

ASPI INTERNATIONAL CONFERENCE: The Submarine Choice

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‘The View from Industry’

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Distinguished guests, ladies and gentlemen.

Thank you for the opportunity to speak to you today and share a few industry insights into future subs in Australia.

We have an extraordinary opportunity to re-shape Australia’s manufacturing landscape, and the future submarines program is a pivotal part of that transformation.

For many people these ongoing discussions must appear to have an element of ‘groundhog day’ about them.

Robust discussion and debate is a good thing, but at some stage a decision will be made and a course set that ensures we have a submarine capability to protect our borders and support our allies.

Having said that, I’m encouraged by the Prime Minister’s re-affirmation last week towards the release of the next Defence White Paper next year and returning Defence spending to two per cent of GDP.

There is also a lot of excellent work progressing in organisations such as the DMO



and the Future Submarine Integrated Project Team office in Adelaide.

The decisions made as a result of this work will not only provide us with a world-class naval capability, but also underpin a world-class naval shipbuilding industry that will take us well into the middle of this century and beyond.

I have been asked to provide an industry perspective on the choice we have ahead of us. Obviously, I have an interest in this as part of my role at ASC, but I'm confident that the view I set out is one largely shared by Australia's Maritime defence industry.

Why not MOTS?

Let's deal with the issue that may still occupy the minds of some experts and commentators, despite the Commonwealth clearly stating its preference for a home-grown product.

That is, why do we think we can build a submarine that is better than something that already exists, or could easily be modified – that is the MOTS or modified MOTS solution?

The 2013 Defence White Paper has ruled a line through these two options, and I think that is a sound judgement.

Those people in favour of the MOTs or modified MOTS have argued that these options will reduce risk and be cheaper.

We're all aware that Australia has unique geographical requirements requiring a submarine that is bigger and can travel further than what many existing designs allow.

What often gets left out of the debate is the simple fact that the initial acquisition



cost of a submarine is only one third of the total lifetime cost.

The other two thirds are for maintenance and sustainment.

Now, I'm sure many of you are driving around in cars that have been imported... from Japan, South Korea, Germany, Italy – essentially bought off-the-shelf from overseas.

For the most part they are reliable, well built vehicles. And when they do need a service or occasionally break down, you no doubt don't have any problems finding a mechanic who has the knowledge and experience to service and fix it.

You can even download a repair manual for a Hyundai or BMW off the internet and give it a go yourself if you are keen!

Let me assure you, maintaining a submarine is absolutely *nothing* like maintaining a car. Last time I checked a repair manual for a Collins class submarine isn't up on any website – or at least I hope it isn't!

The point is this – submarines are incredibly complex, and incredibly difficult to maintain. We need to understand an extraordinary amount of detail to really understand the design.

And let me assure you from first-hand experience, the only real way to understand the design is to **build it**.

We're putting 50 to 60 sailors, men and women, out into the depths of the Indian or Pacific Oceans - one of the most hostile environments on earth – and we must be confident we can keep them safe at all times.

Every aspect of the submarine needs to be highly reliable and highly available. There



are redundant and diverse systems to consider as a consequence. Every bit of the submarine interfaces with every other bit. Make one change in a part of the submarine and it could result in six or seven changes in other parts of the boat. So we need to intimately understand every aspect of the design to maintain it effectively.

It is one proposition to acquire a submarine off-shore but we must be able to maintain and service it on-shore.

Our national security cannot rely on other countries to do this, particularly in times of crisis.

So, even if we were to buy off-shore, we would still need to be across the intricate details of the design.

Then, and only then, would we have a good chance of maintaining the submarine effectively and efficiently and keeping everyone inside it safe.

If two thirds of the costs are in maintenance and one third is in build, then I suggest there's a strong argument that we need to get really good in Australia at designing submarines.

We can't do a full design yet, so we need to partner with others. In doing this and understanding the design, it is easier to translate this into plans for build and ultimately building productively. The two become iterative.

It makes sense for ourselves in Australia to both design and build the Future Submarine. It's a lesson learnt from the Collins Class and precisely to avoid the time and effort spent getting the current Collins Class operating as it should.

We now know a heck of a lot about Collins and it is beginning to perform very



efficiently.

As you know the latest Coles Progress Review into the sustainment of the Collins Class submarine, released here yesterday by the Minister, has described the past 15 months as a 'remarkable transformation' and an 'astonishing turnaround'.

What it means for the Navy is that we already have usually two and frequently three submarines available on a given day, and we're well on the way to achieving the international benchmark of having three subs materially available for sea at all times.

ASC's workforce has worked extremely hard and tested the limits of what can be achieved in such a short period. It has required a considerable amount of lateral thinking and challenging the status quo.

So we now very much understand the design and have learnt how to deal with it, it is now a solid, robust platform.

What about modified MOTS?

The next argument thrown up is that we should pick an off-the-shelf design and modify it to suit our operational requirements.

My response to that is a modified MOTS option is pretty much akin to doing a new design. There is an incredible amount of work involved in taking an existing platform and moving everything around to essentially create a new platform.

It's a time consuming and expensive process, and the end result may still not get you the best possible platform.

By way of a simple example, if you are replacing a diesel engine from that which is a standard fit, you would more than likely be confronted with six pages, containing 50



lines on each page, covering all of the submarine interfaces that are impacted by potentially changing the diesel.

Thus, that engine modification effectively becomes a new design in many ways.

We should not underestimate the complexity of a modified MOTS. It would have to be thought through very carefully so that we don't end up in a de facto new development and design program.

A lot of submarine builders have found themselves in that position when they simply thought they were modifying it.

This leaves an evolved or new design...

Looking therefore at the merits of the remaining two options – we have an evolved Collins; or a brand new design. Evolving designs are pretty much done by every nation, USA, UK, Germany, but they all started somewhere with a new design.

I'm not going to bet on a winner today. The Commonwealth has a tough decision to make, but I believe either would be an excellent outcome for national security; the Defence Force; and Australia's naval shipbuilding industry.

ASC is involved in both of these exercises with people working in each of those teams.

Does fleet size really matter?

So how many submarines do we actually need? The current equation as outlined in the 2013 Defence White Paper is 12 - double that of our existing fleet.

Wiser heads at the Commonwealth level and in the Royal Australian Navy are in a



much better position than me to outline the operational benefits of a fleet expansion.

What I can provide is some insight into the significant benefits to productivity and therefore affordability of such a program.

Using the timeframe to build the Collins class fleet as a benchmark, construction on the first submarine, HMAS Collins, started in 1990.

The sixth and final submarine, HMAS Rankin, was handed over to the Navy in 2003 – a period of 13 years from beginning to end of the build program.

It is now of course more than 10 years since the last submarine was delivered. While some corporate knowledge has been retained in the sustainment phase, we have lost some of the skills from the construction phase.

For industry, our considerations aren't just how many submarines we need to maximise operational capability but, in particular, the life cycle of each of these submarines from build through to sustainment.

Regardless if that number remains at 12, what we're saying is that we need to build them at a **particular rate** and have them last a particular length of time.

For example, if it took three years to build each submarine, and we built 10, that means the build program continues for 30 years.

If we build 12, it's 36 years, or you can reduce the build time to 2 ½ years each to achieve the 30 years.

After you've built the final submarine, the first one is being retired and we start again.



What this creates is a continuous drum beat. A consistent, well-planned build means you never have to relearn skills and we are constantly improving productivity.

We would need to change the design and keep our design skills improving, but this is much more achievable with a constant drum beat to build. The idea of batches of submarines is clearly an approach. Both build and design skills remain at their peak and best affordability achieved.

This approach also allows for continuous capability improvement and evolution so that as new technologies become available, they can be integrated, keeping our fleet at the cutting edge.

Another significant advantage is the investment in production techniques. A constant build allows us for example to set up a production line, and the tools we can use are likely to be quite different to the tools we would use for a bespoke approach.

All of this adds up to better efficiency. The common norm in submarine building is that you can be reasonably efficient after building three submarines, but after the fourth you become a lot better and thereafter they become cheaper to build with no loss in quality.

If we have a consistent build program at a prescribed length between each ship, that allows us to grow our efficiency at all times.

Workforce costs

Another argument that is often thrown up against an indigenous shipbuilding capability is the premium associated with workforce costs.



It's acknowledged that part of that premium is associated with the start or restart of the industry. And again I argue that, by putting in place a consistent build program that sees construction continue over 30 years, or indeed 100 years, we bring the learning curve down quite rapidly. The premium we may pay on the first three or four ships goes away pretty quickly. This continuous build process is viable in other countries. It **can** be viable here too.

The second area of interest is the rate of pay.

It may actually come as a surprise to some that rates of pay in Australia are broadly comparable to shipbuilding industries around the world.

South Korea is recognised as one of the powerhouses of shipbuilding, and yet if you compare our pay rates against Korea, they are actually very similar.

I see absolutely no reason why we can't be efficient and effective like the top end shipyards around the world. It will take time. We need to persevere. But it is about lean manufacturing and constantly raising the bar every day on productivity.

It's about motivation of the team, and it's about good leadership. It's about all the things we are putting in place at ASC, and can be seen in other shipyards around Australia.

Skills

Our people really make the difference and their skills are vital therefore our ability to build future submarines is of course only as good as the people we have to build them.

ASC took the decision three years ago to run our own apprentice training program. Just last month I welcomed 23 apprentices to that program. The program now



stands at 137 apprentices. Some of these apprentices are straight out of school; others are older but have recognised that working with ASC and in the defence industry provides an exciting new career opportunity.

There is also no shortage of intellectual ability coming out of our universities. These graduates are extremely capable of undertaking the tasks we want them to do, and they relish the challenge that we as a high end defence industry offer.

The cadre of young Australians we now have in management roles at ASC are some of the best people I have ever worked with. I don't say that lightly. They are innovative and take great pride in what they do. They are driving change every single day. And I see similar drive for change when I visit one of the hundreds of suppliers lending their expertise to our projects.

All of this hasn't happened by accident. We have invested significant resources in seeking to maintain a very good workforce.

Part of this is driven by the will to be an industry leader. Part of it is driven by necessity. Just four years ago we had 30 production employees working in ASC's Air Warfare Destroyers shipyard. Today we have 753. If you add the project's associated workforce in NSW and Victoria, that number increases significantly.

Lessons learnt

A constant refrain from those who would argue against the local design and build of future submarines is to compare it against the issues faced by the Collins Class build and sustainment process.

“Things didn't turn out right... It cost more than it should have... It took longer to build than it should have...What makes you think anything will be any better the next time round?”



If we abide by this philosophy, if something doesn't turn out right, we should just give up and let someone else do it.

To those people I say – life is all about learning. Learning from things that could've been done better and indeed, doing it better next time.

The Coles Progress Review shows how we have learnt from the Collins sustainment process.

Life is about continual change and that's no different to the submarine build program. If you think you have solved one issue, there will be something else to solve and there is always a better way of doing it.

Author John C. Maxwell, who has written several books on leadership, says a man must be big enough to admit his mistakes, smart enough to profit from them, and strong enough to correct them.

Many organisations fail to learn from their mistakes. ASC's philosophy is that, first and foremost, we must be a learning organisation. We must - and do - review every aspect of what we do from the root cause through to implementing new ways of working.

It's OK to talk about lessons learnt but if you don't apply them, you're going nowhere.

A key lesson we have learnt from the Collins program, which must be applied to the future submarines program, is that the design needs to be right from the very beginning.

Anything we can do to test these design aspects before you even consider building a



submarine is crucial.

One such aspect that I've always been a strong advocate for is the development of prototypes and land based test facilities. I am very pleased that this is a view shared by the Commonwealth.

Being able to prove that design on by either prototype or a land based test facility before implementing it on a submarine will greatly improve the design and reduce the likelihood of problems in the build, and then maintenance, process.

Again, an investment in such prototypes and facilities will have a significant pay off if we're talking about a multi-generational build program.

I also suggest that the sooner the preferred builder can be brought into this process, the better.

There needs to be an interactive discussion between the designer and the builder to make sure we are designing something that not only can be built, but subsequently maintained.

I recall one of those car shows (it may have been Top Gear) where experienced mechanics were given the simple task of replacing a headlight globe in a few popular makes of vehicles. It was like watching a group of three-year-olds with a child proof bottle cap. I think in one car it took around 40 minutes to replace a single headlight because it was so inaccessible.

Now imagine the same scenario with, say, a critical mission component in a submarine. The 40 minutes required to change a car headlight would potentially translate into weeks of unnecessary dismantling of other systems to get to that critical component in a submarine.



That's why the relationship between designer and builder, at the earliest opportunity, is so critical.

So in conclusion...

I remind us that we are one of only a handful of nations with the ability to produce our own submarines.

We have the opportunity to be innovators, not improvisors. We have the chance to set up an industrial base that will be affordable and highly productive and will create jobs and provide for Australia's national and economic security and prosperity through to the end of this century and beyond.

A new or evolved multi-generational submarine will help to ensure our naval shipbuilding capability can continue for the next century and beyond.

Thank you.