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Independent Senator for South Australia
AUSTRALIAN SENATE

Our ref: NC – HEH/JR

Mr Grant Hehir
Auditor-General for Australia
Australian National Audit Office
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BY EMAIL: Tom.Clarke@anao.gov.au

Dear Auditor-General

RE: Request for Performance Audit

I write requesting a performance audit of the Command and Control System selection for the SEA 1000 Future Submarine Project.

Defence appear to have selected the AN/BYG-1 Command and Control System for the future submarine without 1) sufficient due diligence with respect to PGPA Act and the Commonwealth Procurement Rules and 2) proper regard to Australian Industry Participation policies. More specifically:

- a. The AN/BYG-1 is fitted to the Collins Class submarine. The whole of life cost of this system has proved significantly more expensive than originally intended.
- b. There are questions as to the performance history of the Collins AN/BYG-1 system raised by a statutory official in the US (the Director of Operational Test and Evaluation) and there have been system side-by-side comparisons that reveal the core performance of the system is only on par with significantly less expensive systems.
- c. Since the procurement and installation of the AN/BYG-1 on Collins a once innovative and vibrant Australian combat system development industry has been locked out of what is purportedly a joint program, in direct contrast to representation made to Australian industry at the commencement of the program. Moving forward to the SEA 1000 program the Australian Industry Capability considerations have not been properly considered. Australian industry is presented with a status quo situation, where the status quo is in all effect a 'lock-out'.
- d. No costs have been established for fit out of the AN/BYG-1 on the future submarine. Although a Request for Information (RFI) with respect to existing command and control systems from other suppliers was carried out, no such RFI has been carried out for the unique system being sought for the future submarine. Indeed, from an early

stage Defence has locked in the idea that the AN/BYG-1 should be the Command and Control System on the future submarine. Defence has constrained the submarine Competitive Evaluation Process (CEP) participants to a concept design fitted with the AN/BYG-1. They have done this without conducting the necessary due diligence with respect to other potential solutions (including an Australian designed option) and have committed the taxpayer down a significant spending pathway with no understanding of the cost.

I provide a short technical context to my request at Annex A and further information on my concerns at Annex B.

Should you have any questions in relation to this request, please don't hesitate to contact my advisor Mr Rex Patrick at rex.patrick@aph.gov.au who has carriage of this matter on my behalf.

I look forward to your early and positive response to this request.

Yours sincerely



NICK XENOPHON

20 / 05 / 2016

ANNEX B – AN/BYG COMBAT SYSTEM

AN/BYG-1 Background with Respect to Collins

In September 1987 the Australian Submarine Corporation signed a contract with Rockwell Collins for the design, development and installation of distributed Combat System for the Collins Class submarines.

By 1992 the program was in disarray¹¹. In 1998 the ANAO called the program out in its 'New Submarine Project' Review and in 1999 the Macintosh Prescott review stated in unequivocal terms that "*Basically the [combat] system does not work*". It recommended taking the Combat System out of the main contract and seeking a new "*only proven in-service system*" based on a simple 'dot point' selection criteria.

Whilst the recommendation of the Macintosh Prescott review were being implemented, Australian industry stepped up to provide a very successful interim 'Combat System Augmentation'.

A competition to replace the Combat System was held in 2000/2001. The German ISUS-90 system won the competition, but it was not selected as the solution. Instead, the tender process was terminated and the AN/BYG-1 system was selected for the Collins Class submarine. The then Defence Minister Reith announced on 09 July 2001:

The Government has decided that a comprehensive arrangement with the US Navy on submarine issues is in Australia's best strategic interests and has therefore decided that the selection of the combat system for the Collins Class submarines cannot proceed at this time.

In 2003 a contract was signed to fit the AN/BYG-1 combat system to all six Collins Class submarines.

With respect to the whole of life cost¹² and the supplier's performance history¹³:

- In 2003 the budget estimate of acquiring the AN/BYG Tactical and Weapon Control Sub-system from the US Navy for all six Collins submarines and the shore facilities, plus initial spares, training and support was \$140M. The estimated cost of the additional work by Raytheon Australia, including the adaptation of existing Collins computer cabinets and operator consoles to support the introduction of the AN/BYG-1 was \$47 million¹⁴.
- The total cost of the AN/BYG-1 to 2019 is now understood to be USD\$322.9M and AUD\$79.3M¹⁵

¹¹ The Collins Class Submarine Story: Steel, Spies and Spin; Peter Yule and Derek Woolner

¹² See Commonwealth procurement Rules Para 4.5f

¹³ See Commonwealth procurement Rules Para 4.5c

¹⁴ See Senate QON 2598 asked 12 November 2015

¹⁵ See Senate QON 2487 asked 20 July 2015

- It is noted that 13 years after the AN/BYG-1 was procured for the Collins Class submarine, it has still not been to sea on all six submarines.
- The system is subject to a rolling upgrade program of software (APB upgrades and hardware (Technical insertions). It is noted that there is a considerable latency between upgrades are fielded in US submarines and when they are fielded on Collins Submarines¹⁶. In response to questions asked by me in the Senate¹⁷ Defence is now refusing to provide details of software and hardware version install latencies.

With respect to the system's fitness for purpose¹⁸:

- The United States Director of Test and Evaluation (DOTE), a statutory office holder with full access to the performance test results of the AN/BYG-1 stated in his 2013 Report¹⁹ that "*The A-RCI [sonar system] and the AN/BYG-1 systems are not effective in supporting operator situational awareness and contact management in areas of high contact density*" and "*The AN/BYG-1 System did not meet the Navy's requirements for target localization; however, the targeting solutions were often sufficient for a trained crew to provide the torpedo an opportunity to detect the target. Nevertheless, AN/BYG-1 remains not effective in ASW scenarios*". Similar deficiencies of the system have been detailed in the 2012 DOTE Report²⁰, the 2011 DOTE Report²¹ and so forth. Although Defence has dismissed these reports in responses to questions in the Senate²², it is noted that the RAN's own operational test and evaluation regime has been found wanting by the ANAO²³.
- A 2006 and 2008 side-by-side test between the AN/BYG-1 (which has cost more than \$400M²⁴) and the Australian company Acacia Research's TDMS System (which cost the RAN about \$3M²⁵), defence found that "*The 2006 comparison focussed on manual tactical picture compilation and both systems demonstrated similar performance. The 2008 test examined automated tracking functions and both systems performed adequately*"²⁶.

With respect consideration of Australian Industry Capability considerations²⁷:

- In September 2003 the United States Navy ('USN') conducted workshops with Australian industry and provided a presentation that,

¹⁶ See Senate Standing Committee on Foreign Affairs, Defence and Trade 28/29 May 2013 Estimate Question on Notice Q203 and Q205.

¹⁷ See Senate QON 2566 asked 02 September 2015

¹⁸ See Commonwealth procurement Rules Para 4.5b

¹⁹ See <http://www.dote.osd.mil/pub/reports/FY2013/>

²⁰ See <http://www.dote.osd.mil/pub/reports/FY2012/>

²¹ See <http://www.dote.osd.mil/pub/reports/FY2011/>

²² See Senate Standing Committee on Foreign Affairs, Defence and Trade 17 October 2012 Estimate Question on Notice 41

²³ See ANAO Report Number 9 2015-16 Performance Audit

²⁴ See Senate QON 2487 asked 20 July 2015

²⁵ See Senate Standing Committee on Foreign Affairs, Defence and Trade 21 October 2015 Estimate Question on Notice 63

²⁶ See Senate QON 2487 asked 20 July 2015

²⁷ The Defence Procurement Policy Manual 3.12

consistent with the signed government-to-government commitment to develop improvements jointly, stated *"We value our partnership with the Commonwealth of Australia and look forward to the full participation of Australian Industry with the Royal Australian Navy in the Combat System Modernization"*²⁸

- Seven and a half years into the program, in response to a Senate Question on Notice²⁹, Defence revealed that *"The target is for Australian companies to be able to compete for inclusion in the joint development process on the same basis as the United States (US) based companies"* and in October 2012 Air Vice Marshal Deeble advised Senator Fawcett that *"We are trying to increase the range of options that are looked at through our engagement with the US Navy to open up these other priority areas for us. But at this point in time they have not been mated into the APB build" ... and later ... "It is early days in that at this point in time, but that is the clear intent (sic). Bringing industry along and giving them a leg up is going to be an important part of that equation to make them more competitive in that APB process"*
- On 03 June 2013 the then General Manager of Submarines, Mr David Gould stated at Senate Estimates, *"It is a joint program, but, to be honest, we are quite clearly a junior partner in the joint program. We do not take all the updates on the advance processor build, so we have to use our junior partnership to influence the American program as best we can. Although it is joint, the priorities are always going to be more heavily influenced by the senior partner in the program."*

AN/BYG-1 Background with Respect to The Future Submarine

In August 2012 the Commonwealth issue an RFI seeking information from some international Command and Control System on Military off The Shelf Combat Systems. It is understood that the RFI sought general information on existing Combat Systems (with no reference to RAN Submarine Combat System requirements).

On 03 May 2013 the Minister for Defence announced that:

"The Government has also taken the important decision to use the United States AN/BYG-1 combat system as the reference system for future design work. The early definition of a combat system is a feature of a successful submarine program. It allows the submarine design to proceed utilising more accurate projections of space, weight and power requirements".

The position taken by Government was given greater clarity by the then Submarine Project Director when he stated to Senator Johnston on 04 June 2013:

²⁸ Senate Standing Committee on Foreign Affairs, Defence and Trade 15 February 2012 Attachment to Estimate Question on Notice 131.

²⁹ Senate Standing Committee on Foreign Affairs, Defence and Trade 23 February 2011 Attachment to Estimate Question on Notice W46(d)

“The government's announcement in the context of the white paper relating to SEA 1000 is not an acquisition decision. It does not commit to purchase BYG-1 for the future submarine. It simply makes the statement that, for the work that we are now doing on options 3 and 4 to be done sensibly, there must be a combat system. The announcement essentially makes the point that the reference system for that piece of work is the one we have. That is what we have decided to use to do that work. It is the combat system that we have and for which we have extensive data—all the data we need to do the work. Equally, we have no data that is sufficient for that work on any other combat system. We would need to make a selection and go and get that data and get approval to use it for it to make any sense”.

Two and half years later, on 20 February 2015 the Minister for Defence made an announcement of the Strategic direction of the Future Submarine Program which shifted the Combat System from a ‘reference system’ to a ‘preferred system’:

“In addition to this – and on the advice of Defence – the Government has endorsed a set of key strategic requirements for our future submarines:

...

c) The combat system and heavyweight torpedo jointly developed between the United States and Australia as the preferred combat system and main armament”

When queried on this statement by way of a question on notice in the Senate, Defence stated:

“The AN/BYG-1 Tactical and Weapons Control System and the Mk48 ADCAP CBASS Heavyweight Torpedo are jointly developed between the United States and Australia. The term ‘preferred’ in relation to these two systems means that it is the intention to continue joint development and to incorporate these systems in the Future Submarines, subject to the outcome of the competitive evaluation process”³⁰.

And,

“Defence is proceeding on the basis that the AN/BYG-1 Tactical and Weapon Control Sub-system and the Mark 48 Mod 7 torpedo are preferred for inclusion in the Future Submarine combat system.”

Finally, on the 17 November 2015 the Minister for Defence stated during a Submarine Institute of Australia address:

³⁰ Senate QON 2564 asked 02 September 2015

Briefly and in relation to the Future Submarine Combat System; the Government has endorsed the combat system and heavyweight torpedo jointly developed by the United States and Australia as the combat system and main armament for the Future Submarines. This combat system will be integrated in Australia and we will engage a suitably qualified and experienced industry partner as a combat system integrator.

This decision was not one that was taken lightly; the selection balances key considerations including high levels of interoperability with our key ally, the United States, opportunities to de-risk the combat system for the Future Submarine, and synergies arising from commonality between Collins and the Future Submarine.

Importantly the commitment to select a combat systems integrator and to integrate the systems in Australia is a down-payment on jobs in Australia, in Adelaide – real jobs that are likely to begin work as soon as 2016.

To that end, last week (12 November), the Department of Defence commenced a limited tender process with Lockheed Martin Australia and Raytheon Australia to choose a combat system integrator. These two organisations have the experience and the ability to integrate the AN/BYG-1 combat system and the Mark 48 Mod 7 torpedo into the future submarine in Australia. This decision will ensure that we have a combat system integrator in place to work with the international partner selected to work with Australia on the Future Submarine.

Whilst there appears to be no legally binding commitment to the system there is clear intention to procure it. This is concerning.

With respect to the value for money:

- A proper procurement assessment which would meet the mandatory requirements of the PGPA Act or value for money assessment criteria in the Commonwealth procurement Rules:
 - Whilst there has been some effort by Defence to establish the capabilities of other systems and rough order magnitude costs with respect to Combat Systems solutions, no information has been sought with respect to alternate Combat Systems that might be able to be tailored to meet the RAN's specific requirements.
 - Noting that the AN/BYG-1 will be procured by way of Foreign Military Sales (FMS), and the following from the Auditor General's report into AIR 8000 Phase 2 – CJ27J Spartan Battlefield Airlift Aircraft:

"in examining In examining the value for money achieved by this acquisition, the ANAO found that in terms of cost, the procurement process adopted by Defence for AIR 8000

Phase 2—which compared tender quality information from the US Government (in respect to the US variant C-27J) to first pass data from the two commercial suppliers (in respect to the commercial C-27J and C-295), in itself provided a relatively limited basis for comparison between the three options. However, Defence has advised that it also had regard to other cost information on the various aircraft, acquired over the course of Project Air 8000 Phase 2. The comparison of FMS and commercial offers is inherently difficult, and without the benefit of tender quality documentation for the commercial offers, becomes even more so³¹”

Prima facie, the approach used has not met the due diligence threshold expected by the Auditor General.

- Whilst not legally committed to the AN/BYG-1, Defence have taken an active position in avoiding the collection of data about other solutions in the context of the proposed future submarine; an unconscionable approach that leaves the organisations unable to provide proper and fulsome information to Government to assist it in its decision making.
 - When the opportunity presented itself to gather alternate Combat System information during the submarine CEP, Defence did not take it. Asked whether information had been sought from the Germans and Japanese on the inclusion of, the AN/BYG-1 on their concept submarine designs, Defence said “yes”.³² Asked whether information had been sought from the Germans and Japanese on the inclusion of, respectively, SUBTICs, ISUS-90 and the extant Soryu Combat System on their concept submarine designs, Defence said “no”.³³
 - When asked if Defence had given consideration to the possibility developing, as countries such as Singapore has, an indigenous C2 system, defence answered “*In July 2002 the Australian Government established a strategic relationship with the United States on submarine matters. Through this relationship, Defence acquired the AN/BYG-1 Tactical and Weapon Control System in joint partnership with the US Navy. The joint partnership affords Australia the equivalent of an indigenous capability, and by leveraging well established US Navy programs, enables Australia to maintain a capability advantage through continuous improvement in combat system performance. No requirement has been raised to establish an alternative to the AN/BYG-1*”³⁴.
 - Asked recently in broad figures what the acquisition cost of a fleet fit of Acacia’s TDMS system for the future submarine would be Defence answered “*This information is not available. Since*

³¹ Auditor General report No 3 2013-14 Performance Audit Para 4.27

³² Senate QON 2565 asked 02 September 2015

³³ Senate QON 2565 asked 02 September 2015

³⁴ Senate Standing Committee on Foreign Affairs, Defence and Trade 21 October 2015 Question on Notice 63

the introduction of the AN/BYG-1 there has been no requirement to seek prices for TDMS³⁵

The commitment to the AN/BYG-1 raises additional concerns with respect to the overall cost of the program. Concerns with respect to total cost include:

- The adoption of the AN/BYG-1 results in the need for Defence to take on the responsibility for integration³⁶ of the other elements of the Combat System (see Annex A) through a contract integrator. The decision to proceed with the AN/BYG-1 has been made without regard to the technical and integration risks of such an approach, noting that when technical and integration risk materialise cost blows out.
- Risk of divergence from the US Baseline
- When asked in April 2016 what the projected cost of the future submarine's AN/BYG-1 program was with respect to a) procurement in dollar value terms and b) through life sustainment (including annual payments) in dollar term payment, Defence responded "*While indicative procurement and sustainment costs for the Future Submarine version of AN/BYG-1 can be modelled to some extent from the equivalent costs for Collins, there will be differences and actual costs will be refined during the Future Submarine design process. For example, the Future Submarine will be designed from the outset for installation of AN/BYG-1. The ongoing evolution of AN/BYG-1 will also influence procurement and sustainment costs*"³⁷. Taking the answer at face value, it appears that defence has committed to a system without understanding its cost. A value for money assessment is not possible if the 'money' side of the equation is unknown.

³⁵ Senate Standing Committee on Foreign Affairs, Defence and Trade 21 October 2015 Question on Notice 63

³⁶ Senate QON 2482 asked 20 July 2015

³⁷ Senate Standing Committee on Foreign Affairs, Defence and Trade 10 February 2016 Question on Notice 171