Submission

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DEFENCE STRATEGY REVIEW:

A SUBMISSION ON FUTURE SUBMARINE FORCE ISSUES

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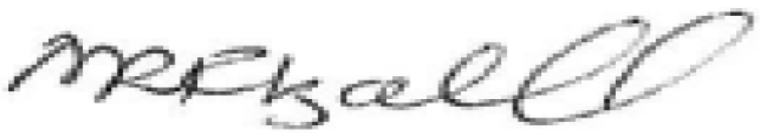

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FUTURE SUBMARINE FORCE ISSUES

EXECUTIVE SUMMARY.

This submission by the Submarine Institute of Australia to the Defence Strategic Review addresses the role of Australian submarines in the defence of Australia.

The SIA is highly conscious of the urgency for this review; and concludes that Government is very concerned about Australia's strategic environment.

From the COVID-19 Pandemic, the SIA recognises the supply-chain lessons for Australia and the likely deterioration in the reliability of supply lines as regional/global strategic circumstances worsen. Open and free flowing supply lines are critical to our survival: protection of those supply lines is critical to the defence of Australia.

The Russian invasion of Ukraine clearly demonstrates the critical nature of the ability of a sovereign country to defend itself. Collaboration with our allies is vitally important, but does not relieve us of the fundamental obligation to exercise sovereign defence. ANZUS is only an agreement to consult. It is not a "NATO like" agreement.

In times of peace, tension in the lead up to war, and in war, submarines can be a significant deterrent to a potential aggressor. Allied submarines based in Australia in WW2 demonstrated their deadly effectiveness. Our geography has not changed. Australians should expect their submarines to play a major role in deterring any potential aggressor. The effectiveness of submarines as a deterrent depends on their ability to maintain continuous presence in the areas of strategic interest to Australia. The critical pre-requisites for a continuous submarine presence include:

- A sufficient number of submarines with the necessary warfighting skill, range, endurance, skills, and weaponry to maintain a continuous strategic effect. [Anything less than a fully stockpiled level of (particularly allied-sourced) weapons and weapons systems spare parts, will severely challenge success in military engagements].
- Sovereign Australian industrial capacity to support the submarine force in high tempo operations, to repair battle damage and replace losses.
- A Submarine Command & Control structure that can manage the nuances of deterrent submarine operations and provide the leadership, confidence and management of the submarine force and industry-together with appropriate allied collaboration- to maintain the deterrent effect.
- Recognition of the totality of this group as Australia's Submarine Enterprise.

The changes necessary to make the submarine force a national strategic deterrent bring increased cost. As the public discussions dealing with the Collins and the Attack Classes of submarines show, the public is not confident of its understanding of the need for or roles of their submarines. This is not acceptable in a modern, educated, democratic society.

The effectiveness of submarines as a deterrent will be greater with 'whole-of-nation' support. Effective communication with the Australian public to explain the function and importance of the Submarine Enterprise is important for the effectiveness of the Enterprise and necessary to meet its obligation to our democracy. The SIA stands ready to play its role in this national information exchange program.

Part 1: Preamble

1 Defence Strategic Review (DSR).

On Wednesday 3 August 2022, the Prime Minister, the Hon Anthony Albanese MP, and the Deputy Prime Minister and Minister for Defence, the Hon Richard Marles MP, announced an independently-led review that will consider the force posture and force structure of the Australian Defence Force (ADF).[1]

2 SIA Submission

This submission, by the Submarine Institute of Australia (SIA), will broadly address a number of issues related to Australia's present and pending/future submarine capability.

Detail of the following issues will be addressed via independent appendices:

1. Public interaction & communication.
2. Submarine Force Structure.
3. Submarine Force Posture.
4. Submarine Command and Control.
5. Genesis and Evolution of Australia's Submarine Force Structure.

2.1.....Nuclear Powered Submarines for Australia.

The Submarine Institute of Australia unequivocally supports the acquisition of nuclear-powered (but conventionally armed) submarines for Australia.

The acquisition of nuclear-powered submarines is likely to lead to the most demanding Defence project ever undertaken in Australia.

3 Preliminary Remarks

3.1.....*Strategic Climate*

The catalyst for the Defence Strategy Review, the target for this submission, is the rapidly deteriorating regional-indeed global-strategic climate The Terms of Reference for the review are via the footnote.[2]

These strategic changes demand the Australian Government re-assess the capabilities and posture of the Australian Defence Force and broader Department of Defence. The Review must consider all elements of the Integrated Investment Program and provide recommendations for the Program's reprioritisation, particularly in light of recently announced large-scale projects, to provide Australia with the force structure required by 2032-33. This submission addresses issues of submarine strategy and tactical capability pertinent to the review.

[1] Defence Strategic Review | About | Defence
[2] defencestrategicreivew-termsreference (2).pdf

3.2.....*Further Strategic Deterioration.*

Should the strategic situation degenerate to the point at which hostilities break out, then our circumstances will change radically. Australia is likely to need to defend itself for an indefinite period

If Australia is envisaging an increased probability of hostilities in the region before 2033, then so are its Allies. In that event the Allies will be focussing on their own issues and significantly less inclined to support Australia than they are today.

It is unreasonable to assume that any of our Allies will put Australia's interests ahead of their own. For this reason, it seems highly unlikely that a nuclear-powered submarine for Australia will be available by 2033.

With nuclear powered submarines unlikely to be available until mid to late 2030s - and given the complexity and risk of such a program potentially later - it is imperative the review ensure a submarine capability for this entire period with a capability commensurate with the potential for further strategic deterioration. Consideration of the capability required could include maintaining and enhancing the current Collins capability, acquiring new systems and platforms, enhancing other existing systems and platforms.

The COVID-19 Pandemic continues to illustrate how vulnerable Australia is to a reduction in the reliability of its supply chains. In the case of the Submarine Capability, reduced capacity of the supply chains will be a major issue – particularly in relation to US sourced weapons

4 Recommendation.

The DSR acknowledge that the details contained in the appendices to this submission are all relevant to the importance of Australia’s submarine force as a strategic deterrent

Part 2: Submarine Strategic Framework

1 Strategic Deterrence

1.1.....*Understanding and Qualification*

Submarine Force Structure and submarine capability are interdependent. In relation to submarines, a definition of “capability” relevant to the Review documentation is taken to mean “The possession of the means and skills to achieve a desired operational effect in a nominated environment within a specified time and to sustain that effect for a designated period. In a submarine context, capability is achieved by developing a submarine force structure, tactically prepared for a range of strategic submarine operations.”

Such strategic operations, planned for, and undertaken in, relevant geo-strategic areas, constitute strategic deterrence.

As geo-political tensions increase and strategic circumstances deteriorate, an effect of deterrence can be achieved by the clandestine deployment of submarines to areas in which the activities/preparations of potential aggressors can be covertly monitored. A further deterioration of strategic circumstances can be countered via an escalation of our deployed submarine activities.

By the very nature of their stealth and covert operation, all submarines offer a level of strategic deterrence. Nuclear powered submarines, because of their unlimited power which enables extended endurance, patrol flexibility, and enhanced depth and speed evasive capability; together with their enhanced stealth (no requirement to charge batteries) offer the highest level of submarine strategic deterrence.

The primary deterring effect of a submarine is the (declared or undeclared) threat posed by the uncertainty instilled in the planning of maritime operations by a potential adversary.

1.2.....*Effect*

'Effect' can be defined as 'a change which is a result or consequence of an action or other cause'. From the perspective of submarine capability (as a strategic asset) the 'result or consequence' of submarine operations against a potential adversary might be viewed as a range of escalating outcomes. The 'designated period' might cover various stages of escalation (see below) which would require sufficient numbers of submarines to ensure that an appropriate number of submarines could be rotated to ensure the 'effect' of escalation

1.3.....*Graduated Escalation as a Feature of Strategic Submarine Deterrence*

At a relatively moderate level, the covert presence (declared or otherwise) of an Australian submarine adjacent to an adversary's home waters might change (restrict) the freedom of movement and exercise (training) of adversarial forces. It might also change our level of intelligence in relation to adversarial capabilities.

At a higher level, a declaration of covertly patrolled exclusion zones would severely change and restrict an adversary's commercial maritime operations and change (heighten) our level of foreign policy political pressure.

In a period of hostilities, the use of covert maritime/land strike against an adversary, would change/deny the use of an adversary's maritime platforms and military infrastructure; it would change (enhance) our level of political control.

2 Strategic and Operational Issues

2.1.....*Submarine Capability.*

Defence Strategists generally acknowledge that a capable, well operated submarine is the most potent maritime strike asset available. An SSN can operate with a high level of impunity anywhere within range of its maximum endurance without regard for who controls the surface and air environments. Diesel electric submarines must periodically 'snort' to charge their batteries. During these periods they are more vulnerable to counter-detection.

2.2.....*Cost Effectiveness.*

A submarine is a very cost effective, multi-task capable platform. The strategic capability greatly increases if fitted with a land attack weapon system.

2.3.....*Allied Maritime Collaboration.*

Whilst the sovereign nature of command and control of Australian forces is an enduring feature of our democratic system, in most cases, the strategic employment of those submarines will be undertaken in collaboration with our allies.

USN/RAN maritime collaboration in surface/amphibious warfare is a political commitment; in submarine warfare it is a strategic and operational imperative. There is a tangible and valued operational benefit to the USN submarine force from what we have to offer. Collaborative, effective allied submarine water-space management is critical for operational effectiveness and safety (e.g. The avoidance of inadvertent 'Blue-on-Blue' engagements).

2.4.....*Presence.*

If a submarine presence is declared – whether valid or not – it demands of an adversary, a vastly disproportionate effort in ASW capability (with little prospect of success) to demonstrate any sort of counter capability.

3 Sovereign Industrial Capability

Australia has a number of highly skilled, technically advanced companies and agencies involved in creating innovative submarine tactical capability; particularly in the development of submarine sensors, signal processing, data integration and data management. Many of them are Small to Medium Enterprises (SMEs). Despite the leading-edge technology and consequent submarine capability 'edge' provided by these skills, the constraints of Defence procurement processes (particularly the 'tender' documentation) result in the risk of the capability 'edge' being overtaken by potential adversaries, before those capabilities can be introduced into service.

4 Recommendation.

That the DSR acknowledges that a capable, well operated submarine is the most potent maritime strike asset available to the ADF.

That the DSR addresses the need to streamline defence procurement in order to rapidly develop and deliver improved submarine tactical system capability.

Part 3: Submarines and Strategy

1 Public Interaction and Communication [3]

1.1.....*Communicating the Nature of Submarine Strategy.*

To generate an informed public attitude to the unique utility of submarines and to the value of their covert employment in the execution of national defence strategy, Australia will require a mature debate about submarines—one that trusts and engages the public, allows the ADF to participate in the discussion, and in which the government enables and enhances the structures to permit those conversations.

[3] More detailed discussion at Appendix 1

The presence of a communication gap between the government and the public on matters of defence policy can undermine the development of strategy. The Australian government perceives sectors of the public as sceptical on the cost and timely delivery of submarine capability and as unpersuaded of the 'value for money' of this endeavour. For the formation of effective strategy in a democracy conversations and broad agreement, both between the government and its public service and defence forces and between the government and its electorate, is required.

1.1.1. Connectivity with the Public.

These two public conversations are difficult and subject to different constraints but both are necessary if, the achievement of a coherent national strategy is not to be undermined. Moreover, the 'public' is not a monolith, but a community that includes, amongst others, opinion shapers, journalists, strategists, members associated with defence industry (particularly the submarine enterprise) and the men, women and children of Australia. But this diversity means that these groups and their members provide the government, through the exercise of meaningful dialogue, a valuable opportunity to acquire much richer and more accurate understanding of the 'will' of that heterogeneous modern Australian 'public'.

2 Submarine Force Structure[4]

2.1 .....*Submarine Force Structure - Overall key considerations.*

2.1.1. Risk of a Capability Gap

It is essential to the national security of Australia that the risk of a capability gap during the transition from the Collins class submarines to nuclear propelled submarines, be minimised and be at the forefront of government policy.

Australia currently has six Collins class submarines in service so for there to be no capability gap, Australia must continue to have not less than six submarines in service.[5]

2.1.2. Growing the Submarine Enterprise Workforce.

Sustaining the Collins class, executing the LOTE program and preparing for a nuclear-powered submarine build program, requires a significant growth in submarine shipbuilding skills. Given RAN experience over the last 50 years, training the expanding numbers of uniformed crews and support specialists needs a radical expansion of submarine sea days.

2.1.3. Maintaining the Capability 'Edge'

It is a strategic imperative that our submarines maintain a weapon's systems capability (weapons, sensors and processors) which gives them a tactical advantage over potential adversaries if a capability 'edge' is to be maintained.

2.2 .....*Force Multiplication*

2.2.1. Land Strike

[4] Appendix 5 discusses the History and Evolution of the Australian Submarine Force Structure
[5] Appendix 2 further discusses mitigation of the Capability Gap Risk

Timely addition of a 'land-strike' capability to the current 'maritime-strike' capability of our submarines would offer a significant strategic 'Force-Multiplying' enhancement to the ADF.

2.2.2. UUVs

UUV technology is under rapid development by NATO countries. Australia remains participative in assessing the feasibility of UUV as a means of sacrificial assets in lieu of risking human life and primary assets. Again, Australia must be clear about how UUV (and corresponding UAS), will augment capable submarine assets. Current issues related to command, control and communications of/with UUVs suggest that it will probably be some years until they can be fully integrated into submarine force structure.

2.3.....*Sovereign Submarine Sustainment: Weapon Stocks and Re-Supply*

In a time of heightened tension/hostilities, the Australian submarine enterprise must be in a position to produce, supply and repair the sovereign submarine force, without reliance upon overseas support. However, it is important to acknowledge the support and collaboration currently underway with our allies to gain knowledge and assets that will achieve longer term objectives of self-reliance.

Sufficient fuel (for diesel-electric submarines) and weapons must be stockpiled to facilitate an extended hostilities campaign. Since our submarine weapons are of US design and origin, we must either stockpile a sufficient number for the predicted term of the conflict, or make all necessary arrangements to establish a weapon production facility in Australia. We must clearly understand the lead times to such development and production to be realised.

The possibility of hull losses during conflict must be recognised and contingency replacement plans put in place.

3 Submarine Force Posture[6]

3.1.....*Submarine Basing.*

3.1.1. Current Operational Base Location.

A major dilemma which challenges the Strategic Defence of Australia is the vast geographic area of the continent. A decision in the mid-1980s (and executed in the mid-1990s) moved the operational submarine base from (Neutral Bay) Sydney to HMAS STIRLING at Fleet Base West at Garden Island, WA. This reduced the transit distance from the major submarine base to areas of operational interest to the north of Australia.

Whilst Fleet Base West is expected to remain as the major Australian submarine base. An east coast base is a realistic strategic future force posture consideration.

[6] More detailed discussion is at Appendix 3

3.2.....*Considerations for Future Submarine Support Facilities.*

3.2.1. East Coast Submarine Base

Discussion on an East Coast Submarine base is at Appendix 3

3.2.2. Forward Basing: *from* *Australia* (RAN): *to* *Australia* (USN/RN) – Strategic Issues

Allied co-operation issues for forward basing (for allies – to Australia, and for the RAN – from Australia) are discussed in greater detail at Appendix 3.

4 . Submarine Command and Control.[7]

4.1.1. Comparisons with Other ADF Capabilities

The RAAF has recently established Space Command[8] while the Army has had Special Operations Command[9] in place for some time.

Special Operations Command and Space Command are led by two-star officers and the respective organisations create environments which encourage close focus on the effects the capabilities they lead are required to achieve.

4.2.....*Reflecting the Strategic Priority.*

Command and control of (at least) eight nuclear-powered submarines demands a strategic priority. The level of operational collaboration with our US allies in our joint areas of interest, using technology sourced from (and approved by) the highest level of US submarine command (Head of Naval Reactors) will warrant a review of Australian submarine command and control.

Australia needs a Submarine Command & Control structure that can manage the nuances of deterrent submarine operations and provide the leadership, confidence and management of the submarine force and industry-together with appropriate allied collaboration- to maintain the deterrent effect.

Operational collaboration will involve close liaison with the US Navy's COMSUBPAC (Commander, Submarines Pacific Fleet) and also the Royal Navy for RN submarines deployed to our region – particularly via joint operations with visiting (or seconded) allied nuclear-powered submarines.

This will warrant a dedicated strategic command of experienced submarine specialists, with a senior staff of post submarine-command officers, headed, preferably, by a two-star ranking flag officer[10]; whose rank would thus be parallel to that of the head of our regional US submarine ally, with a parallel operational specialised command structure.

Such a command structure, with links to Australia's Nuclear Regulating Agencies and also to our UK and US allies, is likely to be the subject of the NSTF study.

[7] A more detailed discussion is at Appendix 4

[8] https://www.airforce.gov.au/our-mission/defence-space-command

[9] https://www.army.gov.au/our-people/army-leadership/special-operations-command

[10] Of note, the RAAF has a 'Space Command' headed by a two-star officer, but with no strategic space assets

5 Recommendations.

5.1.....*Public Interaction and Communication.*

That the DSR recognise the presence of a communication gap between the government and the public on matters of defence policy can undermine the development of strategy and seeks out a resolution for the gap.

5.2.....*Submarine Force Structure.*

That the DSR considers the whole 'submarine enterprise' in evaluating strategic changes for Australia's submarine capability.

5.3.....*Submarine Force Posture.*

That the DSR consider submarine logistic support requirements (including support allied submarine collaboration) against Australia's challenging geography, when addressing ADF Force Posture.

5.4.....*Submarine Command and Control.*

That the DSR consider the adequacy of current ADF Submarine Force Command and Control for the role of Australian submarines as a strategic deterrent.

Part 4: Summary

1 Submarine Capability.

A capable, well operated submarine is the most potent maritime strike asset available to Australia to meet our national maritime defence objectives. It can operate with a high degree of impunity anywhere within range of its maximum endurance (for a nuclear-powered submarine, limited only by available storage space for food and, for a conventionally powered submarine, the requirement to re-charge its batteries) without regard for who controls the surface and air environments.

Australia's submarine force is its primary maritime strategic deterrent.

2 Engaging the Public.

Connecting the defence force, the public and the government is not well executed. Direct public engagement can promote understanding of today's submarine force, together with the benefits gained by the addition of nuclear-powered submarines.

3 Strategic Contingency

This submission examines some key considerations for which strategic submarine contingency planning should be developed. Such contingencies) should, where possible, be sufficiently dynamic to accommodate developing changes in geo-political, military, industrial and economic strategic circumstances.

4 Communicating the Nature of Submarine Strategy.

To generate an informed public attitude to the unique utility of submarines and to their covert employment in the execution of national defence strategy, Australia will require a mature debate about submarines—one that trusts and engages the public, allows the ADF to participate in the discussion, and in which the government enables and enhances the structures to permit those conversations.

5 Submarine Force Structure

The national security of Australia demands that the risk of a capability gap during the transition from the Collins class submarines to nuclear propelled submarines, be minimised and be at the forefront of government policy. This includes any gap in the overall capability of the submarine enterprise.

A key strategic imperative is that our existing submarines maintain a capability 'edge' in weapons, sensors and fire-control systems which gives them a tactical advantage over potential adversaries.

Timely addition of a 'land-strike' capability to the current 'maritime-strike' capability of our submarines would offer a significant strategic enhancement to the ADF.

6 Submarine Force Posture.

6.1.....*Two Ocean Basing for Submarines*

Two-ocean basing of naval assets is a strategically sound decision for a country the size of Australia. However, strategic consideration of how far 'forward' (northwards) such bases should be situated, involves assessment of potential adversarial threat from long range assets, together with cost of support facilities remote from major areas of industrial support. Such forward facilities offer options for allied submarines to plan extended deployments in adjacent operational areas to east Australian waters.

6.2.....*Allied Collaboration.*

In today's prominence of nuclear powered - submarines, Western allies have traditionally offered logistic support to submarines from other allied navies in sovereign submarine bases. Both east (when operational) and west-coast Australian submarine support facilities should be available for support of allied submarine operations.

The relative proximity of HMAS STIRLING (as opposed to Guam and Hawaii) to the Persian Gulf offers significant opportunities to expand logistic support to USN submarines on WESTPAC deployment. (e.g. Joint use of weapons storage/maintenance facilities and underwater tracking range training facilities).

Australian submarines carry USN submarine weapons. In a time of hostilities, access to resupply of these weapons, across the Indian/Pacific maritime region, will feature as an important part of Australian submarine operational planning.

7 Submarine Command and Control

Command and control of (at least) eight nuclear-powered submarines demands a strategic priority. The level of operational collaboration with our US allies in our joint areas of interest, using technology sourced from (and approved by) the highest level of US submarine command (Head of Naval Reactors) will warrant a review of Australian submarine command and control.

Appendix 1: Communicating the Nature of Submarine Strategy[11]

There is a need for detailed, logical and defendable communications regarding the contribution of submarines to national strategy and deterrence – particularly in view of the likely costs to be incurred via the acquisition of (at least) eight nuclear-powered submarines

To generate an informed attitude to the unique utility of submarines and to their covert employment in the execution of national defence strategy, Australia will require a mature debate about submarines—one that trusts and engages the public, allows the ADF to participate in the discussion, and in which the government enables and enhances the structures to permit those conversations.

Key Points
Given the current climate of rapidly changing global strategic circumstances, a government reassessment of national security strategy may wish to consider the following:

Hybrid/asymmetric warfare.
'Hybrid/asymmetric warfare' targets the role of popular opinion in shaping national strategy. 'Hybrid/asymmetric war' as it is now construed is less about 'real war' (notwithstanding blatant terrorist attacks such as that against the World Trade Centre and the USS COLE) than about political influence as a substitute for armed conflict. Economic coercion is an example of this; as is the arbitrary detention of Australian citizens, including journalists., .

The Internet and 'social media' operations are used as part of hybrid warfare to promote messages that divide Australian society against itself. The reason for concern is that these divisions are already present—for example; the zero CO2 emissions (impact on greenhouse gases) goals of energy generation versus the economic consequences. These divisions can (and are) easily exploited by malign and covert actors. Australia's consideration of 'hybrid war' rests on an implicit recognition of its own weaknesses, although they are themselves the product of a free society.

Social resilience in Relation to National Security.
Social resilience is receiving increasing attention in relation to national security. Societal ownership itself underpins resilience. Awareness of the need for security creates a more robust society, and that in itself provides a level of protection as it enhances public support for armed capability. Public engagement in defence debate creates a level of mass participation, which itself leads to resilience. This rests on the integration of the defence forces within the community, and in particular on direct evidence of their contribution to security. Moreover, the Australian community are the future of our nation therefore they should be given the opportunity to influence decisions impacting future matters. A lack of mature public engagement creates a lack of national resilience.

The SIA continues to uphold a key role to engage and educate the Australian public about submarine matters. This includes projects that provide a continuum from past

[11] (*With acknowledgements* to Hew Strachan, Ruth Harris for their RAND paper: 'The Utility of Military Force and Public Understanding in Today's Britain'. https://www.rand.org/pubs/research_reports/RRA213-1.html)

submarine history to skills and workforce needed to achieve future submarine technology endeavours.

Ignoring Domestic Resilience
The effect of ignoring domestic resilience is to undermine deterrence. As with resilience, societal ownership strengthens deterrence. If, in a democracy-the public do not understand what they are interested in defending or what they will fight for, then potential adversaries will assume that the democratic state will pursue every policy option short of conflict, but not outright hostilities.

Considerations for Communicating Submarine Strategy
•.....Emphasising the shared responsibility of resilience.
In the context of domestic security, the responsibility for resilience is a shared one. Future strategic reviews must make this point explicit.

•.....Concept of Deterrence.
Developing an Australian concept of deterrence and the particular role that submarines (and future UUVs and counter UAS) will play in such deterrence. Australia needs a concept of submarine deterrence that is integrated with its national strategy and communicable to its own people, as well as internationally.

•.....Coherence in Communications.
Coherence in communications must be achieved. Any decision to use military capability in an offensive role is inherently risky and morally flawed. The public needs to understand how the measured application of submarine capability as a deterrent, can achieve objectives perhaps otherwise understood by the public as only achievable via hostilities.

•.....Connectivity.
Connecting the defence force, the public and the government is necessary. Direct public engagement can promote understanding of today's submarine force, together with the benefits gained by the addition of nuclear-powered submarines.

•.....Clarity and Transparency.
Engendering clarity and transparency regarding the military operations in which Australian submarines can engage is necessary. Australian strategy needs to be explicit about the capabilities for which its submarine force is configured.

•.....Recruitment and Retention.
Australia aims to expand recruitment and improve retention in the Navy to accommodate the increase in trained personnel needed to operate and maintain additional naval platforms. The submarine force (indeed, the whole submarine enterprise – building, sustaining, supporting and crewing) has a particularly pressing need in this area. The expansion of the force to at least eight nuclear powered submarines, together with the requirement for a nuclear training program in the medium to long term, is a daunting challenge for training the personnel required. Some lateral considerations on this issue, related to joint nuclear training with AUKUS allies, are already in place. This is a great example of intent for allied collaboration towards nuclear-powered submarine capability.

Appendix 2: Force Structure. Submarine Capability Gap: A Risk Assessment.

Introduction

This Appendix will discuss the risk of – and issues associated with – a future gap in submarine capability.

Should the strategic situation degenerate to the point at which hostilities break out, then our circumstances will change radically. Australia is likely to need to defend itself for an indefinite period

As an associated consideration, Australia's Nuclear Powered Submarine Taskforce (NPST) was established to work closely with the UK and US over 18 months from September 2021 to identify the optimal pathway to acquire a conventionally armed nuclear powered submarine capability for the Royal Australian Navy.

With Nuclear powered submarines unlikely to be available until mid to late 2030s - and given the complexity and risk of such a program potentially later - it is imperative the review ensure a submarine capability for this entire period with a capability commensurate with the potential for further strategic deterioration. Consideration of such a capability could include maintaining and enhancing the current Collins capability, acquiring new systems and platforms, enhancing other existing systems and platforms.

This endeavour will lead to the most demanding Defence project ever undertaken in Australia. The study is being managed by a skilled and competent team, which includes a number of highly professional and capable senior submarine command qualified Naval Officers. Their appreciation and knowledge of submarine capability, together with the strategic impact of that capability, is expansive.

Background

Overall key considerations.

It is essential to the national security of Australia that the risk of a capability gap during the transition from the Collins class submarines to nuclear propelled submarines, be minimised and be at the forefront of government policy.

It is a strategic imperative that our submarines maintain a capability 'edge' which gives them a tactical advantage over potential adversaries.

Timely addition of a mature 'land-strike' capability to the current 'maritime-strike' capability of our submarines would offer a significant strategic enhancement to the ADF.

These key considerations have a number of component considerations as follows

Sustaining the Submarine Capability – Hull numbers

Australia currently has six Collins class submarines in service so for there to be no submarine capability gap, Australia must continue to have not less than six submarines

in service. If, however, a nuclear-powered submarine force of at least eight hulls requires a uniformed submarine qualified force of 2,300 personnel, expanding the numbers of trainees and training opportunities should be considered as soon as possible.

- Risk Evaluation, Analysis and Potential Consequences.

The following discussion pre-supposes that there is a risk of a submarine capability gap (this includes the whole 'Submarine enterprise'). The potential consequences of an insufficiently robust risk evaluation, analysis and conclusion is likely to be a less than adequate strategic submarine capability to address the deteriorating strategic circumstances in our region.

Risk Management.

Risk management leads to consideration of the following:

a. *Accept the risk.*

This leaves open the possibility that we may not be able to maintain at least six submarines in operational service. Without them, there will be a hiatus in our ability to train sufficient numbers of uniformed submariners and a reduction in strategic capability in deteriorating strategic circumstances. Should conflict occur, wartime losses will further compound the strategic situation.

b. *Eliminate the risk.*

This is probably only possible via the early build/delivery of nuclear-powered submarines. Given the sovereign requirements of both the UK and the USA for nuclear submarine production, this is a matter being addressed by the NPST. Our (lack of) ability to train sufficient personnel to crew such early deliveries is an additional risk factor.

Other than the above broad observations, little is to be gained by speculation and conjecture in advance of the recommendations by the NPST to Government (due in March 2023, in parallel to the recommendations to Government of the Houston/Smith August 2022 Defence Strategic Review).

c. *Mitigate the risk.*

The following issues are examined in relation to mitigating the risk of not being able to maintain at least six submarines in operational service. A situation realistically possible should conflict occur and submarines losses sustained.

- Submarine Ship-Building Workforce – Capability and Limitations.

The Collins LOTE[12] is effectively a major defence acquisition project. As such, and in conjunction with normal submarine maintenance/sustainment, it is likely to stretch the quantity and quality of the submarine workforce for the next 15 years. Soon after the NPST concludes early next year, it is expected that a major project will be established to acquire whichever class of nuclear-powered submarine the government chooses. This will most certainly be the largest and most complex defence project ever

[12] Collins Life of Type Extension (LOTE) on Vimeo

undertaken in Australia requiring a large, highly trained and specialized workforce in defence and industry.

To cover the uncertainty of nuclear-powered submarine delivery against the phased retirement of the Collins Class (post LOTE), there have been various proposals to mitigate against a gap in submarine capability including building an interim class of conventional submarines.

Without some radical expansion of the submarine industrial workforce, will Australia have the capacity to embark upon a third major project simultaneously for such an acquisition? If all three projects were attempted, the history of defence projects would suggest a significant risk of insufficient numbers of skilled workforce. Is it likely that all three would compete for limited shipbuilding skills and quite possibly fail on budget and/or schedule?

Given the current estimate that the earliest the first nuclear powered submarine will be in service by is 2035, a goal of no less than six (mixed class) submarines in service requires an exceptional level of assistance from our AUKUS allies to achieve a significantly earlier build program and acceptance into service for whichever nuclear powered submarine program the NPST ultimately recommends that the Government negotiates for.

The Submarine Institute of Australia supports Defence and industry continuing to review factors which increase (and decrease) the risk of a capability gap. Growing and managing the submarine ship-building work force to accommodate both the nuclear-powered submarine new build and the Collins class LOTE programs, requires a complex 'risk-mitigation' plan.

- Interim 'Off-the Shelf' Conventional Submarines.

Suggested options are either the Swedish Saab A26 class submarines or German HDW Type 214 (the option of a Korean Type KSS-111 has also been raised – by the Korean government).

Our current (Collins class) submarines have an American combat system, the same as in the USN Virginia class, and use American weapons. Those weapons are primarily MK48 Mod 7 ADCAP torpedoes and Encapsulated Sub Harpoon Missiles, with the possibility of Tomahawk Land Attack Missiles in the future.

If an interim class of conventional submarine was acquired there are clear reasons to consider staying with American weapons; these include proven interoperability with our major ally, sunk costs in National weapons test and maintenance facilities, shared logistic support and combined USN/RAN training. There also is an argument that the USN weapons and fire control systems capabilities may be superior to those offered in European designs; a protected classified review of related material will assist in understanding the substance of this view. The American weapons require a positive discharge system, that is, a system that ejects the weapon from the torpedo tube using either high pressure water or older systems of compressed air. Positive discharge systems are large and complex and must be designed into the submarine. Swedish A26 and German Type 214 do not have positive discharge systems.

It is understood that the USN have not yet agreed to the integration of these weapons and fire-control systems into third party designs. As proven in the Oberon SWUP and Collins programmes, modifying designs to incorporate the American combat system and weapons takes a number of years and adds considerable cost.

If fitted with the same combat system and weapons as the Collins class, neither the performance characteristics of the A26 nor the Type 214 appear to satisfy Australia's capability needs. The size, range and endurance of existing classes appear not to match that of Collins nor the contemporary requirements. The availability of new build European designed submarines is not clear; and considering that it may be many years before such submarines could be brought into service, the benefits of proceeding with this option is difficult to determine. Questions to be considered include how long would they be retained? Only until they could be replaced by nuclear powered submarines or through until the end of their design life, which would probably be the late 2060's or 2070's?

- Post Collins LOTE Additional Collins Class Submarines.

To cover the uncertainty of nuclear-powered submarine delivery against the phased retirement of the Collins Class (post LOTE), there have been various proposals to mitigate against a gap in submarine capability.

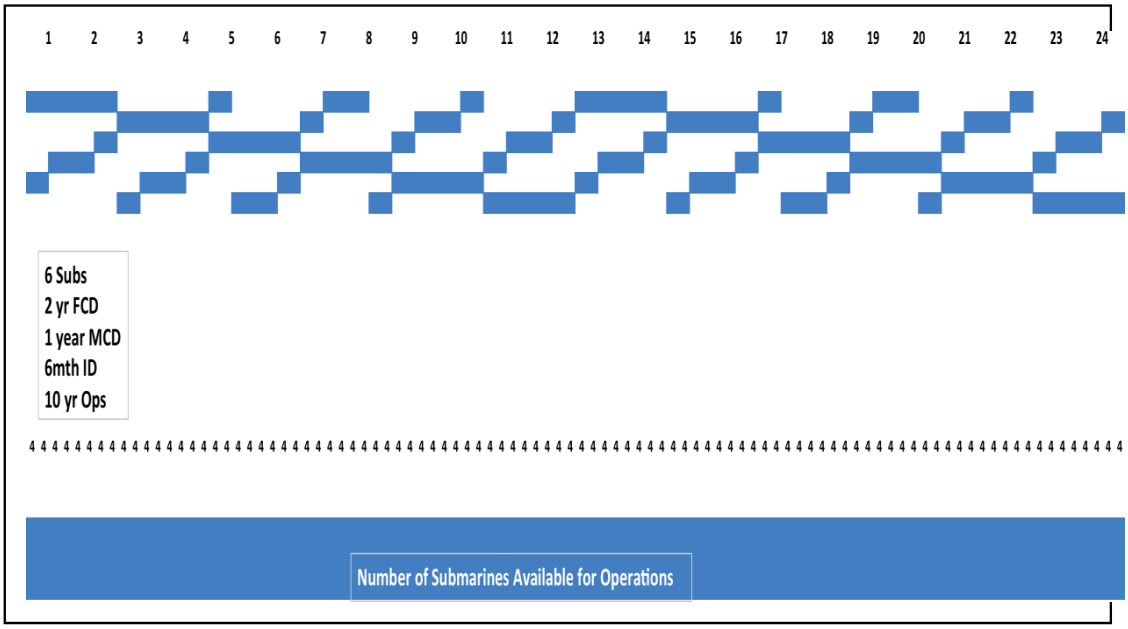
Might this include additional Collins Class submarines, incorporating all the enhanced design features proposed for the Collins LOTE?

Without some radical expansion of the submarine industrial workforce, will Australia have the capacity to embark upon a third major project simultaneously for such an acquisition?

If all three projects were attempted, the history of defence projects would suggest a significant risk of insufficient numbers of skilled workforce. Is it likely that all three would compete for limited shipbuilding skills and quite possibly fail on budget and/or schedule?

Given the current estimate that the earliest the first nuclear powered submarine will be in service by is 2035, a goal of no less than six (mixed class) submarines in service requires an exceptional level of assistance from our AUKUS allies to achieve a significantly earlier build program and acceptance into service for whichever nuclear powered submarine program the NPST ultimately recommends that the Government negotiates for.

If advice to the Government concludes that the risk of a capability gap in hull numbers is a serious risk, and also platforms to train the expanding uniformed required numbers, then is the construction of additional, enhanced Collins Class submarines the best option to fill that gap?



<u>Figure 1:</u> The 2+10 Post LOTE Usage Cycle for Collins (for 2yr FCD read 2yr LOTE)

For transition from Collins LOTE to Nuclear Powered-Submarine, a Collins being withdrawn from service is substituted with the first of class Future Submarine. This will continue the pattern and avoid a major disruption to the Navy, CASG and Industry. If the first post-LOTE Collins is withdrawn from service in 2038, the first of class Nuclear-Powered Submarine should be launched in 2040, as if it were the Collins returning from service following a two-year refit.

Sustaining the Submarine Capability – Trained and Effective Personnel

Minimising the risk of a capability gap is more than having at least six submarines in active service – it extends to having world-leading systems and crew for Australia's submarines. The risk of a tactical capability gap developing is exacerbated if the number of submarines in service drops below six. This will also result in lesser availability of sea-time to train crew skills (a vital part of tactical capability)

The Submarine Institute of Australia strongly supports the operational research leading to the decision to build at least eight nuclear powered submarines however, the timescale to achieve this increase in submarine capability is a matter of concern and there should, wherever possible, be an acceleration of the acquisition program. This in turn will place even greater attention on the recruitment and training of an expanded submarine enterprise workforce to build and crew the additional submarines. (Section 2.1.2 above refers)

Sustaining the Submarine Capability – Tactical Capability: Stealth and Weapon/Sensor Systems, Maintaining the 'Edge'

In conflict, submarines provide stealth options that other military assets cannot, which is why sovereign submarine capability is a central factor in Australia's national security. Given the steady increase in regional submarine numbers, there is an increasing risk that a gap in tactical capability is developing. Investment in improved tactical capability via the Collins LOTE will help to mitigate this risk.

The Capability 'Edge'.

From first acquiring the Oberon class, the Australian submarine enterprise has relentlessly strived to provide Australian submarines with a capability 'edge: a level of tactical capability better than our potential adversaries. Below is a summary (not exhaustive) of the world leading submarine tactical development achievements in Australia.

Oberon Class Developments in Australia.

- Oberon integrated and digitised SFC System incorporating/integrating USN Mk48 torpedoes, UGM84 sub-surface to surface homing missiles and selected sensor suites with advanced signal processing, resulting in the most effective conventional submarine weapon system worldwide. An unsurpassed UGM84 software development (superior to the USN control system) facilitating simultaneous arrival 'on-target' of a salvo of up to six sub-harpoon missiles. All with differing angles of final approach, to saturate the AAW defences of the target.

Collins Class developments in Australia included:

- Submarine hull welding techniques so good that they have been incorporated by the US submarine building industry;
- Australian fabrication of HY80 class steel equal to/exceeding world-wide standards.
- Anechoic tiles, together with an adhesive so good, that Collins class tiles do not separate from the hull (an exclusive world-wide capability).
- Pumps so quiet that the USN acoustic ranging facility on the NW US coast could not detect them.
- Passive Intercept ranging sonar algorithm with continued enhancement.
- Development and continued enhancement of automated passive ranging algorithms.
- Data Fusion algorithms using multi sensor sources to enhance initial detection.
- Close range/high bearing rate target tracking and firing solution.
- Automated, high density target tracking.
- Multi-sensor tactical data management, facilitating automated record compilation.

Life-of-type extensions for the Collins class submarines is not only integral to ensuring there are no less than six hulls in service, but also to ensure that the capability 'edge' is sustained and enhanced. LOTE must address increasingly demanding technological and geopolitical requirements as well as avoiding obsolescence. This again points to the increase of a risk of a capability gap should the number of submarines in service fall below six. This risk would be compounded if the improvement of tactical sensor/weapon system capability via the Collins LOTE is not pursued.

Despite the leading-edge technology and consequent submarine capability 'edge' provided by earlier Australian technology developments, the glacial nature of Defence procurement processes (particularly the 'tender' documentation) may result in the capability 'edge' being overtaken by potential adversaries, before those capabilities are brought into service. The USN have recognised the critical need to fast track innovative developments and provide funding in a timely manner. Australia's attempt to speed procurement up for such smart developments (the Innovation Hub) has not been a success**. Ultimately, a tactical capability edge is a strategic imperative.**

• Summary

○ Submarine Force Structure

▪ *Overall key considerations.*

- It is essential to the national security of Australia that the risk of a capability gap during the transition from the Collins class submarines to nuclear propelled submarines, be minimised and be at the forefront of government policy.

- It is essential that Australia maintains a strong "whole of submarine enterprise" capability during any transition from the Collins class submarines to nuclear-propelled submarines, such that we are ready to build and operate nuclear-propelled submarines when the time comes.

- It is a strategic imperative that our submarines maintain a capability 'edge' which gives them a tactical advantage over potential adversaries.

- Timely addition of a 'land-strike' capability to the current 'maritime-strike' capability of our submarines would offer a significant strategic 'force-multiplying' enhancement to the ADF.

▪ *Risk Management*

Analysing, evaluating and managing the risks associated with avoiding any gap in submarine capability is critical to strategic Australian submarine deterrence.

• Conclusion

Strategic Deterioration

Worst Case.
Should the strategic situation continue to degenerate to the point at which hostilities break out, then our circumstances will change radically. Australia is likely to need to defend itself for an indefinite period.

With Nuclear powered submarines unlikely to be available until mid to late 2030s - and given the complexity and risk of such a program potentially later - it is imperative the review ensure a submarine capability for this entire period with a capability commensurate with the potential for further strategic deterioration. Consideration of such a capability could include maintaining and enhancing the current Collins capability, acquiring new systems and platforms, enhancing other existing systems and platforms.

Purpose and Intent of this Appendix

▪ *Purpose.*

The purpose of this appendix is to examine the risk associated with sustaining Australian submarine capability, as we progress towards the acquisition of nuclear-powered submarines.

- *Intent.*

It is not the intent of this appendix to dictate solutions to the ADF for resolution of perceived issues

Appendix 3: Submarine Force Posture

Submarine Basing.

Current Operational Base Location.

A major dilemma which challenges the Strategic Defence of Australia is the vast geographic area of the continent. A decision in the mid-1980s (and executed in the mid-1990s) moved the operational submarine base from (Neutral Bay) Sydney to HMAS STIRLING at Fleet Base West at Garden Island, WA. This reduced the transit distance from the major submarine base to areas of operational interest to the north of Australia.

Enhancement of this strategic decision included the transfer/development of logistic support facilities including:

- Submarine Escape Training Facility ('Wet Training' no longer undertaken)
- The Submarine Training School;
- The Submarine Command Team Trainer;
- The Submarine Intermediate Maintenance Facility at Henderson;
- Submarine Weapon Maintenance Facility;
- Underwater tactical tracking range (the original facility is no longer operational – a project for a Deep Water, a Shallow Water and a Portable tactical tracking ranges is in place);
- Magnetic Treatment Facility;
- Crew accommodation and recreational facilities;
- Shore power, craneage and 'Hotel' facilities on all submarine jetties (Also configured for nuclear-powered submarine support);
- Submarine focussed Fleet-Base West DSTG research centre.

Fleet Base West is expected to remain as the major Australian submarine base.

Considerations for Future Submarine Support Facilities.

East Coast Submarine Base

A strategically driven government announcement, in relation to an East Coast base for Australian submarines, was made in early March 2022. Three locations were mentioned but the caveat that more detail would not be announced for some time suggested that such detail would be included in the studies being undertaken by the NPTF and hence unlikely to be available until the NPTF recommendations to Government were announced in March 2023. Such East Coast Base considerations might include the benefits of an independent naval base, separate from commercial maritime interests

Some duplication of logistic support facilities will be required, such as industrial facilities for assistance with submarine maintenance. The portable tactical tracking range will provide tactical training and practice weapon firing facilities. Also required will be crew accommodation and recreational facilities, together with shore power, craneage and 'Hotel' facilities, configured for nuclear-powered submarine support, on all submarine jetties. Such facilities offer options for allied submarines to plan extended deployments in adjacent operational areas to east Australian waters.

Two-ocean basing of naval assets is a strategically sound decision for a country the size of Australia. Further strategic considerations cover the issue of how 'forward' (northwards) such bases should be situated, draws into consideration potential adversarial threat from long range assets, together with cost of support facilities remote from major areas of industrial support.

A future requirement for covert submarine operations in south pacific areas adjacent to the east coast of Australia, is a strategic factor which should not be ignored.

Forward Basing: *from* Australia (RAN): *to* Australia (USN/RN) – Strategic Issues

d. *Submarine Depot Ships*

The Royal Navy used to (and the US Navy still does) operate Submarine depot ships capable of offering logistic support to submarines in areas remote from sovereign ports. The U.S. Navy has two aging 40+ year old Submarine Tenders, USS Emory S. Land (AS 39) and USS Frank Cable (AS 40). Both are forward-deployed and based at Apra Harbor, Guam. They deploy throughout the Indian Ocean and the Western Pacific, repairing U.S. Navy ships and submarines in that theatre from Japan to the Persian Gulf. Both are due to complete operational service shortly. No firm decision on replacement has been made.

A submarine depot ship for Australia might represent some significant strategic benefits for conventional submarines. Arguably however, the cost and probable vulnerability (in areas of 'forward' location) and rationale for this type of capability, has been countered by the speed, endurance and stealth of nuclear submarines.

e. *Allied Logistic Support*

Western allies have traditionally offered logistic support to submarines from other allied navies in sovereign submarine bases. Bases without nuclear powered submarine support facilities are of limited strategic benefit in logistic support for nuclear-powered submarines.

The relative proximity of HMAS STIRLING (as opposed to Guam and Hawaii) to the Persian Gulf offers significant opportunities to expand logistic support to USN submarines on WESTPAC deployment (e.g. joint use of weapons storage/maintenance facilities and underwater tracking range training facilities).

A former USN COMSUBPAC[13] is on record as stating that the relationship between the RAN and USN submarine forces in the Pacific should parallel that between the RN and USN in the Atlantic.

Australian submarines carry USN submarine weapons. In a time of hostilities (and in addition to home-based arsenals) access to resupply of these weapons, across the Indian/Pacific maritime region, will feature as an important part of Australian submarine operational planning

[13] RADM Al Konetzni USN COMSUBPAC 1999-2002

Appendix 4: Submarine Command and Control

Submarine Command and Control.

Reflecting the Strategic Priority.
Command and control of (at least) 8 nuclear-powered submarines demands a strategic priority. The level of operational collaboration with our US allies in our joint areas of interest, using technology sourced from (and approved by) the highest level of US submarine command (Head of Naval Reactors) will probably warrant a review of Australian submarine command and control.

Operational collaboration will involve close liaison with the US Navy's COMSUBPAC (Commander, Submarines Pacific Fleet) and also the Royal Navy for RN submarines deployed to our region– particularly via joint operations with visiting (or seconded) allied nuclear-powered submarines.

This may warrant a dedicated strategic command of experienced submarine specialists, with a senior staff of post submarine command officers, headed by a two-star ranking flag officer[14] A rank parallel to that of the head of our regional US submarine ally, with a parallel operational specialised command structure.

Such a command structure, with links to Australia's Nuclear Regulating Agencies and also to our UK and US allies, is likely to be the subject of the NSTF study.

Allied Maritime Collaboration.
Whilst the sovereign nature of command and control of Australian forces is an enduring feature of our democratic system, in most cases, the strategic employment of those submarines will be undertaken in collaboration with our allies.

USN/RAN maritime collaboration in surface/amphibious warfare is a political imperative; in submarine warfare it is a strategic and operational imperative. There is tangible, operational benefit to the USN submarine force from what we have to offer. Effective allied submarine water-space management is a critical operational imperative.

Consolidation of Submarine Force Command and Control.
The current disaggregated approach to submarine command and control – which involves a large number of geographically dispersed organisations dealing with aspects of operations, personnel, training, maintenance, material logistics and capability development seems to avoid the principle of "unity of command". The structure does not train high command for dedicated management of submarine operations. It risks obfuscation of management accountability and obscuring the concept of deterrence.

Establishment of a senior position at two- or three-star level at the head of a Submarine Command, and realignment of the existing structure might clarify the submarine organisation and make accountability for delivery of the effect Government requires.

Command and Control - Comparisons with Other ADF Capabilities
The RAAF has recently established Space Command[15] while the Army has had Special Operations Command[16] in place for some time.

[14] Of note, the RAAF has a 'Space Command' headed by a two-star officer, but with no strategic space assets
[15] https://www.airforce.gov.au/our-mission/defence-space-command
[16] https://www.army.gov.au/our-people/army-leadership/special-operations-command

Special Operations Command and Space Command are led by two-star officers and the respective organisations create environments which encourage close focus on the effects the Capabilities they lead are required to achieve.

The advertised functions of Space Command, namely:

a. … bringing "members of Air Force, Army, Navy, and the Australian Public Service together under an integrated headquarters reporting to the Chief of Air Force, as the Space Domain Lead. (To:)

b. Develop and advocate for space specific priorities across Whole of Government, industry, allies, and our international partners.

c. Allow us to establish an organisation to create, train and sustain our people and assign trained space specialists to the Chief of Joint Operations when needed.

d. Conduct strategic space planning, assist in the development of refinement of space policy, guide scientific and technological space priorities and define a resilient and effective space architecture in close collaboration with our allies.

e. Ensure the design, construction, maintenance, and operation of Defence space capabilities are in accordance with Defence standards and limitations[17]."

The philosophy behind these functions is most relevant to the Submarine Enterprise.

Summary

The various entities which support and manage the Submarine Capability Enterprise conduct functions parallel to other specialised Defence Capabilities in developing, growing and maintaining warfighting capability. However, the current fragmented submarine organisation means that there are many "cross command" responsibilities which blur accountability and create a lot of room for unnecessary confusion and misunderstanding. The fragmentation is further exacerbated at the O5 level and above because there are insufficient numbers of submarine command qualified officers to fill the current multi-departmental staffing requirements.

Conclusion

Submarine Force Command-and-Control structure should be clear and understood by Australian politicians, the public and our Allies. It should be at a level commensurate with the importance of the Submarine Force as a critical facet of national maritime deterrence.

[17] Ibid Space Command

Appendix 5: Genesis and Evolution.

Acquisition of a modern sovereign Australian submarine capability began with the procurement of six Oberon Class submarines from the United Kingdom, HMAS OTAMA being the last delivered in 1978. Around the same time saw the genesis of the Submarine Weapon Update Program (SWUP) via which the Oberon Class were fitted with the digital Submarine Fire Control System (SFCS), an updated digitised sonar suite and two advanced US weapons (Mk48 wire-guided torpedo and UGM84 Sub-Harpoon ASM). The integration of these components was a largely Australian development undertaken at the Submarine Warfare Systems Centre (SWSC) at HMAS WATSON. SWUP was a highly successful program, greatly admired by our USN submarine colleagues. The outcome provided a significant capability 'edge' over potential adversaries.

The construction, acceptance into operational service and tactical development of the subsequent class of Australian submarines – the Collins Class – over the past twenty years has been a challenging (but ultimately, very successful) journey. Systems capability development has largely transferred from SWSC to industry, requiring different management skills and procurement processes. ASC effectively perform the role as Class authority for maintenance and major refits of the Collins Class Submarine capability. The collaborative agreement and participation with the USN for the combat system ANBYG-1 programme has also proven an effective transfer of technology and training to the Collins Class submarine programme.

Decision to Acquire to Date of Delivery:

Historical record of the Submarine Capability 'Gap'.

- The decision to acquire AE1 and AE2 was taken in 1909. They were delivered in 1914 (5 years);
- The decision to acquire 6 Oberon Class was taken in 1959. The first was delivered in 1967 (8 years);
- The decision to acquire 6 Collins Class was taken in 1983. The first was delivered in 1996 (13 years) by which time 4 Oberon Class had decommissioned;
- The decision to acquire (not less than) 8 nuclear-powered submarines was taken in 2021.

The Gap between the first Oberon paying off and the last Collins being accepted into operational service (1994 - 2003: 11years), resulted in a serious shortfall of submarine availability for both operational deployment and practical sea-training for growing the number of qualified submarine personnel. A capability gap which took over 15 years to resolve. This gap had serious strategic consequences; a repeat of which cannot be countenanced in today's increasingly deteriorating strategic climate and heightening regional tensions.