Joint QinetiQ and BMT submission to Senate Foreign Affairs, Defence and Trade Committee on Procurement procedures for Defence capital projects

Draft Version 2.0, July 22nd 2011

THE SEA1000 PROJECT:

PROCUREMENT METHODOLOGY

Delivering a world class submarine capability for Australia

Draft Version 2.0, dated 22nd July 2011

Any questions relating to this paper or its content should be provided to the primary authors using the contact details below:

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Information and context:

Further to the submission of a join QinetiQ and BMT abstract "The SEA1000 Project: Procurement Methodology", this draft paper is provided to representatives of the Senate Standing Committee on Foreign Affairs, Defence and Trade Committee to support discussion and questions development in preparation for a hearing on Defence Procurement scheduled for 12th August 2011.

This submission includes the original executive summary submitted on 15th April 2011 and the latest Draft Version 2.0 of the referenced paper: Delivering a world class submarine capability for Australia. This paper is a work in progress document which continues to evolve based on feedback and discussion with SEA1000 Project stakeholders across Defence and Industry.

QinetiQ and BMT therefore welcome any questions, comments and observation in relation to this document, and request that such feedback is provided directly to the authors referenced above.

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Original Executive Summary, submitted 15th April 2011

SEA1000 Project: Delivering a world class submarine capability for Australia.

The Commonwealth has decided that a submarine capability forms an essential part of the assets needed to deliver a coordinated and coherent defence strategy, in collaboration with its international partners, over the coming decades. At a time of increasing security and asymmetric threats, a submarine fleet provides a unique set of countermeasure capabilities, able to operate covertly in anticipation of and in reaction to events.

However, the operational constraints imposed on the existing fleet by poor availability, which has its origins in the design and acquisition choices, processes and subsequent IPR and other difficulties; requires that the past lessons guide the approach to be adopted for SEA1000. Perhaps more important is that this must be seen to be the case, if both public support, multiple stakeholder buy in and industry, research and the wider economic community are to be properly motivated and engaged.

The Commonwealth is in the process of determining and defining its acquisition strategy as part of a cabinet submission for the SEA1000 Project. As part of that process, the Commonwealth will need to consider how to deliver the best submarine capability Australia can afford, and the Project structures required to underpin capability delivery. This question has been considered as part of this summary paper developed by QinetiQ and BMT, where the following conclusions are discussed and evidenced within:

- *A key objective of the SEA1000 Project should be the development of an indigenous sustainable submarine design, build and support capability as opposed to sole focus on acquisition of 12 submarines.*
- *Separating the Design and Production Phases of the SEA1000 Project as a means of drawing together a "best of breed" collaborative team to support the convergence of Project requirements into a well developed Preliminary Design solution followed by a competitive detailed design and production activity thereby achieving the "Value for Money" objective.*
- *Delivering the 12 submarines in batches, for example as 3 batches of 4 submarines, will accommodate lessons learned, modified operational requirements and technology insertion.*
- *Scheduling the build program to achieve a continuum of design and build activities, for example a 3 batch program of 4 boats, will result in a delivery schedule of one per 2 ½ years.*
- *The Commonwealth appetite for and appreciation of risk and commercial structures will drive Australian Industry's capacity and ability to deliver.*
- *Consideration should be given to the establishment of a Capability Partner to take the SEA1000 Project through the design and production phases, with the option to extend the commercial relationship to an SPV in preparation for the production phase.*

As one of the most significant programs for the Commonwealth and the Royal Australian Navy (RAN), the SEA1000 Project will deliver and maintain a powerful ocean-going presence; place RAN firmly on the front foot of regional operations; and with industry, develop in-country skills and capabilities to ensure the sustainable, affordable and cost effective delivery of the (SEA1000) Future Class of Submarines from its service life through to disposal.

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Delivering a World Class Submarine Capability for Australia

ABSTRACT

SEA1000 can deliver two capabilities for Australia; 1) a modern submarine force and 2) an enduring submarine design, build and support capability. Assuring the effective design, acquisition, development, delivery and sustainable operability of Australia's Future and ongoing Submarines Capability will be dependent on the creation of a nation building program that addresses existing industrial capability and capacity shortfalls, current and anticipated technology and engineering skills requirements, mobile and sustainable workforce creation, and appropriate commercial contracting mechanisms that encourage and incentivise all stakeholders to work together as part of a single team. In this Paper, QinetiQ and BMT have jointly considered how the Commonwealth can deliver the best submarines and submarine capability Australia can afford, and the project structures required to underpin capability delivery, whilst addressing the critical need to create a growing and sustainable national submarines capability. In delivering this paper, we will discuss options available and conclusions that include:

- Development of a national sustainable submarine design capability
- Separating the Design and Production Phases of the SEA1000 Project
- Delivering the 12 submarines in batches
- Creation and sustainment of a 21st century Navy workforce
- Commonwealth appetite for and appreciation of risk
- Establishment of a Capability Partner
- Consideration of the creation of an SPV for production

In developing this paper it is our intention to challenge current approaches and present new ideas, promote and encourage innovative thinking and proactively engage in an open debate to support and ensure the sustainable, affordable, and cost effective delivery of the SEA1000 Future Submarines Project.

INTRODUCTION

For the purpose of this paper the number of submarines defined in the Defence White paper 2009 has been used in program considerations. The recommendations of this paper are however flexible to accommodate any range of submarines to be produced and the timeframe over which they are delivered, noting that the unit cost of ownership will vary accordingly.

This summary paper has been compiled on the basis of ongoing discussions with SEA1000 stakeholders in the Commonwealth of Australia (the Commonwealth) and Industry. It assumes a level of SEA1000 Project knowledge inherent in the Commonwealth and Industry stakeholders involved in Australian Submarine acquisition and sustainment programs, and provides an overview on peer review, analysis and consideration of the imminent requirements of the Project.

The significant level of investment, particularly in comparisons with the other spending imperatives of the Commonwealth means it is incumbent on the SEA1000 Project to define a clear, properly funded and communicated acquisition strategy from design to disposal which can gain Ministerial sponsorship and overt support. To inform the SEA1000 Project as the team prepares its Cabinet

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Submission, QinetiQ and BMT have jointly prepared this paper to inform and potentially challenge stakeholders in the Project when considering their options by addressing the following key questions:

- How does the Commonwealth deliver the Best Submarine Capability Australia can afford?
- How does the SEA1000 Project structure itself to enable the Commonwealth to deliver the required capability?

In the context of these questions, this paper also considers the resources, experiences and references available to support Ministerial review of the Collins experience to ensure: positive and constructive lessons are learned; the existing Collins Class Submarines are maintained; and there is a smooth transition to the Future Class Submarines. This paper is therefore broken down into 4 key discussion areas:

- Separation of the Design and Manufacturing phases
- Batched Production
- National Capability and Resource Development
- Commercial Models and Teaming Options

CONSIDERATIONS

In defining the acquisition strategy for the SEA1000 Project, there are a number of Stakeholders each with defined success factors. These success factors critically include the following:

- Engagement and development of indigenous industrial capability and capacity to ensure taxpayer funds benefit the Australian economy.
- Industrial capability needs for skills and resources sponsored by industry through education and training.
- Collaboration between industrial, research, academic and Commonwealth parties to migrate understanding, ensure adequate and realistic testing and challenge to assumptions, outcomes and promotion of best practice.
- Collaboration to drive exposure and subsequent management of risk by those best equipped to do so.
- Recognition that Value for Money is relative: it must be judged by comparison between alternative national outcomes at the program level as well as configurations of performance cost and schedule.
- Recognition that “Best Affordable Submarine” means the budget is the dominant control mechanism for determining the achievable performance and the schedule. It implies that a reduction in budget will result in reduced performance (capability) and a production schedule optimised for least cost.

A sustainable submarine arm requires proper consideration to the needs of serving sailors aboard a new vessel in more than a decade. These sailors, eight years old today, will be those of the iPod and mobile phone generation. Today’s youngest sailors, combined with an academic and behaviour science approach, will have a valuable contribution to ensuring the design goes as far as possible to meeting those needs while promoting an attractive working environment and career choice.

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DELIVERING A WORLD CLASS SUBMARINE CAPABILITY FOR AUSTRALIA

In compiling this paper a submarine capability is defined as the intellectual, scientific, managerial, industrial and operational capability and capacity required to achieve the through life design, development, production and operation of submarines.

To inform the SEA1000 Project as it prepares its Cabinet Submission, QinetiQ and BMT have jointly prepared this short paper to inform and potentially challenge influential stakeholders in the Project when considering their options by addressing the following key questions:

- How does the Commonwealth deliver the Best Submarine Capability Australia can afford?
- How does the SEA1000 Project structure itself to enable the Commonwealth to deliver the required capability?

This paper is broken down into 4 discussion areas:

A. Separation of the Design and Manufacturing phases

B. Batched Production

C. National Capability and Resource Development

D. Commercial Models and Teaming Options

A. Separation of the Design and Manufacturing Phases

It is reasonable to expect that the Australian government should not pay a premium for acquisition of new capabilities such as the future submarine force and that 'best value' is achieved through competition.

It should be recognised however that Value for Money is relative, not absolute: it must be judged by comparison between alternative national outcomes at the program level as well as configurations of performance cost and schedule. A key factor that may be considered in determining what is Value for Money would include the ability to design and modify submarines in-country.

The government has clearly signalled the intent to build and sustain submarines in Australia. The safe and efficient execution of submarine acquisition and sustainment programs require suitably qualified and experienced design, engineering and production staffs. These skills can only be sustained by work on real submarine projects. Personnel with these skill sets are limited in Australia, and consequently an acquisition model that relies on the availability of competing teams of such personnel is unrealistic. An alternative model that attracts and retains this skilled workforce whilst achieving continuity and development is required.

The concept of batching, captured in Annex A, provides the continuity of design and production skills through the development of an evolved design baseline every 8 to 10 years. This batching approach thereby supports learning and career development.

Noting that no other nation has a Military Off the Shelf (MOTS) solution to the unique Australian operational requirement, and hence design will always be a major element of any Australian submarine project, the question "Should Australia develop the capability to design submarines?" should be asked.

The cost of ownership for a submarine capability must be considered on a whole of life, whole Fundamental Inputs to Capability (FICs) perspective to provide a realistic basis for comparison. For

convenience the practice of splitting the SEA1000 Project into an acquisition and in-service phase has been adopted. It is anticipated that the acquisition cost for a 12 boat submarine force would be in the order of $36B with a projected in-service cost of $60B (based on Budget estimate FY 09/10 for Collins Class).

The acquisition cost can be further decomposed into the Design and Build phase. The design of a submarine is an iterative process from concept and feasibility design activity, preliminary and detailed design with progressive levels of design definition and resources being required. Typical engineering/technical resource loading for a conventional submarine design activity are approximated in table 1.

TABLE I. DESIGN PHASE PERSONNEL COSTS

Design Phase	Personnel Requirements	Indicative Cost*
Concept and Feas bility	• 15 personnel for 6 months	• $1.5M
Preliminary	• 150 personnel for 18 months	• $45M
Detailed	• 400 personnel for 30 months	• $180M

* Personnel costs calculated using current rates for long term contracted, mid range resources in support of Defence programs

The concept and feasibility design activity is a high level activity which explores the user requirements and available technologies to identify options and subsequently determine their feasibility and merit ranking.

The preliminary design activity involves an increased level of subject matter discipline engineering, supported by equipment and system suppliers to develop the design to establish the functional baseline and preliminary physical baseline. Design for production is considered during this activity at a functional level only.

The detailed design activity expands the design to a full physical definition and configuration optimised for the build strategy and facilities. The integrity of the functional design baseline must be maintained throughout this activity and hence requires a level of oversight and control by the designer.

Noting the different focus and priority of each phase of design and hence the skill set required to support each, it is reasonable to split the activities into two separate elements with a transition at the end of Preliminary Design.

The team that supports the initial phase of the design activity would form the Australian indigenous submarine design capability and be populated with subject matter experts and representatives of the key stakeholder communities (personnel cost of this activity for a single design program would be in the order of $50M).

The conduct of the Preliminary Design Review activity would represent the end of this phase at which point the allocated baseline has been established (definition of the major systems that make up the submarine, how the systems functional and performance requirements are to be achieved and allocated to lower level sub systems and equipments) and approval to proceed to the detailed design phase is provided.

Detailed Design and Build – The detailed design activity expands the design to a full physical definition and configuration optimised for the build strategy and facilities. The detailed design and

build activity would be conducted by the prime contractor and hence this activity, which represents by far the bulk of the funding, could be competed to gain best Value for Money.

It would be imperative that team members from the design team be involved in an oversight and control role to maintain the design configuration baseline. It would also be essential that members of the design team be involved in the Acceptance Test and Evaluation activity to monitor achievement of the requirement and where necessary revise the design baseline. The strength of this assertion is based on experience of related programs, such as Astute, where divergence from design intent occurred during the Production phase.

In-Service – The maintenance and modification of a submarine when in-service represents a considerable ongoing cost. With respect to the Collins Class the in-service support has been provided by ASC with significant contractual and IP constraints. This situation has limited the Commonwealth options in competing support activities and hence demonstrating that it is getting Value for Money. Should the Commonwealth adopt an approach whereby the design configuration control activity is conducted by an Australian indigenous submarine design agency then Value for Money can still be achieved by competing the in-service support activity on a batching basis similar to that being adopted in the surface fleet.

Through this mechanism, the understanding of the design philosophy vested in the design team established through the initial design process is retained through life, and, deviations and changes from the design baseline can be achieved with confidence drawing upon this understanding.

The conduct of the maintenance and configuration change activities will be vested in organisations with the appropriate project management, technical and manufacturing skills to optimise this element of the support activity. The competing of long term support contracts with these organisations against set Key Performance Indicators (KPI's) will develop product knowledge, encourage ownership and innovation.

B. Batched Production

During options development and analysis, QinetiQ and BMT have jointly considered the suitability and potential benefits of batched production in the creation of an evolving, sustainable submarine capability. By way of an example we have developed a schedule for a submarine program (at Annex A) that achieves a 12 boat build with a hull life of type of 30 years. Using the schedule for the Collins Class design and construction activity as a basis this results in an overall schedule from concept design to retirement of the first boat of 43 years (i.e. replacement of First of Class (FOC) in 2055 assuming concept design commences in 2012). Cost estimates for the 12 program build have been reported in the press of up to $36 billion (2010 dollars) which would result in an average annual spend in the order of $840 million, a significant proportion of the annual defence budget.

Noting one of the primary industry concerns from an efficiency perspective is the achievement of a consistent flow of work and hence overcome the expensive requirement to repeatedly build up industrial capability then to have it dismantled at the end of each phase. To that end the approach of having a continuous build program provides a framework to achieve this objective and deliver significant Value for Money to the Commonwealth through distributed resource investments rather than individual investments and associated start up and close out costs for single, uncoordinated contracts.

It is apparent however that in a program that extends over a 43 year duration, boat 1 and 12 cannot be the same. At several points capability requirements will deviate from the baseline and its subsequent enhancements, obsolescence will become an issue; lessons learned will need to be embraced and contemporary requirements adopted. As a consequence of this it is argued that the

Commonwealth should accept a batching strategy to enable continuous development and refinement as part of a coherent, current and world class fleet. If this recommendation is adopted, the question "What are the drivers of batch size and what would be the objective of moving to each successive batch?" needs to be posed.

There are two separate but integrated activities involved in a submarine program, the design activity and the construction activity, each with distinct roles, organisational arrangements and skill sets. To maintain and develop these elements they must be continuously exercised and developed. From a simplistic approach to determine batch schedule and hence number of boats per batch the original Collins program has been used. The design activity from concept through to the end of detailed design was approximately 10 years. To achieve continuity of design activity the concept design activity for batch 2 would commence on completion of detailed design of batch 1. This logic would result in a 30 year period for design of 3 batches (at which point continuity of skills and capabilities would be maintained through commencement of design activity for the replacement of batch 1). This scheduling would result in a 4 boat batch size with one boat being delivered every 2 ½ years. Consequently the batch size would be 4.

Comparison of the duration of the construction activity against that achieved in the Collins Class program indicates that this would be a low risk delivery schedule which would also greatly ease the concerns over the required ramp-up of the submarine personnel required for manning.

While the proposed schedule reflects Collins' actual durations, several alternative options are available. For example, the duration of the development of Submarine 01 (SM01) could be extended with a larger gap to SM02 to allow for construction lessons to be implemented (e.g. 7 years for SM01 with a 3 year gap to SM02 and subsequent submarines delivered at 18 month intervals). Experience has demonstrated that the build time for subsequent boats in a batch would be expected to progressively reduce due to the builder's learning curve.

The number and scheduling of batch sizes would require consideration of several other important factors including:

- Technical Development

Assuming a largely in-country bespoke design and build, there is a strong argument for the batches to be more than technology insertion but to be technology growth and risk reduction. The first batch can be deliberately designed to be relatively simple to prove both the overall build, test and commissioning philosophy and to start to train crews and reset the entire submarine operating capability from Collins to SEA1000. The capability of SM01 would be limited and might be retrofitted later – but the objectives are simplicity, speed, and growing the build and operating capability. It may deliberately hold back on available technology. The next batch can be much more ambitious and introduce more complexity, for example in automation and more capability in signatures. A final batch could be the full desired capability using the appropriate available technology at the point of introduction into service. In due course the earlier batches would be brought up to the final standard.

- Technology Insertion

The batches need to consider the timescales to implement technology insertion. With this aspect the determination of the desired technology and its respective Technology Readiness Level (TRL) at the outset and subsequent program phases will determine what is realistic. A technology mapping process can then be adopted to progress these in parallel with the submarine program with decision gates for inclusion in the next batch or otherwise.

- Bi-partisan political support

This is an issue that would need to be addressed in order to sustain the nation building intent of the SEA1000 Project and accept the challenges of long term contracts i.e. the ability to forecast and control costs on the SEA1000 Project, political willingness to commit to long term costs, election periodicity, national consideration for material and system supply, regional issues regarding industrial development and sustainment, international relationships and so forth.

- The commercial acceptability of contracts

The commercial acceptability by the Government and the need to ensure that appropriate incentivisation is included. In addition long term high value contracts may not be acceptable to the industrial supplier(s) as without significant risk margins it would be almost impossible to gain Company approval. As part of this clear accountabilities need to be established up front for role such as Design Authority, clear Contract Acceptance criteria drawn up but covering the total duration of the contract and clear risk ownership and risk mitigation accountabilities.

C. National Capability and Resource Development

Many correctly consider the SEA1000 Future Submarines Project as Australia's largest Defence program. However, a critical success factor in securing the political, deliverable and operational success of the SEA1000 Project is the realisation and acceptance of Australia, its people and its government that the SEA1000 Project is about the investment in, creation and sustainment of a national capability where program success is dependent on a number of key factors:

- Political ownership and support

The SEA1000 Project needs visibility, understanding and support from Australia's political and media communities. A clear Project champion will ensure that the Project is accurately reflected and considered as part of political and social decisions that have an impact on skills development, national infrastructure, Navy force development, Industrial investment, attraction and development; significantly, any decisions around the potential and probable extension of the Collins Class platform past its original Out of Service (OOS) date. Support, clarity and availability of information for the SEA1000 Project will need to drive national support from the Australian people. 2014 marks the centenary year for Submarines in Australia and therefore offers an excellent and relevant platform for the launch of a Submarine information and support campaign for a sustainable through life Australian submarine capability.

- Successful Delivery of the Collins Program

The successful delivery of Collins and other programs is critical to obtaining the desired support and sponsorship for the SEA1000 Project. In an interview on Wednesday 20th July this year, Defence Minister Stephen Smith made it clear that no firm decisions would be made on the future submarines until the Cole's report is released in March 2012 stating "I don't want to start the fully fledged planning [for the future submarine] until I'm absolutely certain we've got the sustainment issues of the Collins Class right.". The recently released Rizzo report (Plan to Reform Support Ship Repair and Management Practices, July 2011) provides guidance on lessons learned for planned maintenance of Amphibious platforms; and the recently commissioned Coles report is expected to deliver the same guidance for Submarines. Australia's maritime Defence programs have received significant media coverage over the past few years, and as such Navy and the Commonwealth are working hard to re-establish the Australian Navy as a sustainable, national, world class capability. Such repositioning is critical in capturing the support of Australia's decision makers, politicians, and critically tax payers.

- International Economic Environment

A recent publication in the Economist "Australia's Promise – The Next Golden State" (http://www.economist.com/node/18744197) identifies the potential and promise that Australia as a nation is able to deliver, challenging Australia to "actively set about creating the sort of society that other nations envy and want to emulate." It invites greater self belief from the Australian people and to recognise "It is the most pleasant rich country to live in" as reported by the OECD (Organisation for Economic Co-operation and Development) at the time of publication. The paper advises that "Better themes for politicians would be their plans to develop first-class universities… …and stimulate new industries in anything from alternative energy to desalinating water. All these are under way, but few are surging ahead... However, the most useful policy to pursue would be education, especially tertiary education. Australia's universities, like its wine, are decent and dependable, but seldom excellent. Yet educated workers are essential for an economy competitive in services as well as minerals". Development of a national Submarine Capability is an excellent example of where Australia can invest today's available funds in education, skills creation and infrastructure. If accepted and recognised as a required, national capability, it is an assertion of this paper that Australia should use this time of relative prosperity to invest in skills development, attraction of specialist global experts, and the creation of a national infrastructure to support the design, develop and build program for Future Submarines.

- Skills Development… early

A critical and growing risk to the successful delivery of Australia's submarine capability is the lack of suitably qualified and experienced personnel. In delivering the through life aspects of the Future Submarine Project, Australia will need to support, define and implement a national workforce development campaign and action plan. Submarine designers, scientists, technicians, engineers, propulsion experts, platform developers, systems integrators, production staff and specialist procurement experts in commerce and finance for complex projects are draw from a finite pool in Australia. Additionally, the global pool is very limited with significant resourcing limitations at an international level minimising Australia's ability to draw on other nation's industries. At present, Australia is already stretched in its ability to resource and support the sustainment of the Collins Class of submarines. Further; there are a number of gapped posts in Industry, DSTO, SEA1000 SPO and DSME roles. Significant advances have been made in the creation and training of submarine crews with a fourth crew expected to be operationally ready by the end of 2012. In addition to the absolute number of available submarine resources, Australia's submarine community is an ageing population that requires attraction of a new generation of submarine experts and operators. It is an assertion of this paper that the lack of skilled individuals for design, development and operation is a critical risk to the SEA1000 Project and Australia's submarine capability which requires the creation of a focused, sponsored and supported workforce campaign and action plan to target the future workforce as early as possible. Such a plan should include focused engagement with schoolchildren (the Future Submarine operators), teens, college students, university graduates and current specialists already at work in non-defence environments to highlight the benefits and excitement that a career in submarine offers using familiarisation programs and online gaming as rapid engagement tools. Engagement opportunities could include submarine familiarisation days, school visits and opportunities to experience submarines, as well as use of common media environments such as cartoons, networking forums, phone applications, computer games such that a future in Submarines is an accessible, attractive and desirable aspiration for Australia's workforce of tomorrow. Jason Clare has recently sought Industry suggestions and ideas on how to improve SADI (Skilling Australia's Defence Industry). This could provide an excellent, innovative approach to investing in awareness and skills today to attract, develop and educate the workforce of tomorrow. This could be enhanced by the inclusion of Submarine Capability in the National Priority and Strategic Industry Capabilities (PICs and SICs).

As well as the future fleet, perhaps more concerning is the difficulty faced today in recruiting and retaining experienced procurement experts as part of the SEA1000 Project Office. Successful definition and implementation of the SEA1000 acquisition Project will require a fully resourced, highly skilled team of experts. It is a recommendation of this paper that any perceived skills and roles gaps in the Project office be addressed immediately, and that the Commonwealth considers options to attract the best skills and capabilities available in the Australian workforce to support Australia's largest and most complex Defence procurement. That is, the commercial construct and pricing model for SEA1000 requires the best in Industry and these specialists need to be targeted to join the team.

It is important that the SEA1000 Project is accepted and acknowledged as a national capability development program as a key contributor to national security. There are a number of commentators who believe the program objectives to be procurement of equipment rather than development of national capability. As such, these commentators believe that the Commonwealth should not be using Defence programs as a means of creating jobs, rather spending government funds on buying hardware as cost effectively, or cheaply, as possible. However, the need for a national submarine capability is driven by Australia's national security requirements. In the case of the SEA1000 Project the way to assure that Australia's national submarines capability is achieved, requiring significant access and utilisation of a globally limited workforce of skilled professionals, is to create the jobs required to deliver and sustain that capability well beyond the timescales of the SEA1000 Project.

This paper therefore asserts that the acceptance of Australia's submarine capability as a national capability and the creation and implementation of a workforce campaign and action plan, are critical to the eventual success of the SEA1000 Project.

D. Commercial Models and Teaming Options

Securing the successful and sustainable definition, procurement and delivery, of a "best affordable", technically superior submarine capability will be significantly dependent on the Project structure employed. The level of investment, significance and opportunity that the SEA1000 Project offers should attract the best that Australia is able to deliver from functional experts in the development of innovative finance and commercial models, through to world class domain and technical experts to drive the best capability Australia can afford. However, recruitment and retention is a significant risk.

Section C of this paper explored some of the resourcing risks in the Project's ability to attract the best that Australia has to offer as part of Government and Industry. Elements of this recruitment and retention risk can be addressed through the implementation of innovative Project structures that attract and retain experts as part of a clear and communicated Project with defined entry and exit points for all stakeholders. It is the recommendation of this paper that the Commonwealth establishes a Capability Partner, and considers, with commercial guidance, the option to extend that arrangement to a Special Purpose Vehicle or Entity (SPV/E) as the Project progresses.

In defining the acquisition strategy for the SEA1000 Project, the Commonwealth will have a number of procurement options available to secure technical, commercial and Project commitment and assistance in delivery. These options include:

- Continue with current commercial structure

The Commonwealth could continue with a small Defence support team to manage the totality of contracts across the acquisition phase of the SEA1000 Project, including technical support and commercial arrangements. Whilst this would place the Commonwealth at the core of Project delivery, it would create a complex web of interrelated contracts and dependencies that could have a detrimental effect on the through life cost of delivering the overall Project. The placement of multiple contracts with different terms and objectives may also affect Project coherence, limiting access to IP

and enhancements that draw on resources from other nations' rather than developing sustainable in-country capability and future proofing future submarines.

- Defence conduct all work in-house

The Commonwealth could complete all Concept Design, Preliminary Design and Detailed Design activities in-house. Whilst this may offer short term savings, there is currently too few experienced staff to support such an option. Furthermore it may distract the attentions of the Defence engineering and research personnel from those areas where they are truly expert, and could lead to a short term focus in a time of significant pressure on budgets and resources. Whilst specialist expertise could be contracted, month by month contracting means that all risk resides with the Commonwealth as all experts will have clearly bounded remits for delivery – potentially suppressing innovation and knowledge share.

- Establish a "Panel"

A panel of pre-approved experts could be established through competition with an agreed set of specialisations, rates and roles to meet surge and specialist requirements as the project evolves, securing delivery of specific tasks as part of the SEA1000 Project. Benefits of this approach could be limited by the lead times to issue and compete requirements, and could also drive competitive behaviours that will have a detrimental impact on knowledge sharing and flexibility. It could also put a burden on the Commonwealth. Embarking on a program that is the size and complexity of the SEA1000 Project requires the early establishment of culture, trust and effective relationships. Examples of panels include DMOSS, FATS (UK), AWD Shipbuilding.

- Establish an Alliance

An Alliance is a collaborative commercial construct that manages a clearly defined program. Successful delivery requires clear definition and communication of entry and exit points, supported by clear program boundaries. To ensure the creation and sustainable delivery of an effective Alliance, a critical success factor is clear and early definition of roles to ensure there is no turf warfare across the boundaries of each function or company. Implementation of an alliance would require early competition to support selection of "core" players, whilst establishing the Alliance Charter to govern behaviour as part of program delivery. It would enable team delivery of the SEA1000 Project wherein all parties have clearly communicated goals and Key Performance Indicators. Examples of Alliances include AWD Alliance, ANZAC and DJIMINDI.

- Establish a "Capability Partner" (through competition)

A Capability Partner is a contracted entity or team that works in partnership with the Commonwealth under a single contractual relationship. The Commonwealth sits above the contract, working in partnership with, but having clear governance and separation from, the Capability Partner. To share the management of risk, focus resources and secure timely, collaborative delivery of expertise from across Industry, the Commonwealth could establish a Capability Partner working directly with Defence engineering and research support personnel. This would require time and funds in advance of commissioning work, to create a collaborative team working under a strict partnering charter where business performance can be directly related to the through life success of the SEA1000 Project and its key gates. This prime contractor would manage the Value for Money delivery of all specialist support contracts as part of a collaborative consortium where knowledge is shared, innovation encouraged, competition recognised and timely support provided. Examples of Capability Partners include the Future Submarine Capability Advisor and Naval Design Partner programs in the UK.

- Establish an SPV/E

A Special Purpose Vehicle or Entity (SPV/E) is a legal entity created solely to serve a particular function, such as facilitation of a financial arrangement or instrument, delivery of a clearly bounded program or creation of a commercial entity. In recognition of the investment, significance and complexity of this task, the Commonwealth could consider establishing a SPV/E with a clear budget, remit, timescale, board and Project structure. This would enable the SEA1000 Project to operate with clear direction from the Commonwealth and produce clearly defined outcomes and deliverables against a fixed budget. Examples of SPV/Es include Snowy Mountains and Sydney Opera House.

It is a strong recommendation of this paper that the Commonwealth seeks commercial guidance on the viability of an SPV/SPE to support the SEA1000 Project as there is limited information and evidence in the public domain about the relative benefits and risks faced in delivery.

TABLE 2. THE BENEFITS AND RISKS OF COMMERCIAL MODELS

Model	Benefits	Risks
Current Structure	• Team that understands history of project • Existing relationships with Key Stakeholders	• Small team with large portfolio of programs • Gapped Posts • Inability to recruit
CoA in-house	• Short term savings • Strategy definition	• Resources no longer available • Insufficient commonwealth resource • Resources may have inappropriate experience
Panel	• Surge requirements management • Rapid access to expertise • Focused (narrowly defined) Compe ition throughout • Pre-qualification in advance	• Incoherent and/or spasmodic delivery • Unavailability of resource • Effort focused on SoW development not output deliverables • Timeliness of deliverables • Limited knowledge share • Administratively cumbersome
Alliance	• Single joint entity responsible for delivery • Internal competition for best of breed • Defined partners roles, responsibilities and scope of supply but with ability to trade	• Alliance becomes a competitive entity in itself to maximise its scope of work leading to... • Limited access to broader Industry • Potential internal competi ion over work share • Confusion around collective responsibility needs a painshare as well as gainshare mechanism
Capability Partner	• Risk managed join ly • Focused resources • Collaborative behaviours • Coherent program • Internal competition	• Higher initial investment in time and costs needed to develop teamwork and trust • Staff allegiance to the parent (stakeholder) organisation rather than collaborative team
Special Purpose Vehicle	• Nation Building • Enterprise Growth	• Detached from Mainstream Commonwealth activities • Not previously delivered in the Defence context

In the context of assuring successful through life delivery of the SEA1000 Project, the Commonwealth needs to develop a collaborative coherent program, where critical skills and expertise are available throughout the delivery and team members are encouraged to drive innovation through knowledge share and collaborative behaviours.

Regardless of the model employed, the following lessons and associated recommendations apply to ensure successful delivery of a coherent value for money Project construct:

- Early commitment and communication of a delivery plan developed and owned by all of the delivery team
- IP and Competition Laws must be addressed early
- A Partnering Charter and Principles Agreement must be jointly developed and agreed prior to commencement
- Common systems and IT tools are essential for effective delivery of complex programs
- Steering boards are necessary for effectiveness and keeping track of portfolio and alignment to objectives
- Co-location is recommended
- Behaviours and individuals are critical to success

Ultimately, Teaming and Partnering models work for the reasons they are established. Innovation and teamwork is driven by business processes and incentivisations employed.

Panels, Alliances and Capability Partners all offer excellent opportunities to develop trust. In a Panel, trust is established through a series of specific contractual arrangements over time; for Alliances and Capability Partners, that trust and collaborative culture is delivered more quickly as part of the teaming, negotiating and establishment of partnering charters and principles in which each entity will operate. This paper asserts that the Commonwealth should establish a Capability Partner, with the option to extend the commercial relationship to an SPV/E that includes the Build/Construction entity from the outset in preparation for the production phase.

The SEA1000 Capability Partner will work as one with, and under contract to, the SEA1000 Project. This ensures that the Commonwealth is able to develop a culture of trust and collaboration with the appointed Capability Partner and critically, if an SPV/E is subsequently established, the Build/Construction entity is engaged from the outset and the Commonwealth will have the time to work with the Capability Partner and commercial advisors (these can be part of the Capability Partner team if desirable) to develop the commercial and cultural framework feeding the lessons of the Design phase into the Production phase. Key Commonwealth benefits that can be expected from the implementation of a Capability Partner include:

- One centrally managed contract
- A collaborative team with a common objective
- Stakeholder definition, development and implementation of agreed, communicated, coherent program
- Creation and adoption of a best athlete model
- Immediate access and impact from experienced team
- Retained access to Industry experts through life
- Assured flexibility, agility and responsiveness
- Delivery of a nation building program

Joint QinetiQ and BMT submission to Senate Foreign Affairs, Defence and Trade Committee on Procurement procedures for Defence capital projects

Draft Version 2.0, July 22nd 2011

SUMMARY

In compiling this paper, the requirements, options, enablers and boundaries for the SEA1000 acquisition strategy have been considered. The focus of the Commonwealth decision will be much greater than that presented in this focused paper, however in compiling this focused paper, QinetiQ and BMT have made the following assertions:

- Separating the Design and Production Phases will enable collaborative delivery of program requirements as part of a well developed Preliminary Design solution. This solution will be readily translated into a practical Production Design which suits the industrial capability and appetite for delivery.
- Delivering the 12 submarines as 3 batches of 4 submarines (or a subsequently defined phased program) will accommodate lessons learned, modified operational requirements and technology insertion.
- Scheduling the build program to achieve a continuum of design and build activities as a 3 batch program of 4 boats will result in a delivery schedule of one per 2 ½ years will develop a sustainable national capability and supporting workforce.
- Considering a key objective of the SEA1000 Project to be the development of a national sustainable submarine capability. By accepting the program as a national capability and implementing an early workforce campaign and action plan, the Commonwealth will be able to draw on a sustainable local pool of suitably qualified and experienced resources well beyond the lifetime of the SEA1000 Project.
- The Commonwealth appetite for and appreciation of risk and commercial structures will drive Australian Industry's capacity and ability to deliver. Therefore this should be tested early with clear boundaries and commitments identified as part of the SEA1000 Project framework.
- Consideration should be given to the establishment of a Capability Partner to take the SEA1000 Project through the design and production phases, with further consideration given to the option to extend the commercial relationship to an SPV for the production phase.

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Annex A: Outline Schedule for Batched Production

Please see Enclosure A: Submarine Batching.pdf

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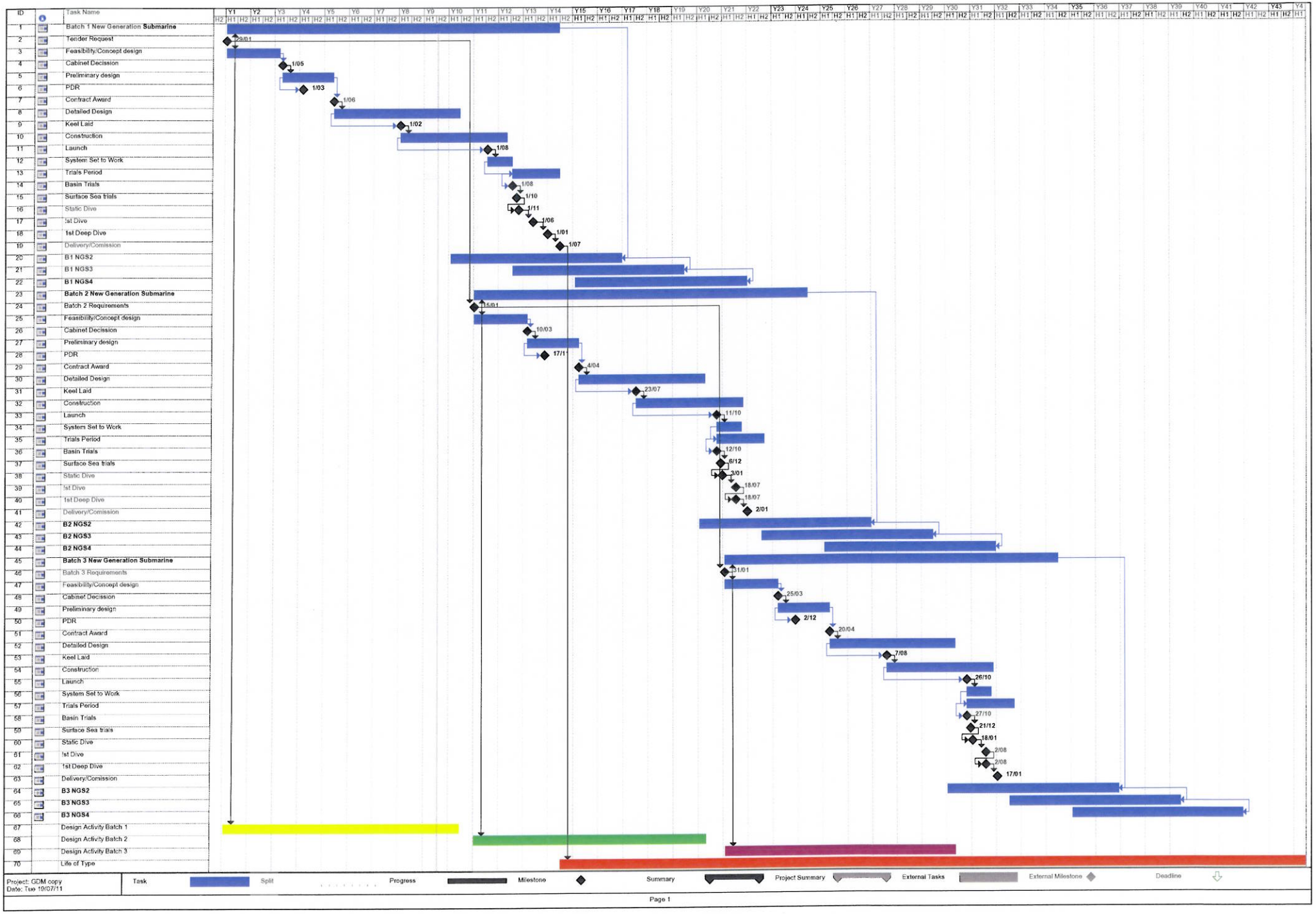
Annex B: Overview of Project Structure and Delivery Options

Model	Benefits	Risks	Australian Defence Examples	International Defence Examples	Commercial Examples
Current Structure	• Team that understands history of project • Existing relationships	• Small team with large portfolio of programs • Gapped Posts	• SEA1000		
The Commonwealth In-House	• Short term savings • Strategy definition	• Resources no longer available • Insufficient commonwealth resource • Resources relevant experience			
Panel	• Surge requirements management • Rapid access to expertise • Focused (narrowly defined) Competition throughout • Pre-qualification in advance	• Incoherent and/or spasmodic delivery • Unavailability of resource • Effort focused on SoW not outputs • Limited knowledge share • Administratively cumbersome	• AWD Shipbuilding • DMOSS	• Wessex (Submarine) • FATS – Framework Agreement for Technical Services • QBD – QinetiQ-BMT-Deloitte in the UK Successor	
Alliance	• Single joint entity responsible for delivery • Internal competition for best of breed • Defined partners roles, responsibilities and scope	• Alliance becomes a competitive entity in itself to maximise its scope of work • Limited access to broader Industry • Potential internal competition over tasks • Confusion around collective responsibility needs painshare and gainshare mechanism	• AWD & AWD Alliance • ANZAC • LHD Prime • DJIMINDI	• NITEworks • RPDE • SEPP (Submarine Enterprise Partnership) • ACA (Aircraft Carrier Alliance) for CVF	• Cereal Partners – JV between Nestle and General Mills • Oil & Gas – normal behaviour to participate in a development to share risks and rewards e.g. Barents Sea has Hydro, Statoil, Gazprom, Total, Chevron and Conoco
Capability Partner	• Risk managed jointly • Focused resources • Collaborative behaviours • Coherent program	• Higher initial investment in time and costs needed to develop teamwork and trust • Staff allegiance to the parent (stakeholder) organisation rather than collaborative team		• FSM CA (Future Submarine Client Advisor) • NDP (Naval Design Partnership)[1] • MOSA (Military Open Systems Architecture) • WTC (Weapons Technology Centre)	
Special Purpose Vehicle	• Nation Building • Enterprise Growth	• Detached from Commonwealth activities • Not previously delivered in Defence context		• AWE (Aldermaston Weapons Establishment) • NDP (Naval Design Partnership)	• Snowy Mountains • Sydney Opera House

[1] NDP is a JANE – Joint Arrangement No Entity – because UK MoD contracts separately with each participant. It could become an SPV if the participants formed one and then the MoD could contract through a single vehicle which would be more cohesive.


ID
Task Name
1 Batch 1 New Generation Submarine
2 Tender Request
3 Feasibility/Concept design
4 Cabinet Decission
5 Preliminary design
6 PDR
7 Contract Award
8 Detailed Design
9 Keel Laid
10 Construction
11 Launch
12 System Set to Work
13 Trials Period
14 Basin Trials
15 Surface Sea trials
16 Static Dive
17 !st Dive
18 1st Deep Dive
19 Delivery/Comission
20 B1 NGS2
21 B1 NGS3
22 B1 NGS4
23 Batch 2 New Generation Submarine
24 Batch 2 Requirements
25 Feasibility/Concept design
26 Cabinet Decission
27 Preliminary design
28 PDR
29 Contract Award
30 Detailed Design
31 Keel Laid
32 Construction
33 Launch
34 System Set to Work
35 Trials Period
36 Basin Trials
37 Surface Sea trials
38 Static Dive
39 !st Dive
40 1st Deep Dive
41 Delivery/Comission
42 B2 NGS2
43 B2 NGS3
44 B2 NGS4
45 Batch 3 New Generation Submarine
46 Batch 3 Requirements
47 Feasibility/Concept design
48 Cabinet Decission
49 Preliminary design
50 PDR
51 Contract Award
52 Detailed Design
53 Keel Laid
54 Construction
55 Launch
56 System Set to Work
57 Trials Period
58 Basin Trials
59 Surface Sea trials
60 Static Dive
61 !st Dive
62 1st Deep Dive
63 Delivery/Comission
64 B3 NGS2
65 B3 NGS3
66 B3 NGS4
67 Design Activity Batch 1
68 Design Activity Batch 2
69 Design Activity Batch 3
70 Life of Type
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Date: Tue 19/07/11
Task
Split
Progress
Milestone
Summary
Project Summary
External Tasks
External Milestone
Deadline
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