JAPAN'S SORYU SUBMARINES

AUSTRALIA'S DEFENCE INDUSTRY SUPPORT BASE

ASMD SOLUTION FOR SEA 5000?

NEW PACIFIC PATROL BOATS
FUTURE FRIGATE CAPABILITY DEBATE

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The future of the Australian naval shipbuilding industry remains in a state of considerable uncertainty because of the status of SEA 1000, the Air Warfare Destroyer program and SEA 5000—the Future Frigate. All of these activities are connected in a complex way, with speculation about various combinations of projects, companies and required skills. A worst-case scenario would see the end of new builds in Australia, with industry shrinking to only provide support for platforms constructed overseas.

A new round of instability has been generated because of the sudden and powerful impulses that—originating from the Prime Minister's Office—we should buy all future submarines from Japan, covered earlier in this edition. A rumored quid pro quo is that ASC in Adelaide would not only complete the current AWD program, but would then seamlessly transition to the Future Frigate, using the current Navantia F-100 / 105 hull but with a different weapon and sensor mix. If the White Paper guidance confirms that the eight ANZAC frigates are to be replaced one for one, in this scenario Government-owned ASC, its Adelaide workforce and its major subcontractors will be kept in steady work for decades to come.

One of the problems bedeviling the AWD project is that there have been no noticeable economies of scale over a three-ship build—despite financial estimating to the contrary from the AWD Alliance prime contractor—but that would change over an 11-ship program (3 AWVs plus 8 Future Frigates). That is, unless current ownership and management arrangements remain in place.

With the caveat that all of this will be detailed in the 2015 White Paper, on June 6 Defence Minister Johnston announced:

"The Government has also agreed to bring forward preliminary design work to ensure Australia maintains the necessary capabilities to retain the option of building the future frigate in Australia. This work will focus on continued production of the current AWD hull, suitably adapted and utilising capabilities from the cutting-edge Australian companies CEA Technologies Australia and Saab Combat Systems."

This comes about because of the extraordinary success of the ANZAC Anti-Ship Missile Defence (ASMD) program, which has dramatically improved the offensive capabilities of those frigates by combining CEA Technologies revolutionary active digital phased array radar with the Saab 9LV combat system and Saab's Varberg Inra Red Search & Track (IRST) sensor to control Evolved Sea Sparrow Missiles. This combination has proven to be so effective that it is logical to consider whether it should be the preferred solution for the Future Frigates as well. This study and design activity is funded to the tune of $76 million and Defence explained its purpose:

"This funding will be primarily used to undertake SEA 5000 engineering studies associated with evolving the design of the Air Warfare Destroyer to potentially include a CEA Rader and SAAB 9LV Combat Management System. This includes concept design work, obsolescence design assessment, environmental compliance design assessment,
requirements development, and warfare studies. This funding also includes the continued work with CEA on the development of the high-powered active phased array radar system (referred to as CEAPAR2) being evolved from that installed in the ANZAC Class under the ANZAC ASMD Upgrade project.

"Within this approved funding, Defence will continue the Radar Risk Reduction Program on the CEAPAR2 radar system being considered for SEA 5000-1. Funding for SAAB and CEA for the design studies associated with the SAAB 9LV Combat Management System and the CEAPAR2 radar system installation into the Future Frigate will not be known until request for tender responses are received, assessed, and negotiated."

However, under current guidance, the Future Frigate is planned to be much larger than the 3,500 tonne ANZACs. If the new class is to indeed be based on the F-100 / 105 AWD hull it will be almost twice as large at 6,500 tonnes. So it is worth asking, what will all this extra size be used for? One reason is to overcome a major deficiency of the AWDs and also the ANZACs by having two embarked helicopters rather than one. This should have been part of the AWD baseline, but a single helicopter was specified to reduce cost.

Another important difference between ANZACs fitted with the ASMD solution and the AWDs is that the former uses only ESSMs for self-defense, while the latter will use much longer-range area defense SM-2s. This is a major difference because with SM-2 it is possible for a ship to protect other assets - especially things such as two very large landing helicoper docks (LHDs) about to enter into service.

To protect an admittedly much larger aircraft carrier, the USN typically uses five screening ships, including an air defense cruiser and at least two anti-submarine warfare units. However, these 100,000 tonne carriers themselves have tremendous defensive capability, embarking up to 150 aircraft, including F-18e / F14s Prowler / Growler electronic warfare assets; and embarked anti-submarine warfare helicopters. At 27,000 tonnes the RAN's LHDs will carry no embarked fixed wing aircraft - meaning the protective screen will need to be very robust if these ships are ever to be placed in harm's way given their size and insignificant defensive armament.

It therefore makes sense for the Future Frigates to also have an area defense capability because three Air Warfare Destroyers might not be enough - and this completely leaves aside the depressing topic of the timing of their availability. Asked directly if SM-2 is being considered for the Future Frigate, Defence said:

"At this stage multiple capability options are being studied in terms of feasibility to implement into the future frigates. A growth path to SM2 is part of these feasibility considerations."

A quick look at the ASMD solution suggests that it could be scaled up to the level of capability required to provide area defense based on using SM-2 with its 150km range. The CEA radar is modular in nature and higher-powered versions of it are already being trialed and have demonstrated the ability to detect and track aircraft many hundreds of kilometres away. Similarly, CEA's digital fire control CEAFAIR radars should be able to provide long range multiple channels of fire to SM-2s. The Saab-9LV is also scalable and has demonstrated the ability to deal with a large number of threats during ASMD trials. The Vampir IRST equips all ANZACs and AWDs and seems a logical candidate for the Future Frigate as well.

Because of the digital active phased array radars, the ASMD solution can provide a very large number of simultaneous detections as well as direct outgoing ESSMs. Even with that, the number of targets that can be engaged sequentially or overlapping is larger again. These are attributes that are distributed across, and can support from, both the RLV Combat Management System (CMS) and the radars. 9LV has always supported multiple channels with the Threat Evaluation and Air Defence Coordination functions capable of prioritising and engaging a large number of tracks simultaneously. Essentially, the capacity of the CMS to execute multiple engagements significantly exceeds the number of missiles any RAN warship could ever carry at one time (based on the shoot-shoot look doctrine).

By contrast, the AWDs equipped with the USN's 'Arleigh' defensive system are more limited, relying on two Raytheon Mk 93 fire control radars to direct outgoing SM-2s. This does not mean that only two defensive missiles can be used at any one time - on the contrary. On a time share basis, the fire control radars can be switched from target to target to sequentially destroy incoming threats, because SM-2s only require continuous wave illumination for the terminal phase of guidance. This means that the number of missiles that can be in the air at one time is a function of target range, speed and required illumination time.

Having said that, the two AWD CVN illuminators are located aft and have serious blind area forward which limit the engagement envelope and would require ship maneuvering. In contrast the ASMD CEAMOUNT provides 360-degree coverage. A failure of one or both of the illuminators on the AWD reduces anti-air capabilities substantially. The loss of active elements in the ANZAC CEAMOUNT has significantly less impact.

As an aside, it is interesting to note that New Zealand has decided to move away from ESSMs equipping their ANZAC Frigates and have selected MBDA's Sea Ceptor for future self-defense. Sea Ceptor is lighter and is cold-launched - a combination that will allow the RNZN to entirely remove the large MK41 Vertical Launch System missile cell from their ships, freeing up a great deal of space and allowing other improvements such as simplified ventilation.

To date the RAN appears to have shown zero interest in Sea Ceptor, even though it will be in service with the Royal Navy amongst others - as well as the other alied of the 'Five Eyes'. This is presumably because Australia is part of the ESSM consortium and there is a perceived loss of face in withdrawing from it, even though Sea Ceptor would come with a significant high value industry involvement package - these days something of little interest to Defence. The usual argument in favor of ESSM is the myth of guaranteed supply from the US in the event of a national emergency - an argument that correctly carries no weight in New Zealand.

It is interesting to speculate what a Future Frigate using a combination of SM-2 and Sea Ceptor might look like. Because the latter is canister launched - unlike ESSM, which requires a Mk 41 - these could be located anywhere around the deck in considerable numbers, meaning that the VLS could be packed full of SM-2s - giving the ships an even greater capability increase over the Air Warfare Destroyers.

However, there is still a long way to go before any of these possibilities can be realised. As Defence Minister David Johnston has repeatedly pointed out, so much of what can take place will depend on the Air Warfare Destroyers getting back on track. Until that happens he cannot credibly go to Cabinet with a submission for yet another huge investment in the Australian naval sector. No amount of special pleading from industry and the South Australian government will convince sceptical Federal politicians that in the scheme of things the small defence sector deserves treatment different to that already dishled out to the much larger car industry.

Of course a major step forward would be to privatise ASC as quickly as possible, but this seems beyond the wit of the current shareholder - the Department of Finance - or its Minister Mathias Cormann, who will now carry responsibility for the worsening mess. Additionally the Department of Finance is in charge of implementing the findings of the Winter-White AWD review, which was completed more than six months ago. In Canberra there is always speculation about who will be the first major Ministerial casualty in a new Government (Assistant Treasurers don’t matter) and unless things improve someone is going to be held to account for the AWD.

But in the meantime, for naval industry it is a case of swim or sink.