D work on residual stresses in welded structures, undertaken by ASC and our research partners, is today contributing to a better understanding of the risk of failure of naval and maritime platforms. The results are also being used in the assessment of life of platforms, and will be used in the design of future platforms to minimise fatigue failure.

This is Collins-inspired work that will pave the way for global submarine improvements.

ASC ramped up its founding five employees in 1985 to 1,200 employees during construction of the submarines. And, for every direct employee, it was estimated that there was a multiplier effect of two to three within Australian industry.



Therefore, the Collins Class Submarine Build program didn't just deliver a project, it laid the foundations for an industry; a high-end skills industry that put an international spotlight on Australia.

If the right decisions are made, Future Submarine will not only sustain an already thriving defence industry in Australia, but serve to significantly enhance it.

My career has afforded me some experiences that better help me to understand just how powerful a vibrant shipbuilding industry can be to the life of a nation:

- It encourages investment;
- It encourages innovation;
- It stimulates jobs growth;
- It brings wealth to the community; and
- It provides independent defence of the nation.

A project of the size, complexity and scale of Future Submarine can inevitably shape the future of thousands of Australians looking for training, employment and an exciting and challenging career many years from now.

Are these the sorts of opportunities Australia should give away to other countries?

Certainly not. We in Australia cannot afford to let this opportunity pass.

### **Lessons Learned**

Criticism regarding the performance of Collins is often used as an argument against building Future Submarine in Australia.

To its detractors, the Collins submarine failed to meet the program's budget, schedule and performance objectives.

While informed commentators and experts universally agree that Collins has been successful, it's true that the Class has experienced a number of reliability issues.

Most recently, Phase 1 of the Coles Review identified a number of long standing key issues that continue to hinder the performance of the submarine fleet.

Informed and constructive review of the Collins build and sustainment programs is beneficial to the process. Beneficial in that we can use lessons of the past in our experience with the Collins Class to inform development of the Future Submarine project.

And, indeed, lessons have been learnt.

Lessons on reliability of diesels, motors and generators. Lessons that speak of equipment acquisitions that should have been more inquisitive about the equipment.



Lessons that tell us we should undertake research and development in order to predict the potential for latent product defects or unknown faults arising.

A recent RAND report provided further insight into lessons learned from the Collins program. In consulting with many personnel involved in both the establishment of the program as well as ongoing maintenance of the Class, the RAND study identified lessons learned in:

- Supporting and maintaining the program;
- Setting operational requirements;
- Establishing an acquisition and contracting environment;
- Designing and building the submarine; and
- Establishing an integrated logistics support plan.

It is only through experience that we have learnt to not only predict issues but provide solutions to these issues; solutions that can be implemented before the issue makes the submarine unavailable.

These are lessons that were impossible to learn prior to experiencing, first hand, the baptism of fire that is a first of class submarine program. However, they are lessons that Australia can benefit from if we choose not to write-off the last thirty years of know-how and experience.

The Future Submarine should, where possible, build on and leverage this investment, rather than attempt to start again.

### **ASC: Continuously Improving**

Two years ago, I joined an organisation that was treading water.

ASC lacked leadership. It lacked a sense of urgency and pace. It lacked a commitment to exemplary performance. And, startlingly, it lacked a customer focus.

What ASC did have, however, was some of the best people I have ever worked with. A team who, when challenged, could pull a rabbit out of a hat and deliver exceptional engineering outcomes.

Take, for example, the recent emergency docking of HMAS Dechaineux after she was hit by a tug. Within a week, the submarine was docked, her propeller removed, a new propeller certified and replaced, with Dechaineux back in the water and sailing off to meet important national commitments.

With a team of people that can achieve these outcomes, what better foundation for organisational improvement?





In two years, we have set in place a number of significant improvements. We have revised and raised our game to set some good standards, and we have set some demanding goals that we are well on the way to achieving.

Since my arrival, I have focussed my team on two main areas for improvement: labour utilisation for submarine maintenance and the supply chain.

In both areas, we have worked with the DMO to deliver some great results, including a 100 per cent increase in supply chain capacity for full-cycle dockings, and a 150 per cent increase in labour utilisation.

These are not ambit claims, but measured results that have been independently verified by DMO's key contractor on submarine efficiency.

We have also established a data set on sustainment and performance at ASC. One that now gives facts by which we can continuously improve our efficiency and effectiveness, reduce the cost of sustainment and provide better value for the Navy.

Most importantly, as an industry leader, we have collaborated with other leaders in DMO and Navy in a collegiate sense to form a united body and enterprise – the Australian Submarine Program Office.

On the back of the Coles Review, the Enterprise is committed to establishing a culture focussed on the cost effective achievement of sensible availability goals.

There are a significant number of projects underway to improve the wider enterprise, including a new performance-based agreement known as the In Service Submarine Support Contract, implementation of recommendations made by the Coles Review and associated benchmarking.

Our new contracting model, currently in the final stages of development, will facilitate a significant change in the way we work together with this common goal which is intended to further improve both reliability and availability.

And, in addition, we're rolling out changes as a result of the Sea King Board of Inquiry, Rizzo Review, the US NAVSEA SUBSAFE Review and DMO's Collins Class Reform Program, as well as developing a whole-of-submarine safety case, and assisting Navy lead a submarine continuous improvement program and submarine life evaluation program.

In addition to these enterprise-wide programs, I'm driving improvement at ASC through the implementation of a Lean Six Sigma program.

This initiative, based on similar programs adopted by Electric Boat, Bath Iron Works and the US Navy, has already delivered a return on investment greater than 4.6 million dollars within the first nine months of operation in our AWD shipyard.

Indeed, the program has been so successful; I have taken it across to our submarine program and have commenced roll-out there.





The progress ASC has made over the last two years has been startling. The organisation now works with a renewed sense of purpose and we're kicking some serious goals.

We have learnt the lessons of Collins and we have put in place a significant reform program that is embedding a deep and well-developed sustainment culture for Collins and the future.

Over the next 18-months, the enterprise will demonstrate that things are still fundamentally changing in our business as our newly embedded initiatives deepen our engineering knowledge, set accountabilities in motion and reap real rewards.

We are but one business, hence, we have learned from experience and we are continuously improving.

### **Concluding Remarks**

Much in the same way as I am looking at a fifty-year horizon for ASC, the Future Submarine program is planning an approach that will extend beyond our lifetime.

Those with true experience in this field make no bones about the complexities involved in the Future Submarine project. It will be costly, and a massive technical challenge unlike any other project considered before in the defence sector, but my experience tells me it can be achieved with determined leadership.

At ASC, we are establishing a capability, tools, processes, people and knowledge that will form part of the design of the Future Submarine.

In 2007, ASC established a self-funded team focused on design aspects of SEA 1000.

Deep Blue Tech currently has a staff capacity of thirty, which will double by the end of this financial year. It is tasked with establishing the tools and methods needed to understand submarine design.

Although I hold a strong belief that Australia should choose an indigenous design to replace Collins, the decision rests entirely with the Commonwealth and ASC will support whatever decision is made.

To date, we have entered into more than thirty non-disclosure agreements with providers around the world; we will be prepared to work with equipment designers as needed when a decision is made.

One of the lessons learnt from Collins is when you buy equipment, you need to be inquisitive, you need intricate knowledge of it, and you need to establish requirements to ensure all aspects of its performance are understood and can be connected if they were for the intended performance.

The agreements are important in building the relationships and understanding what will be the key to a successful future submarine build and the future of naval shipbuilding in Australia.



It's time for Australia to stand up for an indigenous shipbuilding capability.

In two years' time, this country will celebrate 100 years of submarines in Australia. This country is ready for the next step in its submarine evolution.

It's time for Australia to stand beside the key players in the industry and affirm that this country has the expertise, international relationships and capacity to build the next generation of submarines on Australian soil.

Let's not forget what we've achieved:

- Capability partnerships and links with foreign submarine designers and builders, universities and global technology providers;
- An established supply chain, over 1,600 organisations strong, tasked to provide value for money and operate to the highest quality standards;
- Lessons learned, based on hard experience, about, among other things, supporting and maintaining a submarine program, setting operational requirements, and designing and building a submarine;
- How to interrogate a business to improve its efficiency, productivity and effectiveness; and
- We've built, delivered and maintained a first-of-class unique submarine capability.

We cannot afford to let the exclusive opportunity of building a new class of submarine pass us by and, at the same, discard thirty years of valuable lessons learnt through Collins.

Thank you.