Australian Government
Department of Defence

Objective ID: BM7147176

s47F

Naval Group S.A
40-42 Rue du Docteur Finlay
75015 FRANCE
FRANCE

Dear s47F ,

SEA 1000 FUTURE SUBMARINE PROGRAM – SUBMARINE DESIGN CONTRACT — DRAFT TOT WAY FORWARD REVIEW OPTIONS REPORT – COMMONWEALTH RESPONSE

References:

A. Naval Group Submarine Design Contract Deliverable Data Item – DID-TOT-TWFOR (TOT-130) – DRAFT Transfer of Technology Way Forward Options Report, received 1 July 2019, (Objective ID: BM7098624).

B. Commonwealth Letter titled "SEA1000 Future Submarine Program – Design and Mobilisation Contract – Location and Organisation of Detailed Design Activities – Commonwealth Decision – Selection of Option 2" dated 18 December 2018 (Objective ID: BM2066191).

C. Commonwealth Letter titled "SEA1000 Future Submarine Program – Design and Mobilisation Contract – Integrated Master Schedule (MGT-110) – Planning Guidance" dated 3 October 2018 (Objective ID: (BJ1600343).

D. Commonwealth Letter titled "SEA1000 Future Submarine Program – Design and Mobilisation Contract – SDC Offer and Detailed Design Location" dated 31 December 2018 (Objective ID: BM2469740).

E. Commonwealth Letter titled "SEA1000 Future Submarine Contract – Transfer of Technology Way Forward Options Report" dated 18 June 2019 (Objective ID: BM6491525).

F. Minutes of Meeting – Intermediate Way Forward Review dated 27 June 2019, (Objective ID: BM7089977).

1. The Commonwealth acknowledges receipt of the Draft Transfer of Technology (ToT) Way Forward Review Options Report (TWFOR) (TOT-130) (Reference A). s47, s47C, s47G

s47, s47C, s47G

2. The Commonwealth has previously expressed its decision for all of s47, s47C, s47G s47, s47C, s47G along with the reasons why, on numerous occasions and References B-E provide a sample set of those communications. At Reference E s47, s47C, s47G s47, s47C, s47G

3. The Minutes of Meeting (Reference F) refer to the specific actions necessary to move forward in preparation for the planned decision meeting (the 'ToT Way Forward Review' (TOTWFR)) in September 2019. These actions, along with the requirements within this letter, are s47, s47C, s47G

4. If you have any further questions, the Commonwealth point of contact is s47F

Yours sincerely,

S22

C.D. BOURKE
Commodore, Royal Australian Navy
Director General Future Submarine Program
Capability Acquisition and Sustainment Group

Future Submarine Program Office
PO Box 169,
Kilburn North SA 5084

s47F

8 July 2019

For Information:

s47F

Naval Group SA
40-42 Rue du Docteur Finlay
75015 Paris, FRANCE

s47F

Naval Group SA
40-42 Rue du Docteur Finlay
75015 Paris, FRANCE

Mr John Davis
Naval Group Australia
1 Richmond Road,
Keswick, Australia 5035

s47F

Document 2

From: s47F
Sent:
To: s47F
Cc:
Subject: RE: Action From Intermediate Way Forward Review [SEC=UNCLASSIFIED]

s47F

Sorry to be late in my answer. This question raised during the intermediate WFR when we mentionned that we had currently no reliable data regarding the available workforce in Australia, experienced in detailed design activities. As well as we have no precise idea about the progress of actions that are undertaken by NSC with the RTOs i that field of competency.

Regards

s47F

AFS - ToT Delivery Manager

s47F

s47F

Date : 11/07/2019 04:40
Objet : Action From Intermediate Way Forward Review [SEC=UNCLASSIFIED]

UNCLASSIFIED

s47F

As part of the Minutes from the Intermediate Way Forward Review I have an action to facilitate access to NSC data on Sustainable Workforce.

I am wondering if you can provide me with some direction as to what exactly you need from the NSC as I have a meeting with them and the Naval Shipbuilding Office (The NSC Contract Manager) tomorrow.

Outside of the action if there is anything else I can help with please feel free to ask myself or anyone in my team.

Regards

s47F

Manager – Transfer of Technology
Industry Group

s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
s47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

s47F

Document 3

From: s47F
Sent: Tuesday, 16 July 2019 3:17 PM
To: s47F
Cc:
Subject: Re: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

s22

s47F

Date: 16/07/2019 12:00 PM
Subject: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

UNCLASSIFIED

s47F

I have just been reviewing the status CMS and associated PPMR and would like to point to a couple of items which if delivered would address action 14 from the Intermediate ToT Way Forward Review.

- Market and skills analysis report updated completion date 25 Mar 19 (PPMR ID Milestone 104212965024)
- Required skills on Detailed Design analysis report completion date 27 June 19 (PPMR ID Milestone 104234226624)
- Market and skills analysis report for Detailed Design completion date 9 July 19 (PPMR ID Milestone 105028178424)

- Skills gap analysis for Detailed Design issued due for completion 22 July 19 (PPMR ID Milestone 104234600524)

Further to this list I understand that Naval Group Australia HR and ToT have subcontracted Kinexus to carry out a study of the Australian Workforce to provide a market analysis of Detailed Design workforce in Australia. Can This also be provided to the CoA if not already one of the items above?

Finally it would also be useful as suggested in action 14 for NG to engage with ICN (Industry Capability Network) for an evaluation of the current subcontractor workforce in Australia capable of supporting the Detailed Design. This service is free to the program and you could potentially do an Expression of Interest (EOI) on ICN requesting registered interested parties to supply NG information on their current capability, such as levels of people they have within their organisation with experience aligned to your "SAME" ratio. I will CC s47F on this email as they will be familiar with ICN and its capabilities and can brief you if you would like more info.

Regards

s47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
s47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

s47F

Document 4

From: s47F
Sent: Tuesday, 23 July 2019 2:13 PM
To: s47F
Cc:

Subject: Re: Detailed Design Capability Discussion
Attachments: CAD Tech Assist Guide V 1.2.pdf; Taxonomy Master.xlsx; Designer Short Course WHITE PAPER - DRAFT.docx; Design_Performance Needs Analysis.pdf

s47F

HR will support this initiative from a recruitment perspective and I am happy to lead the NGA participation.

Do you intend for the external provider of the workforce analysis to present at the meeting and talk to their analysis data?

Also, if you can provide a detailed agenda I can ensure the right people are available to support this meeting.

Perhaps a meeting in the week post the report being delivered would be most appropriate?

I will wait to hear from you.
Kind regards
s47F

Naval Group Australia

Postal: PO Box 3065, Rundle Mall SA 5000
Office: Level 2, 1 Richmond Road, Keswick SA 5035
s47F

s47F

Date: 19/07/2019 04:01 PM
Subject: Detailed Design Capability Discussion

Hi All,

The College has been asked by s47F SEA1000 Program Office, to discuss with NGA workforce planning/skilling for Detailed Design Capability in Australia.

To support this initiative, it is suggested that we conduct a workshop which includes NGA, NSC and CASG SEA1000.

Attached are the following documents to support this action:
1. Taxonomy Master file
2. Design Performance Needs Analysis report
3. CAD Tech Assistance Guide
4. Designer Short Course white paper – DRAFT
5. NGA Workforce demand data – Will be sent in a separate email to NGA staff only. s47F – Please confirm if I should send data file to you for distribution to other NGA staff or if it is acceptable for me to send to the NGA staff on this email.

Designer labour market analysis - currently in scoping discussions with an external provider to undertake market analysis. The purpose of the market supply data is to provide a perspective on the immediate and ongoing availability and sustainability of workforces within the relevant job codes. This data may then provide industry (primes, OEM's and supply chains) and other stakeholders with supporting information for naval shipbuilding programs. It will become an integrated element of the Naval Shipbuilding College or Government programs for workforce skilling, development and other market interventions. Anticipate receipt of the DRAFT market analysis report for designers to be supplied to the College from our vendor by August 9th.

Please advise if NGA would like our assistance to conduct a workshop to address the designer workforce. Also, please advise proposed dates for the workshop that support NGA's detailed design capability plan to CASG.

Regards,

s47F

Workforce Planning Manager

630 Mersey Road, Osborne, SA 5017 AUSTRALIA
s47F I www.navalshipbuildingcollege.com.au

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15 April 2019 DRAFT

Computer Aided Design Drafting Technical Assistance Pack Guide

Introduction

This Technical Assistance Pack has been prepared by the Naval Shipbuilding College ('the College') to assist training organisations in the development of computer-aided design ('CAD') drafting programs and ensure alignment with the needs of the naval shipbuilding enterprise. The implementation of this pack forms a key component of the College's endorsement of the *MEM30305 Certificate III in Engineering – Technical* and *MEM50212 Diploma of Engineering – Technical.*

Organisations choosing to contextualise programs using content included in the Technical Assistance Pack are responsible for ensuring their education, training and assessment practices comply with all relevant legislative requirements, including but not limited to the *Standards for RTOs 2015* and *Higher Education Standards Framework 2015* or successors.

The technical assistance pack includes the following:

1. CAD Drafting Technical Assistance Pack Guide – document

   Supporting Documents:

   a. MEM09002B & MEM30031A Supplement - Shipbuilding terminology and compartment identification resource
   b. MEM09204A – Weld Neck Flange Sectioning Activity
   c. MEM30031A - Hand Wheel Drawing Activity
   d. MEM30031A - Ball Valve Assembly Assessment Activity
   e. MEM30032A - Weld Neck Flange Drawing
   f. MEM30033A - Idler Arm Learning or Assessment Activity
   g. MEM30033A - Lofting Activity
   h. MEM09214A - Orifice Flange Union Assembly Activity
   i. MEM09221A - Piping Assembly Activity

2. Drawing and Model Files
   j. Valve Hand Wheel Drawings
   k. Weld Neck Flange – sectioning activity drawings
   l. Ball Valve Assembly – assessment activity drawings
   m. Lofting Exercise – canoe hull drawings
   n. Orifice flange assembly – drawings
   o. Pipe Assembly – model and component files

CAD Drafting Technical Assistance Pack Overview

This Naval Shipbuilding College Technical Assistance Pack has been developed in response to the category one recommendation included in the College's Performance Needs Analysis Report – Design (Oct 2018). The recommendation – "*Contextualise delivery of current units of competency to include shipbuilding attributes (work examples, case studies, terminology, and engineering tools used by industry) to provide exposure to shipbuilding concepts and processes*". The recommendation is directed at training that will provide people for the entry level 'Designer' job role.

The nature of some units of competency provides limited scope for naval shipbuilding contextualisation because the focus of these units is to develop the skills required to use CAD software features. To provide contextualisation, each item in this pack has some shipbuilding relevance. For example, the 'valve hand wheel' exercise is a simple item to construct using the array command but is also an item regularly encountered on surface ships and submarines.

The College has developed the included range of items to replace existing exercises or to be added as additional learning activities to the identified units of competence. These items can also be included in higher education learning materials to support a case for Naval Shipbuilding College endorsement. Where a training provider believes their existing learning/assessment activity meets or exceeds any of those included in this technical assistance package, they can notify the College prior to endorsement of their course. The College will make a judgement on the suitability of the item/s.

Vocational Education and Training ('VET') providers may wish to include these activities in the delivery of other VET products that incorporate the units of competency listed throughout the Technical Assistance Pack. Materials are in a format that allows additional editing to suit a training organisation's requirements.

The following CAD design courses have been identified as suitable for an entry level 'Designer' job role. Naval Shipbuilding College endorsement recommends the inclusion of the units listed below. Where it is not possible for an RTO to include all of these units in their training structure they will need to incorporate ALL of the contextualised items provided in this pack in the units included in their training plan and advise the College of their intentions. The College reserves the right to decline endorsement if it believes the overall content of the design training is insufficient.

- **MEM50212 Diploma of Engineering – Technical**
    1. MEM09002B Interpret technical drawing
    2. MEM09204A Produce basic engineering detail drawings
    3. MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements
    4. MEM30032A Produce basic engineering drawings (not required for College endorsement when MEM09204A is included)
    5. MEM30033A Use computer-aided design (CAD) to create and display 3-D models
    6. MEM09214A Perform advanced engineering detail drafting

7. MEM09221A Create 3-D model assemblies using computer-aided design (CAD) system

- **MEM30505 Certificate III in Engineering – Technical**
  1. MEM09002B Interpret technical drawing
  2. MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements
  3. MEM30032A Produce basic engineering drawings
  4. MEM30033A Use computer-aided design (CAD) to create and display 3-D models

The units included in the *MEM30505 Certificate III in Engineering – Technical* qualification are also included in the *MEM50212 Diploma of Engineering – Technical*. This supports the transition from the Certificate III to the Diploma.

The contextualised items to be included:

1. **MEM09002B Interpret technical drawing** (MEM50212 & MEM30505)
   a. Shipbuilding Terminology
   b. Frames and Compartments
2. **MEM09204A Produce basic engineering detail drawings** (MEM50212)
   a. Weld Neck Flange – sectioning activity
3. **MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements** (MEM50212 & MEM30505)
   a. Valve Hand Wheel Drawing - Learning or Assessment Exercise
   b. Shipbuilding Terminology, Frames and Compartments
   c. Ball Valve Assembly - assessment activity
4. **MEM30032A Produce basic engineering drawings** (MEM50212 & MEM30505)
   a. Weld Neck Flange Drawing - Learning Exercise
5. **MEM30033A Use computer-aided design (CAD) to create and display 3-D model** (MEM50212 & MEM30505)
   a. Idler Arm - Learning or Assessment Exercise
   b. Lofting - Learning Exercise
6. **MEM09214A Perform advanced engineering detail drafting** (MEM50212)
   a. Butt Weld Orifice Flange Assembly - Learning Exercise
7. **MEM09221A Create 3-D model assemblies using computer-aided design (CAD) system** (MEM50212)
   a. Pipe Assembly - Learning Exercise

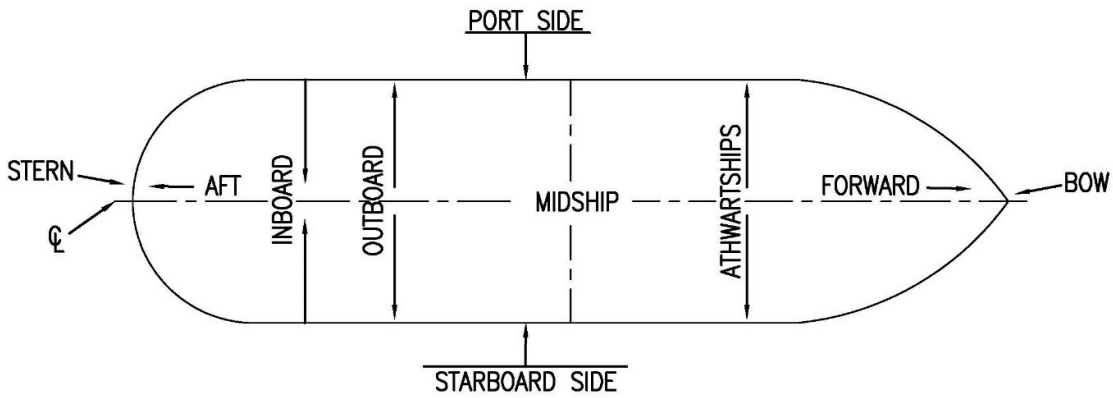
MEM09002B Interpret technical drawing

MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements

The following text and diagrams from the 'MEM09002B & MEM30031A Supplement' are to be added to the MEM9002B and MEM30031A learning materials:

Basic Shipbuilding Terms

The naval shipbuilding industry uses a range of terms that are specific to the industry. These terms are quite different to other engineering and fabrication industries. The following are common basic shipbuilding terms with definitions.



Aft – At, toward or near the stern of the ship.

Athwartships – Across the ship or at 90° to the centre line of the ship. A thwart is a seat in a small boat like a dingy that runs across the boat.

Bow – Is the front or forward end of the ship also known as the stem of the ship.

℄ **Centre Line** – Is a straight line that runs through the middle of the ship from bow to stern.

Forward – At, toward or near the bow of the ship.

Inboard – Inside of the ship and toward or near the centre line.

Midship – At or near the middle section of the ship (can also be called amidships).

Outboard – Away from the centre line and toward the sides of the ship.

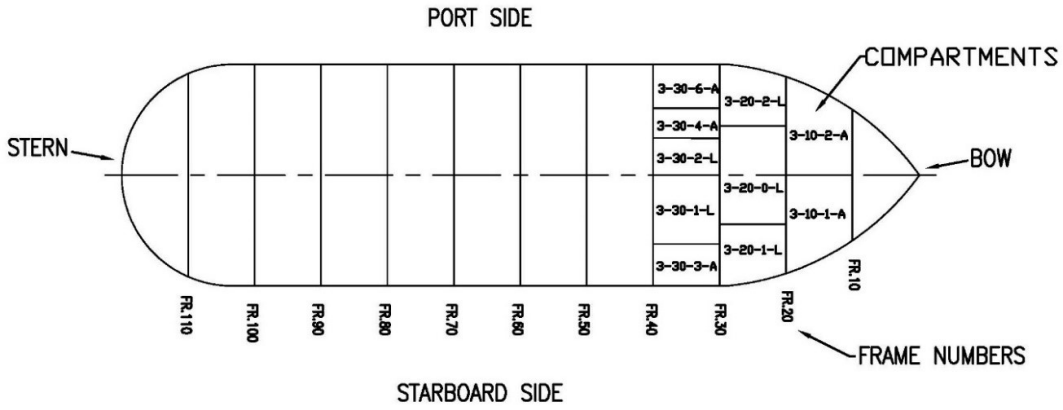
Port Side – Is the left-hand side of the ship when on-board and facing forward.

Starboard Side – Is the right-hand side of the ship when on-board and facing forward.

Stern – Is the back end of the ship.

Frames and Compartments

Naval ships are made up of compartments that form various functions. Some can be for accommodation, others for storage, propulsion, fuel and weapons to give a few examples. Ship plans often identify and show the location of these compartments using standardised alpha-numeric naming conventions for identifying the location of compartments. The example below shows a section of a ship with a typical frame numbering layout and compartment codes. Frames are the ribs that form the skeleton of the ship's structure. In this example the number one rib is closest to the bow with the number allocated to a frame increasing as you move toward the stern of the ship. There are however variations to this convention between different countries. In the diagram below the frame numbering is shown for every 10 frames.



Compartment Numbering

On ship drawings each compartment is numbered to indicate its location and broadly identify its function or use. Compartment numbers have four parts in the following sequence:

1. Deck number – Main deck is number 1 with numbers increasing each deck below it.
2. Frame number – The frame number of the foremost (closest to the bow) bulk head provides the location number for a compartment.
3. Position – Port side of centre (are even numbers starting at 2 for closest to centre line)

   Starboard side of centre (are odd numbers starting at 1 closest to centre line)

   On the centre line (is 0 – zero).
4. Use of the compartment – Examples:

   A = Storage

   E = Machinery space

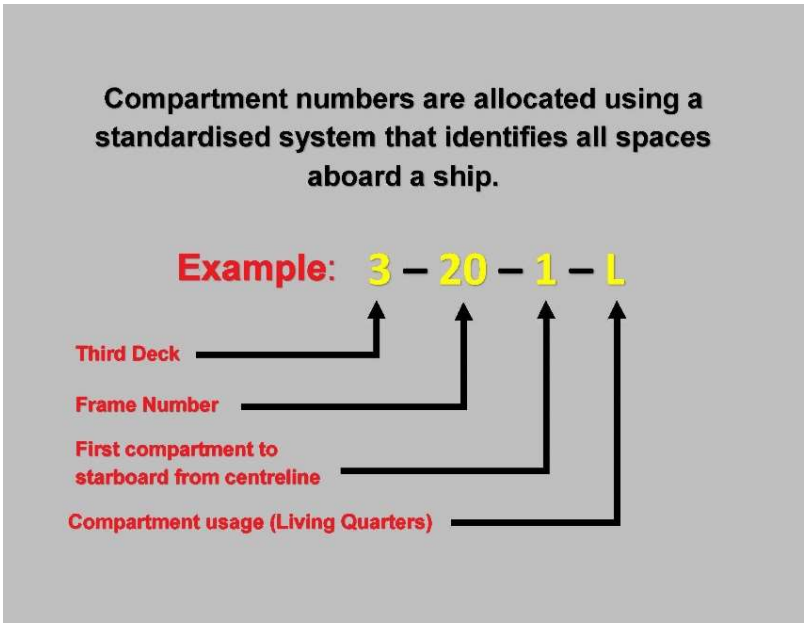
   F = Oil tanks

   K = Chemical and hazardous materials stowage

   L = Living quarters

   M = Ammunition

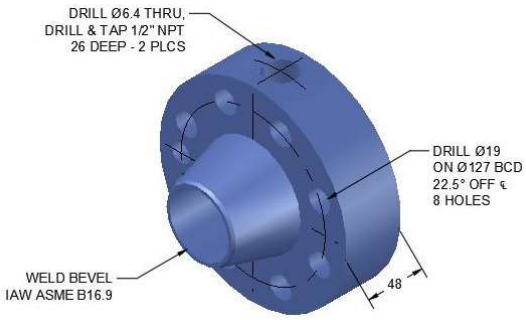
The table below shows one example of a numbering convention used for compartments but there can be different variations to this.

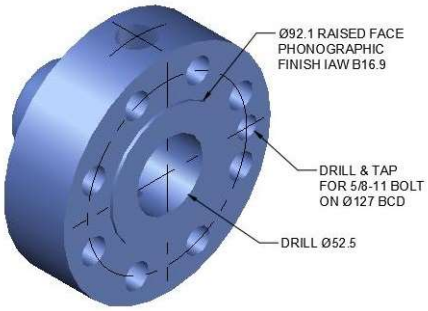


MEM09204A Produce basic engineering detail drawings

Weld Neck Flange Sectioning Activity

The 'Weld Neck flange sectioning activity' supplied is to be used as a sectioning skill development exercise. It can replace an existing activity or be a new addition to the course. These types of flanges are a common item in ship pipework construction and its inclusion provides a shipbuilding context to the sectioning activity. The CAD drawings for these isometric models are included in the pack.



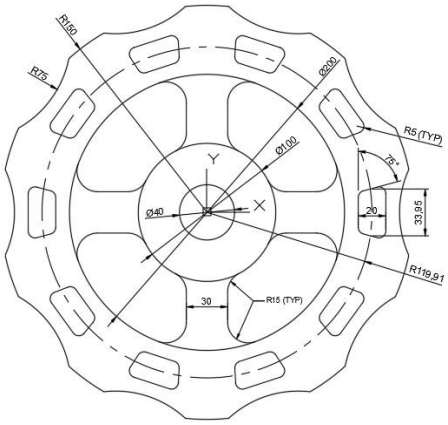


15 April 2019 DRAFT

MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements

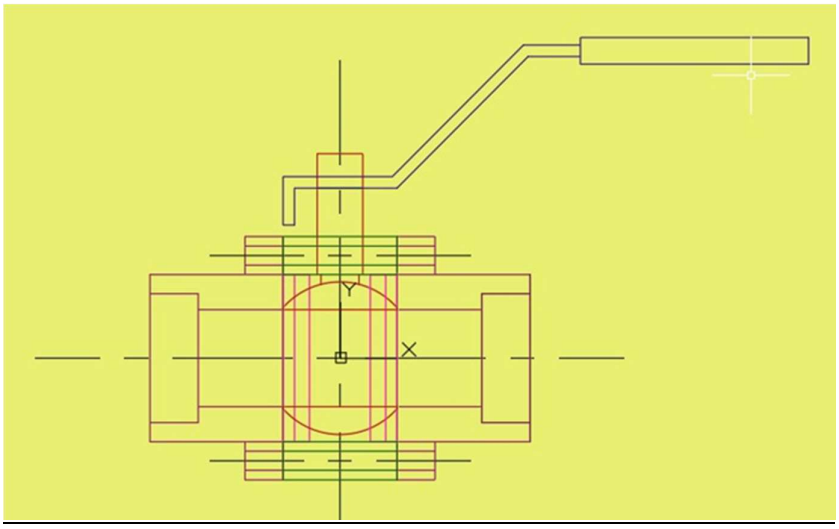
Valve Hand Wheel Drawing Activity

This unit of competence is focused on the skills and knowledge required to use CAD software packages and the learning and assessment exercises are not overly complex. The supplied 'Hand Wheel Drawing Activity' has be developed to cover the array command. It has some very basic relevance to naval shipbuilding as there are many valves in a surface ship or submarine. Please incorporate this activity as a skill development or assessment activity for the unit. The AutoCAD file is provided.



Ball Valve Assembly Assessment Activity

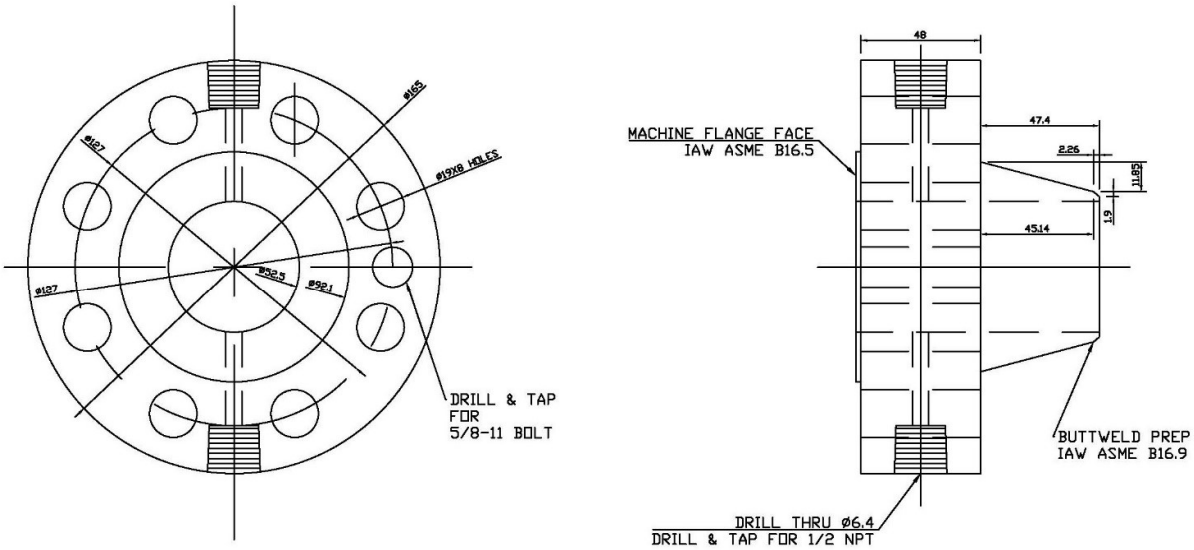
A key feature of this unit is preparing engineering drawings and an engineering parts list. The ball valve is a type of isolation valve – used for open and close type operations and are frequently used on ships. This simple ball valve assembly including a parts list is to be used as an assessment item for this unit. Detailed AutoCAD drawings are included in the pack.



MEM30032A Produce basic engineering drawings

Weld Neck Flange Drawing

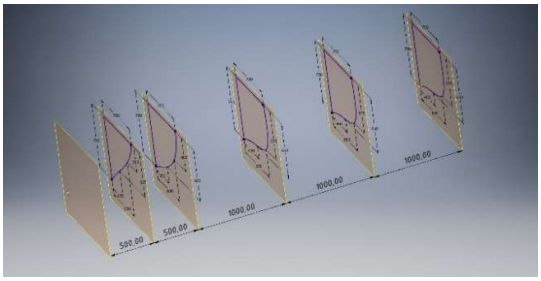
This unit of competency covers producing drawings or similar graphical representations where the critical dimensions and associated tolerances and design specifications are predetermined. The 'Weld Neck Flange' drawing pictured is to be created by the student from the information supplied in the 'Weld Neck Flange Activity' document. This is a common flange used in many industries but is regularly required in naval shipbuilding. The isometric models required to create this drawing are included in the pack.

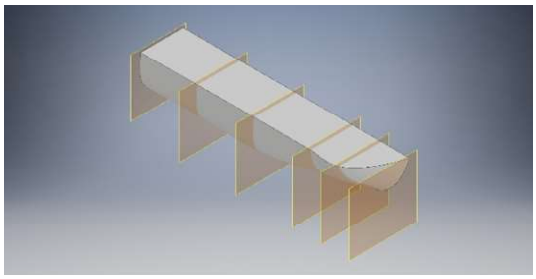


MEM30033A Use computer-aided design (CAD) to create and display 3-D models

Lofting Activity

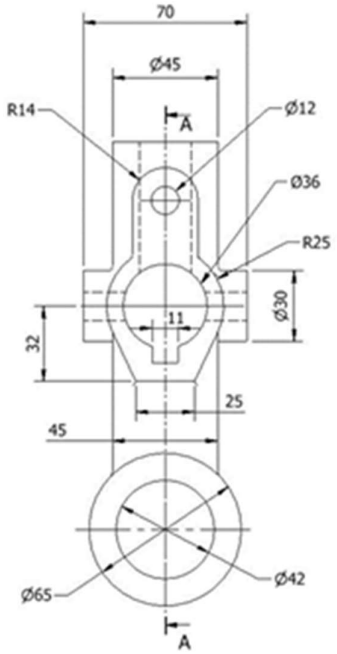
To provide a shipbuilding context to solid modelling techniques, a lofting activity has been created. Lofting is used to establish the outer shape of a ship hull and while this exercise is only rudimentary (basic canoe hull shape) it provides an exposure to the skill. This exercise will need to be included in the unit's skill development activities. The 'Lofting Activity' document and 'Inventor' model files are included in the pack supplied.

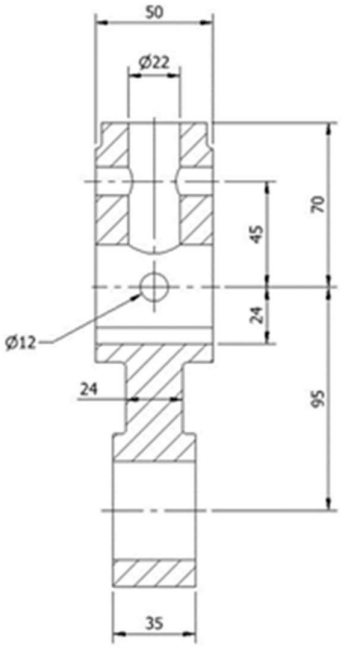




Idler Arm Report and 3D Model Activity

This idler arm model is currently used by TAFE SA as an assessment item for the MEM30033A Use computer-aided design (CAD) to create and display 3-D models unit of competency. It has been determined as providing a suitable shipbuilding context as components with a similar structure and function can be found on ships. TAFE SA has provided the instruction sheets for this exercise that are included in the 'Idler Arm Activity' document supplied.



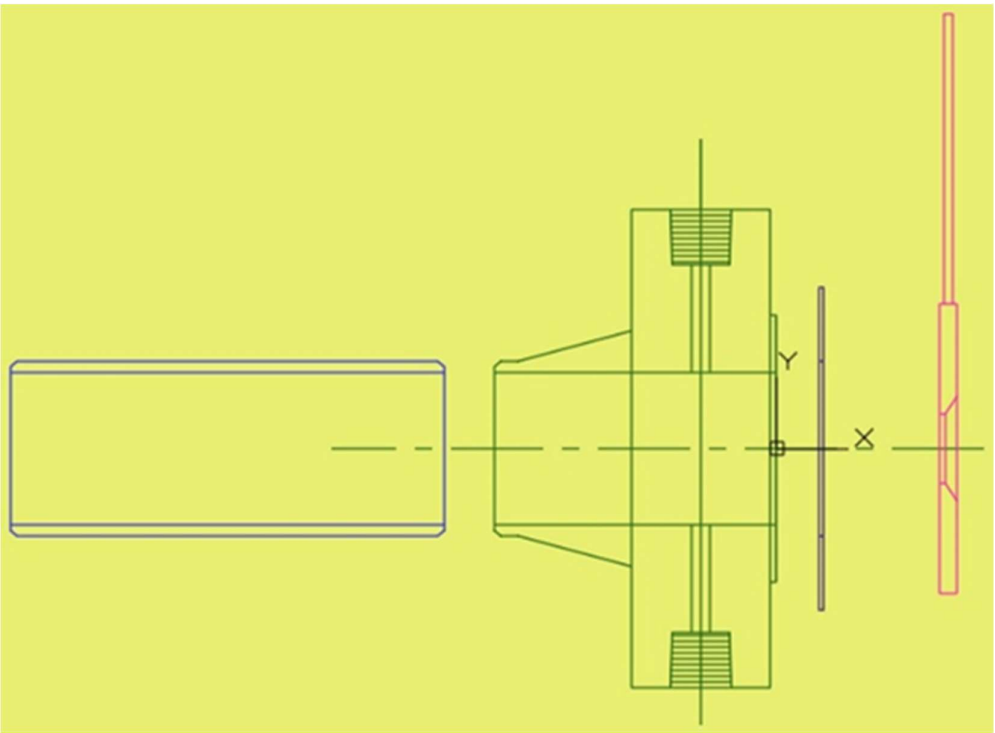


SECTION A-A

MEM09214A Perform advanced engineering detail drafting

Orifice Flange Union Assembly Activity

A key feature of this unit is preparing engineering drawings and an engineering parts list. The 'Orifice Flange Union Assembly' drawing supplied should be used as a replacement for one of the existing skill development exercises covered in the unit. These types of assemblies are a common inclusion in ship pipework. Orifice plates are used for the measurement and control of fluid flow. The inclusion of this exercise provides a shipbuilding context but these devices are also found in other industries that convey fluids such as oil and gas and petrochemical, which keeps the activity relevant to other engineering sectors. The 'Orifice Flange Union Assembly Activity' and AutoCAD drawing file is included in the supplied pack.

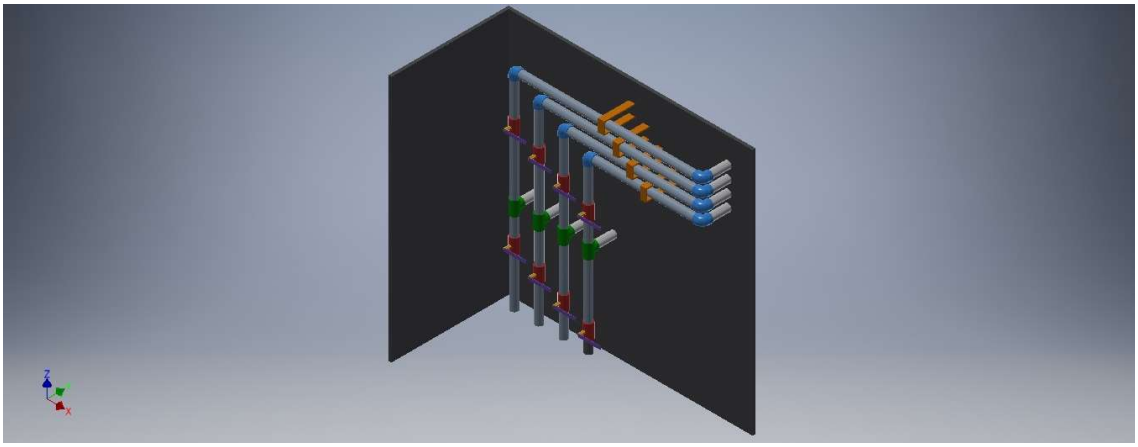


15 April 2019 DRAFT

MEM09221A Create 3-D model assemblies using computer-aided design (CAD) system

Pipe Assembly Activity

3-D models are widely used across the international naval shipbuilding sector so the production of 3-D assemblies using CAD modelling software is a critical skill for the industry. - is pipe assemblies. The pipe installation supplied provides exposure to basic pipe assembly as it may be encountered in a shipbuilding environment. It is also relevant to other industries such as oil and gas. A library of parts is supplied to support the assembly as 'Inventor' models. The 'Piping Assembly Activity' and model files are supplied with this pack.



White Paper: Designing for Naval Shipbuilding Short Course (non-credit)

Scope and schedule are currently being established to support the development and delivery of units of competency focused on shipbuilding and marine design.

The goal of the project is to up-skill:

- Craftsmen who have an interest in and aptitude for design,
- Designers from allied industries who may hold VET or higher education qualifications, and,
- Recent graduates with VET or higher education qualifications, who have an interest in designing for the naval shipbuilding enterprise.

The plan will include development and delivery of training content, student learning activities and assessments which provide learners context relative to processes, tools, terminology and products associated with the naval shipbuilding enterprise. Once completed this course will develop and provide job ready entry level marine designers for industry.

A list of suggested content for specific units include:

1. Ship Design and Systems

Describes the basic structural components of a naval vessel, the basic components of shipboard piping systems, a basic shipboard propulsion system, the primary shipboard auxiliary systems, a basic shipboard refrigeration system, a basic shipboard air conditioning system, a basic shipboard ventilation system, a basic shipboard electrical system, fire detection and firefighting systems, and submarine systems and operations.

2. Specifications and Standards for Ship Design

Familiarise the relatively new designer with the numerous factors that need to be addressed during the design process. An overview of design parameters such as specifications, regulations, quality technologies, manufaturability issues, and life cycle costs which affect the design product will be discussed in this course. Introduce the guiding Specifications and Standards used for Australian shipyards (Defence & Industrial).

3. Geometric Dimensioning and Tolerancing (GD&T) for shipbuilding applications

Geometric dimensioning controls used on ship drawings. Theoretical and practical concepts of each of the geometric controls are explained relative to design and production.

4. Model Based Design (MBD) concepts and practices for shipbuilding

Engineering/design collaboration within the model files, introduction to model based outputs and outcomes (design, attributes, information control, CAM, quality, procurement, systems) and applying part attributes and annotations to items in a 3D model.

5. Product Lifecycle Management (PLM) concepts and practices for shipbuilding

Introduction to the modelling process (conceptual, developmental, detailed, production, operations), concepts of information management relative to model files and part information and change management processes in design.

6. Model Based Design Collaboration for Shipbuilding Industry (Capstone Course)

Cohort of designers from various disciplines use industry equivalent design criteria to create a working model of a ship space complete with relevant systems, annotations, and attributes. Teams will use file management and change management practices and be able to report out on the various processes used to complete the project and provide a detailed description of their system using live CAD models. Outputs also include: Bill of materials and manufacturing/assembly ready products.

7. Ship Drawing Interpretation

Reading and interpreting various drawings used within the shipbuilding industry. Familiarisation of the various types of drawings, symbols, layouts, notes and other features found on shipbuilding drawings.

8. Introduction to Naval Architecture

Hull shapes and characteristics, line drawings, views, structural components, shipboard compartmentation, deck structures, ship types, principle calculations for hull design, basic types of propulsion, power calculations, propeller types.

9. Advanced Naval Architecture

Evaluation of multi-hull design, submersed flow, cavitation effects, laminar/turbulent transition, tow tank experimentation and shock requirements.

10. Introduction to Shipbuilding

Learners will be exposed to introductory processes, tools and outputs related to the shipbuilding industry that will include the following phases: design, plan, build, test, and sustain. Learners will explore basic parts/features of a ship, to include: terminology, hull forms and structures, ship systems. This course also includes onsite tour(s) of facilities and ships (upon availability) within industry. Courses will also include case studies on significant achievements in shipbuilding and disasters at sea.

11. Australian Naval Heritage and Shipbuilding History.

History of naval operations in Australia including significant achievements and milestones within industry and at sea.

The course will be developed by HII curriculum developers and instructional designers with consultation of Australian subject matter expertise. The short course will be developed as classroom/laboratory instruction ready, but with a plan for conversion to computer based delivery.

Performance Needs Analysis Report – Design

October 2018

Contents

Background

A skilled workforce is critical to the success of the naval shipbuilding enterprise responsible for delivery and sustainment of the Royal Australian Navy's future frigates, future submarines, offshore patrol vessels and current fleet. The Naval Shipbuilding College has been commissioned to help ensure training and education programs are addressing the critical skills and knowledge needs of the current and future shipbuilding workforce.

The key role of the Naval Shipbuilding College is to conduct needs analyses comparing the requirements of the industry with the current offerings of the education and training providers in Australia. The Performance Needs Analysis Report will include; individual project details, results, findings and recommendations which will inform and enable education and training providers to customise courses/programs to a shipbuilding industry context. The College will work diligently with Australian education and training providers, in a spirit of partnership, to ensure the requirements of the shipbuilding industry are met and exceeded as efficiently as possible.

Aim

The primary aims of the performance needs analysis process is to identify adjustments that can be made to design training and educational programs in order to improve the outcomes for the naval shipbuilding industry.

The College will provide recommendations based on analysis processes and will then work with stakeholders to implement those recommendations.

Methodology

Initial stages of the Naval Shipbuilding College Performance Needs Analysis involved high level research into the requirements for design functions relating to shipbuilding. This stage of assessment involved identification and analysis of job advertisements and role descriptors to identify the appropriate levels of skills and knowledge required for entry level design work, through to more advanced functions.

Initial conference calls and face to face meetings were held between College staff and industry stakeholders. These meetings were followed up with surveys and further contact where clarification was required.

Three experienced designers and educators from Huntington Ingalls Industries (HII) (USA) were seconded to the College as subject matter experts to assist with further needs analysis work. Once in Australia, the College and HII representatives met with educational stakeholders to identify qualifications and courses relevant to design work. Further meetings were also held with industry to discuss more detailed requirements.

Further research and analysis was conducted considering publicly available information such as training package content, university qualification structures and course information.

Recommendations presented as a result of this performance needs analysis will be considered within two categories, including:

Category 1 – Current training product offerings are sufficient but training must be further contextualised to meet shipbuilding industry demand. Category 1 Guidelines include:

- Can be implemented within 60 calendar days without additional funding (external or capital).
- Possible to modify within the Training and Assessment Strategy or contextualisation of resources.
- Does not require external intellectual property.
- Does not require approval of an accrediting body.

Category 2 – Training Product does not sufficiently meet the demand of the shipbuilding industry. Category 2 Guidelines include:

- Requires more time to implement, typically greater than 60 days.
- Requires additional funding (external or capital).
- Requires formal adjustments to current training packages or new training package product development.
- May require external intellectual property.
- May require approval of an accrediting body.
- May require additional consultation.

Once needs analysis is completed and the performance needs analysis report is delivered, the Naval Shipbuilding College will work collaboratively with education and training providers to develop a Training Alignment Plan (TAP). The TAP will detail the plan to implement recommendations and will include target dates, resources required, funding gaps and recommendations to achieve funding.

Executive Summary

Early discussions with shipbuilding industry stakeholders identified that there will be a requirement for a number of marine design workers with skill sets that have not previously been taught to the level of specificity required by industry. In particular, skills and knowledge associated with feature-based collaborative modelling are required rather than the current training and education in parametric and direct modelling techniques.

Throughout the needs analysis process the College identified that training package content and training and education programs lacked contextualisation and content specific to the needs of the shipbuilding industry. This is particularly important given the differences in terminology and processes associated with shipbuilding.

Due to the nature of the current build projects, ramp up requirements and employment level for designers, it is likely the most appropriate initial training will be provided by the vocational education and training sector. However, for Australia to develop true sovereign capability to create unique vessel designs into the future, the higher education sector will need to be equipped to increase the amount of engineering design and marine design programs available.

To ensure a sovereign workforce and develop future Australian capability to the point that Australia could design its own unique naval vessels, the College has provided a number of occupation specific recommendations that are relevant to the school, vocational education and training and higher education sectors. These recommendations are in addition to general recommendations provided in previous performance needs analysis reports.

Occupation specific recommendations are divided into two categories:

Category 1 – Current training product offerings are sufficient but training must be further contextualised to meet shipbuilding industry demand.

Category 2 – Training Product does not sufficiently meet the demand of the shipbuilding industry.

The most critical and immediate recommendation is the need for training to be better contextualised to include shipbuilding examples and case studies. At a minimum, learning activities should expose learners to design and modelling work that replicate ship components, even though it is not likely to be possible to include specific examples from the current build projects. This training can be supported further by ensuring industry representatives assist in the delivery and validation of training programs.

Longer term recommendations include the development of units of competency and qualifications that more specifically address the skills and competency requirements of engineering/marine designers within the shipbuilding industry. These include units of competence that develop the ability to read and interpret ship drawings, understand terminology and shipbuilding production processes. Training and education content of this nature was also recommended in previous Naval Shipbuilding College needs analyses.

Ship design content and an understanding of ship systems has also been identified as an area for future training content development. Of significant importance, is the need for more experience with collaboration within the model files, which could be assessed through multiple learners working on different design aspects before designs are combined within visualisation software.

In addition to recommendations regarding training and education content, the College provides the following recommendations to industry, government stakeholders and Standards Australia.

1. Industry to better foster collaboration with vocational education (VET) and higher education providers by:
   - Encouraging subject matter experts to perform as guest lecturers, capstone advisors/sponsors and mentors.
   - Sponsoring research and capstone projects.
   - Collaborating with higher education and vocational education and training providers to ensure learning paths and content more closely align with industry processes, tools and deliverables and meet current and future expected requirements.
   - Sponsoring development of shipbuilding mock-up training facilities through material and personnel support and collaboration on the design of any facility.
2. Industry to evaluate the current remuneration levels for designers to foster attracting entry level candidates as well as candidates from allied industries.
3. Industry to foster the up-skilling of senior trades workers to marine design positions as:
   - Senior trades workers will have experience working with downstream products of design. They will have a better understanding of design products being produced for downstream shipbuilding processes. Their time to proficiency will be enhanced by leveraging their years of experience working in the field.
   - Up-skilling can focus on the need of each employee using components of ‘bridging’ courses or programs as the trades worker transitions into a marine design role, rather than expecting the entire future design workforce to start at the beginning of the training pipeline.

4. The Commonwealth should foster growth and development for marine design in shipbuilding by:
   - Increasing the ability for higher education providers to access funding for sub-bachelor programs.
   - Providing funding mechanisms that better allow for cooperative and internship programs aligned with higher education programs.
   - Establish labour statistics for industrial design and marine design across broad industry. The Naval Shipbuilding College will be establishing these specific to the shipbuilding industry.
   - Continue to support the Naval Shipbuilding College to update labour forecasting to account for the needs of marine designers and the shipbuilding industry.
   - Develop funding programs for veterans of the Royal Australian Navy, and other defence agencies, to encourage and promote transition into VET and higher education programs in marine engineering/design.
   - Develop a market campaign, in conjunction with industry stakeholders and the Naval Shipbuilding College to:
     - Increase awareness in upcoming growth and future needs of the shipbuilding industry;
     - Increase interest in career pathways into and within the shipbuilding industry.
   - Consider the need for a ship mock-up training facility to allow VET and higher education providers to better contextualise programs of study to meet the needs of the shipbuilding industry.
5. State governments to ensure:
   - Workforce development initiatives and programs are aligned and focus on supporting growth in the shipbuilding and wider defence industries.
   - VET funding programs allow learners to access funding to undertake programs of study to allow for a change of career or transition into marine design.
   - Funding programs consider access to single unit of competency or skill set enrolments to allow for up-skilling training to increase the development of marine designers.
6. Standards Australia to consider the reestablishment of specifications and standards for marine engineer/design under the ME-059 Shipbuilding Committee and foster industry development, research and collaboration through projects and activities.

Industry Input Summary

The College engaged with various representatives from education and shipbuilding industry in order to evaluate comprehensive Marine Designer shipbuilding skills requirements including job and task specifications. The college obtained details of the requirements at various levels. Requirements were obtained through, but not limited to, interviews, tours, demonstrations, discussions with managers of job roles, educators and management of education providers, public postings of shipbuilding industry job opportunities and associated description of job expectations.

Further Industry Validation

The College will submit these draft initial findings and solicit feedback from participating industry representatives, which include:

- ASC
- BAE Systems Australia
- Naval Group
- Civmec

Further information on industry engagement and requirements is detailed in the *Analysis* and *Findings* sections of the report.

Educational Input Summary

Initial College analysis focused on training package qualifications and units of competency that were delivered as part of design pathways, primarily:

- MEM40412 Certificate IV in Engineering Drafting
- MEM50105 Diploma of Engineering – Advanced Trade
- MEM50212 Diploma of Engineering – Technical

TAFE SA provided advice on the training packages and products students undertake when seeking a career in the areas analysed.

To help support the Subject Matter Experts (SME) to better understand and contextualise the Australian education and training sector environment and infrastructure, a number of engagements were arranged including site visits, tours, demonstration and interviews. Participating organisations included:

- Flinders University
- TAFE SA
- University of South Australia

Design elements of professional engineering programs were also considered throughout the analysis process.

Requirements

Details of high level information gathered and analysed from industry and education representatives:

- Design and computer aided design functions may be required for a range of roles within the shipyard and supply chain. Broadly, these may include specific design functions, general engineering and technical positions and plant maintenance/supervision functions.
- Industry use numerous design software packages and are moving towards model based 3D software system engineering packages.
- Industry, particularly the supply chain will be challenged to review the way it currently works, with work likely to utilise 3D models rather than 2D drawings.
- Current Australian naval vessels will be built considering a number of different Australian and international standards and class requirements.
- Design considerations will also include platforms and support equipment throughout the shipyards.
- There will be an increased use of augmented and virtual realities within the manufacturing sector.
- Technical drafting and design roles are likely to be filled using vocational education and training qualifications rather than higher education graduates.
- Industry view of core gaps in current design training include:
  - Requirement for high level knowledge of concepts and practice of geometric dimensioning and tolerancing, for individual components and within the full design.
  - Critical importance of configuration management.
  - Understanding of databases and big data behind the modelling.
  - Requirement for high level understanding of the integration of systems within a design.
  - An understanding of design standards for pressure vessels is required, particularly when designing components of submarines.
  - Design requirements, linked to supply chain management and aspects of integrated logistics support (ILS) should influence design work.
  - An understanding of risk based approaches relating to quality and safety will be required.

Analysis

After comprehensive analysis of available training content curriculum and with consideration of high level and detailed industry requirements, the following items were identified:

- The current quantity and experience level of marine designers in industry is unlikely to support detailed design work as well as execution design work.
- The shipbuilding industry in Australia is already using design software packages focussed on shipbuilding.
- Current contracts for new shipbuilding construction will require additional marine designers to support detailed design work as well as execution design work.

- Shipbuilding industry stakeholders agreed on the need for training of basic skills for entry level designers with emphasis on modelling software and collaboration, configuration management, manufacturing processes, shipbuilding terminology, the shipbuilding lifecycle, geometric dimensioning and tolerancing, materials and material selection and coatings.
- There are no specifically defined vocational education and training (VET) qualifications with a final outcome for marine design.
- There are no specific VET qualifications or units of competency to address the competency requirements relating to shipbuilding, marine design, naval architecture or marine engineering.
- Current units of competency for computer-aided design (CAD) training utilise parametric modelling and direct modelling techniques instead of feature based, collaborative modelling necessary for shipbuilding design and construction.
- Current units instruct for a variety of engineering tools due to the wide variety of tools being used by different companies and industries
- Many existing units of competency delivered by VET providers could be readily modified to include shipbuilding specific content to contextualise the instruction for marine design in both the Drawing, Drafting & Design and Engineering Science curricula.
- There are many existing qualifications and units of competency within the national VET system that could provide candidates with bridging training to up-skill them in marine design areas. Some of these units of competency are also candidates for contextualisation to provide a shipbuilding focus.
- There are existing units of competency within the national VET system in the Maritime Training Package (MAR) (maritime operations) that are directly applicable and could be offered as core or bridging units. These include the Maritime Training Package units relating to electrotechnology, marine engineering thermodynamics, and marine survey tasks.
- Currently there is no evidence of collaboration with shipbuilding industry for the VET design qualifications and units of competency.
- There are limited program offerings for Bachelor degree level programs in engineering design.
- There are limited program offerings for Bachelor degree level programs in marine design.
- The demand driven Commonwealth funding program impedes the development of new higher education programs until such time as there is student demand.
- Many universities are collaborating with prime shipbuilders and international education institutions with regard to the implementation of marine engineering programs.
- Most universities are not funded for the delivery of sub-bachelor programs such as Associate Degrees in Engineering.
- Online distance courses, both web-delivered and synchronous-delivered, are possible but are still being developed in most universities' engineering programs.
- Adjunct faculty from industry are occasionally used by Universities and VET providers.
- Secondary schools and colleges have varied Science, Technology, Engineering & Mathematicss (STEM) programs that contain some aspects of engineering design.
- The Commonwealth developed the Maritime High Schools Program with a focus on supporting the shipbuilding industry by fostering interest in students.

- The Commonwealth developed the Advanced Technology Project and Defence Industry School Program to increase interest in STEM and pathways into technical careers.
- The 'Subs in Schools' competitions directly develop interest in shipbuilding with focus on submarines.
- Findings and conclusions.
- Vocational education and training providers, such as TAFE SA are able to provide designers specifically for the shipbuilding industry by one of three methods:
  - Incorporate shipbuilding examples, case studies and terminology in existing design units of competency;
  - Develop and offer specific qualifications as a marine designer; and/or
  - Develop and offer courses to up-skill designers from other industries.
- The VET sector would better prepare design graduates for shipbuilding work by either modifying existing units of competency or developing new units of competency that cover feature-based collaborative modelling. Learning and assessment resources could then mirror the engineering tools which are to be used by Lürssen, BAE Systems and Naval Group.
- There are vocational education and training providers, such as TAFE SA, with excellent facilities and existing infrastructure and equipment to deliver training for marine designers; though, there is a lack of shipbuilding specific training aids available or a mock-up facility.
- There is ample opportunity for the shipbuilding industry to collaborate with VET providers to guide and direct marine design programs to support their needs.
- Universities would be able to provide designers specifically for the shipbuilding industry by one of two methods:
  - Development of associate degree level programs in engineering design or marine design;
  - Development of bachelor degree level programs in engineering design or marine design.
- Existing school programs could be readily modified to provide more focus towards shipbuilding topics and career paths.

Recommendations

Recommendations resulting from the needs analyses are divided into two categories:

Category 1 – Current training product offerings are sufficient but training must be further contextualised to meet shipbuilding industry demand.

Category 1 recommendations include:

D1. Contextualise delivery of current units of competency to include shipbuilding attributes (work examples, case studies, terminology, and engineering tools used by industry) to provide exposure to shipbuilding concepts and processes.

Incorporation of shipbuilding attributes into the training package units of competency listed in *Appendix A – VET Units of Competency for Contextualisation* will provide learners context relative to processes, tools, terminology and products associated with the shipbuilding industry. Current delivery of units of competency considered during the analysis does not cover components contextualised for shipbuilding. These changes will develop and provide job ready entry level marine designers for industry.

D2. Utilise shipbuilding industry subject matter experts as adjunct faculty, guest lecturers and capstone advisors/sponsors and mentors.

As a means of providing content relative to current industry practices, industry personnel should be leveraged to provide examples of tools and process, and assist with validation of assessment to ensure relevancy to designer roles and tasks.

Category 2 – Training Product does not sufficiently meet the demand of the shipbuilding industry.

Category 2 recommendations include:

D2. Develop and deliver units of competency focussed on shipbuilding and marine design to up-skill designers from allied industries who already hold VET or higher education qualifications.

Delivery of skill sets including specific units of competency will provide learners context relative to processes, tools, terminology and products associated with the shipbuilding industry. These changes will develop and provide job ready entry level marine designers for industry.

A list of suggested content for specific units is included at *Appendix B – Recommended competencies for development*.

D3. Develop technical qualifications for marine design with emphasis on traineeships and up-skilling current employees within the shipbuilding industry.

Programs should be created to target existing shipbuilding workers who hold Certificate III or IV level:

- Trade qualifications;
- Technical non-trade qualifications.

Programs should provide learners context relative to processes, tools, terminology and products associated with the shipbuilding industry. These changes will develop and provide job ready entry level marine designers for industry.

D4. Develop individual units of competency to provide specific content relating to the software packages to up-skill and develop marine designers with skills and knowledge that will specifically support the Australian shipbuilding industry.

Software packages should include:

- ShipConstructor
- Navisworks
- PTC Windchill
- Tekla Structures

Additionally, these software packages should be incorporated into current VET training where appropriate.

D5. Develop non-accredited courses that address the pre-requisite skills and knowledge requirements for VET programs in marine design.

Individuals seeking to transition into a marine designer career may not meet the current pre-requisite requirements for units of competency included in qualifications such as *MEM50212 Diploma of Engineering – Technical* or any future developed design specific qualification.

Use of non-accredited training to address pre-requisite skills and knowledge requirements will require the training packages to be modified to reduce the explicit requirements relating to pre-requisites and recognise skills and knowledge obtained through experience and alternative training methodologies.

D6. Develop a marine designer qualification based on the existing *MEM40412 Certificate IV in Engineering Drafting*.

Refer to Appendix B and Appendix C for further details on proposed pathways and content.

D7. Develop a marine designer qualification based on the existing *MEM50212 Diploma of Engineering - Technical*.

Refer to Appendix B and Appendix C for further details on proposed pathways and content.

D8. Develop a marine designer qualification based on the existing *MEM60112 Advanced Diploma of Engineering*.

Refer to Appendix B and Appendix C for further details on proposed pathways and content.

D9. Develop and construct a shipbuilding mock-up training facility.

A large scale shipbuilding mock-up facility will support multiple training applications for shipbuilding design of shipboard systems, arrangements and components, installation/outfitting methods and safety on-board ships. A large scale mock-up facility will provide:

- Accelerated learner development in a controlled training environment;
- Consistency in the outcome of assessments;
- Increased attraction to shipbuilding training by exposing prospective learners to aspects of shipbuilding they cannot experience without current employment in the shipyard.

Design of the mock-up facility must include collaboration with industry stakeholders and ensure relevant and critical ship spaces are included. Further to this, learning objectives and practical exercises and assessment materials associated with the mock-up should be co-designed with industry to ensure current build requirements are included.

The mock-up facility could provide increased experiential learning opportunities for learners in a range of trade, semi-professional and professional occupations across the school, vocational education and training and higher education sectors.

The mock-up facility should at minimum include:

- Hull Structures – deck, bulkheads, frames, beams, stiffeners, backing structure, doors, hatches, inclined ladders, brackets, pads, access openings and coamings.
- Various foundations, hangers, wire way racks, lighting fixtures and studs.
- Machinery – motors, pumps, gears and machinery components.
- Piping – large, small, pressurised, drains, tubing, piping fixtures (flanges – welded and bolted, hangers and full range of fittings).
- Electrical – distribution panel for lighting and power systems, automatic and manual bus transfer switches, alarm panels, all sources of lighting (emergency, incandescent, LED), low voltage (communications, instrumentation and control), and all associated wiring and wire way hangers and tags.
- Ventilation – ductwork, registers and fan controls.
- Insulation – as required.
- Paint/coatings – as required.
- Outfitting – general habitation/operational furnishings and equipment.

D10. VET and Higher education providers to develop assessment materials and courses for computer-aided design that are directly associated with the mock-up facility.

Use of a digital twin of the mock-up facility will allow learners to better develop the skills and knowledge required for the shipyard by practising comparison of digital and physical structures and componentry in a simulated environment that replicates real-world conditions.

D11. Expand current Commonwealth higher education funding to sub-bachelor programs to allow for an increase in the development and delivery of Associate Degree programs in Engineering Design and Marine Design.

Currently, there is little funding support available for sub-bachelor programs. This level of education satisfies the entry requirements for engineering/marine design occupational roles.

D12. Develop bachelor level and post-graduate level qualifications for engineering/marine design.

There are currently limited qualification offerings at the bachelor and post-graduate level that specifically relate to engineering and marine design. A bachelor degree or graduate certificate/diploma level qualification would satisfy the requirements for mid-level engineering and marine design roles. Qualifications such as Charles Darwin University's Bachelor of Design may be able to be utilised as a starting point for more specific marine design work.

D13. Evaluate the potential for developing curriculum in engineering technology with a specific focus on the shipbuilding industry.

While there is training product available that addresses broad advanced manufacturing and engineering technology requirements, curriculum that specifically addresses shipbuilding was not identified during the needs analysis process.

D14. Modify post-graduate level marine engineering courses for use as undergraduate or certificate level educational programs.

Redesigning content currently included in post-graduate level marine engineering courses could address the requirements for entry level marine designers.

D15. Foster and increase the number of work placements during the third and fourth years of undergraduate marine design programs.

Increasing the amount of work placement within an education program will better ensure learners are exposed to real-life work practices and culture. This will also provide industry with an opportunity to identify prospective future graduate employees.

D16. Ensure undergraduate engineering/marine design students have the opportunity to engage with industry and view shipyards in the first year of their educational programs.

Early engagement with industry, including visits to shipyards is likely to increase the promotion of shipbuilding as a career of choice and allow learners to develop a better understanding of the real-life application of their studies.

D18. Develop and deliver units of competency focussed on shipbuilding and marine design to up-skill designers from allied industries who already hold VET or higher education qualifications.

Delivery of skill sets including specific units of competency will provide learners context relative to processes, tools, terminology and products associated with the shipbuilding industry. These changes will develop and provide job ready entry level marine designers for industry.

D19. Ensure development of design programs uses the Royal Institute of Naval Architects (RINA) as an industry stakeholder.

RINA provides expertise in marine design and naval architecture and should be included in future collaboration when developing marine design programs.

Performance Needs Analysis Team

Listing of staff involved in the performance needs analysis and areas of input.

Name	Organisation	Area of input
s47F	Huntington Ingalls Industries	Curriculum Design and Design subject matter expertise
	Naval Shipbuilding College	Australian Vocational Education and Training and Assessment subject matter expertise
	Naval Shipbuilding College	Curriculum Design and Australian Vocational Education and Training subject matter expertise
	Huntington Ingalls Industries	Curriculum Design and Design subject matter expertise
	Huntington Ingalls Industries	Curriculum Design and Design subject matter expertise

Industry acknowledgements and participants

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The College would like to specially thank representatives from the following organisations:

- Australian Maritime College
- ASC
- Babcock Australia
- BAE Systems Australia
- Dassault Systèmes
- Fiva Australia
- Flinders University
- Huntington Ingalls Industries
- Kadego
- Naval Group Australia
- TAFE SA
- University of South Australia

Appendix A – VET Units for Contextualisation

- *MEM09002B Interpret technical drawing*
- *MEM09003B Prepare basic engineering drawing*
- *MEM09004B Perform electrical/electronic detail drafting*
- *MEM09005B Perform basic engineering detail drafting*
- *MEM09006B Perform advanced engineering detail drafting*
- *MEM09007B Perform advanced mechanical detail drafting*
- *MEM09008B Perform advanced structural detail drafting*
- *MEM09009C Create 2D drawings using computer aided design system*
- *MEM09010C Create 3D models using computer aided design system*
- *MEM09011B Apply basic engineering design concepts*
- *MEM09021B Interpret and produce curved 3-dimensional shapes*
- *MEM09141A Represent mechanical engineering designs*
- *MEM09142A Represent mechatronic engineering designs*
- *MEM09151A Apply computer aided modelling and data management techniques to mechanical engineering designs*
- *MEM09152A Apply computer aided modelling and data management techniques to mechatronic engineering designs*
- *MEM14005A Plan a complete activity*
- *MEM14061A Plan and design mechanical engineering projects*
- *MEM14062A Plan and design mechatronic engineering projects*
- *MEM14063A Plan and design manufacturing engineering projects*
- *MEM14064A Plan and design maintenance engineering projects*
- *MEM14065A Plan and design aeronautical engineering projects*
- *MEM14066A Plan and design avionic engineering projects*
- *MEM14081A Apply mechanical engineering fundamentals to support design and development of projects*
- *MEM14082A Apply mechatronics fundamentals to support design and development of engineering projects*
- *MEM15001B Perform basic statistical quality control*
- *MEM15007B Conduct product and/or process capability studies*
- *MEM15008B Perform advanced statistical quality control*
- *MEM15017B Use and maintain reference standards*
- *MEM16009A Research and analyse engineering information*
- *MEM16012A Interpret technical specifications and manuals*
- *MEM23002A Apply calculus in engineering situations*
- *MEM23003A Operate and program computers and/or controllers in engineering situations*

- *MEM23041A Apply basic scientific principles and techniques in mechanical engineering situations*
- *MEM23051A Apply basic electro and control scientific principles and techniques in mechanical and manufacturing engineering situations*
- *MEM23061A Select and test mechanical engineering materials*
- *MEM23062A Select and test mechatronic engineering materials*
- *MEM23071A Select and apply mechanical engineering methods, processes and construction techniques*
- *MEM23072A Select and apply mechatronic engineering methods, processes and construction techniques*
- *MEM23081A Apply scientific principles and techniques in mechanical engineering situations*
- *MEM23082A Apply scientific principles and techniques in mechatronic engineering situations*
- *MEM23083A Apply industrial engineering principles and techniques in competitive manufacturing engineering situations*
- *MEM23091A Apply mechanical system design principles and techniques in mechanical engineering situations*
- *MEM23092A Apply automated systems principles and techniques in engineering Situations*
- *MEM23094A Apply maintenance systems principles and techniques in engineering situations*
- *MEM30001A Use computer aided drafting systems to produce basic engineering drawings*
- *MEM30002A Produce basic engineering graphics*
- *MEM30003A Produce detailed engineering drawings*
- *MEM30004A Use CAD to create and display 3D models*
- *MEM30005A Calculate force systems within simple beam structures*
- *MEM30006A Calculate stresses in simple structures*
- *MEM30007A Select common engineering materials*
- *MEM30008A Apply basic economic and ergonomic concepts to evaluate engineering applications*
- *MEM30009A Contribute to the design of basic mechanical systems*
- *MEM30010A Set up basic hydraulic circuits*
- *MEM30011A Set up basic pneumatic circuits*
- *MEM30012A Apply mathematical techniques in a manufacturing, engineering or related environment*
- *MEM30013A Assist in the preparation of a basic workplace layout*
- *MEM30014A Apply basic just in time systems to the reduction of waste*
- *MEM30015A Develop recommendations for basic set up time improvements*
- *MEM30016A Assist in the analysis of a supply chain*
- *MEM30017A Use basic preventative maintenance techniques and tools*

- *MEM30018A Undertake basic process planning*
- *MEM30019A Use resource planning software systems in manufacturing*
- *MEM30020A Develop and manage a plan for a simple manufacturing related project*
- *MEM30021A Prepare a simple production schedule*
- *MEM30022A Undertake supervised procurement activities*
- *MEM30023A Prepare a simple cost estimate for a manufactured product*
- *MEM30024A Participate in quality assurance techniques*
- *MEM30025A Analyse a simple electrical system circuit*
- *MEM30026A Select and test components for simple electronic switching and timing circuits*
- *MEM30027A Prepare basic programs for programmable logic controllers*

Appendix B – Recommended competencies for development

1. *Ship Design and Systems*

   Describes the basic structural components of a naval vessel, the basic components of shipboard piping systems, a basic shipboard propulsion system, the primary shipboard auxiliary systems, a basic shipboard refrigeration system, a basic shipboard air conditioning system, a basic shipboard ventilation system, a basic shipboard electrical system, fire detection and firefighting systems, a basic propulsion system, and submarine systems and operations

2. *Specifications and Standards for Ship Design*

   Familiarise the relatively new designer with the numerous factors that need to be addressed during the design process. An overview of design parameters such as specifications, regulations, quality technologies, produce ability issues, and life cycle costs which affect the design product will be discussed in this course. Introduce the guiding Specifications and Standards used for Australian shipyards (Military & Industrial).

3. *Geometric Dimensioning and Tolerancing* (GD&T) *for shipbuilding applications*

   Geometric dimensioning controls used on ship drawings. Theoretical and practical concepts of each of the geometric controls are explained relative to design and production

4. *Model Based Design* (MBD) *concepts and practices for shipbuilding*

   Engineering/design collaboration within the model files, introduction to model based outputs and outcomes (design, attributes, information control, CAM, quality, procurement, systems) and applying part attributes and annotations to items in a 3D model

5. *Product Lifecycle Management* (PLM) *concepts and practices for shipbuilding*

   Introduction to the modelling process (conceptual, developmental, detailed, production, operations), concepts of information management relative to model files and part information and change management processes in design

6. *Model Based Design Collaboration for Shipbuilding Industry* (Capstone Course)

   Cohort of designers from various disciplines use industry equivalent design criteria to create a working model of a ship space complete with relevant systems, annotations, and attributes. Teams will use file management and change management practices and be able to report out on the various processes used to complete the project and provide a detailed description of their system using live CAD models. Outputs also include: Bill of materials and manufacturing/assembly ready products.

7. *Ship Drawing Interpretation*

   Reading and interpreting various drawings used within the shipbuilding industry. Familiarisation of the various types of drawings, symbols, layouts, notes and other features found on shipbuilding drawings.

8. *Introduction to Naval Architecture*

   Hull shapes and characteristics, line drawings, views, structural components, shipboard compartmentation, deck structures, ship types, principle calculations for hull design, basic types of propulsion, power calculations, propeller types.

9. Advanced Naval Architecture

Evaluation of multi-hull design, submersed flow, cavitation effects, laminar/turbulent transition, tow tank experimentation and shock requirements.

10. Introduction to Shipbuilding

Learners will be exposed to introductory processes, tools and outputs related to the shipbuilding industry that will include the following phases: design, plan, build, test, and sustain. Learners will explore basic parts/features of a ship, to include: terminology, hull forms and structures, ship systems. This course also includes onsite tour(s) of facilities and ships (upon availability) within industry. Courses will also include case studies on significant achievements in shipbuilding and disasters at sea.

11. Australian Naval Heritage and Shipbuilding History

History of naval operations in Australia including significant achievements and milestones within industry and at sea.

Appendix C – Marine Designer Program

Unit Code	Unit Title	Notes	COURSE CONTENT Develop New - Dev Revise Existing - Rev COTS HII IP Available	Recommended Level	Recommended Learning Phase	E - Electrical G - General H - Hull/Structure HME - Hull, Mechanical, Electrical LAB - Field Work or Practical L - Apply Learner's Specialization M - Mechanical N/A - Not Applicable to Marine Design O - Outfitting P - Piping/Piping Systems V - Heat/Ventilation/Air Conditioning
CPCCOHS1001A	Work safely in the construction industry			IV	1	
MEM16008A	Interact with computing technology			IV	1	
MEM09002B	Interpret technical drawing			IV	1	
MEM09202A	Produce freehand sketches			IV	1	
FDFOP2005A	Work in a socially diverse environment			IV	1	
MEM16006A	Organise and communicate information			IV	1	
MEM16007A	Work with others in a manufacturing, engineering or related environment			IV	2	
MEM30031A	Operate computer-aided design (CAD) system to produce basic drawing elements			IV	2	
MEM12023A	Perform engineering measurements	Include points of origin used in ship design (Base line, Frame lines, Water lines, Buttock lines, etc), include modeled line theory	Rev	IV	2	
MEM12024A	Perform computations			IV	2	
MEM16014A	Report technical information			IV	2	
MEM30005A	Calculate force systems within simple beam structures			IV	2	
MEM30006A	Calculate stresses in simple structures			IV	2	
MEM30007A	Select common engineering materials	Use Shipbuilding/Marine examples		IV	2	
MSATCS301A	Interpret architectural and engineering design specifications for structural steel detailing	Use Shipbuilding/Marine examples	Rev	IV	2	
New Unit	Ship Design and Systems	Descr be the basic structural components of a naval vessel, the basic components of shipboard piping systems, a basic shipboard propulsion system, the primary shipboard auxiliary systems, a basic shipboard refrigeration system, a basic shipboard air conditioning system, a basic shipboard ventilation system, a basic shipboard electrical system, fire detection and firefighting systems, a basic propulsion system, and submarine systems and operations	HII IP	IV	2.1	
New Unit	Specifications and Standards for Ship Design/Build	Familiarise the relatively new designer with the numerous factors that need to be addressed during the design process. An overview of design parameters such as specifications, regulations, quality technologies, producibility issues, and life cycle costs which affect the design product will be discussed in this course. Introduce the guiding Specifications and Standards used for Australian shipyards (Millitary & Industrial)	HII IP	IV	2.2	
MEM09203A	Measure and sketch site information	Suggest ship checking exercise on mock-up or actual vessels being worked on by Industry. 2 full days to record measurements. 1 day to convert into CAD Model. 20hr LAB	DEV	IV	2.3	
MEM30032A	Produce basic engineering drawings	Use Shipbuilding/Marine examples		IV	3	
LMTGN4002A	Participate in product engineering	Ensure product is shipbuilding centric	REV	IV	3	
MEM05051A	Select welding processes	Understand selection of weld types and symbols for shipbuilding applications	Rev	IV	3	
MEM15001B	Perform basic statistical quality control			IV	3	
MEM30008A	Apply basic economic and ergonomic concepts to evaluate engineering applications			IV	3	
MEM30012A	Apply mathematical techniques in a manufacturing engineering or related environment	Use Shipbuilding/Marine examples; include layoff of parts and assemblies, location of parts and assemblies for installation relative to ship reference lines and materials.		IV	3	
MSATCS302A	Detail bolts and welds for structural steelwork connections	Use Shipbuilding/Marine examples	Rev	IV	3	
MSATCS501A	Detail standardised structural connections	Use Shipbuilding/Marine examples	Rev	IV	3	
MSATCS502A	Detail structural steel members	Use Shipbuilding/Marine examples	Rev	IV	3	
MSS402002A	Sustain process improvements			IV	3	

Unit Code	Unit Title	Notes	COURSE CONTENT Develop New - Dev Revise Existing - Rev COTS HII IP Available	Recommended Level	Recommended Learning Phase	E - Electrical G - General H - Hull/Structure HME - Hull, Mechanical, Electrical LAB - Field Work or Practical L - Apply Learner's Specialization M - Mechanical N/A - Not Applicable to Marine Design O - Outfitting P - Piping/Piping Systems V - Heat/Ventilation/Air Conditioning
MSS402051A	Apply quality standards	Introduce Military Standards / Shipbuilding Industry	Rev	IV	3	
MEM09204A	Produce basic engineering detail drawings	Inspect terminal objectives to validate terminal objectives can satisfy production of drawings within learner's specialisation	Rev	IV	4	
MEM09205A	Produce electrical schematic drawings	Use Shipbuilding/Marine examples		IV	4	
MEM09206A	Produce drawings for mechanical services	Use Shipbuilding/Marine examples		IV	4	
MEM09208A	Detail fasteners and locking devices in mechanical drawings	include valves (globe, shut-off, etc)	Rev	IV	4	
MEM09209A	Detail bearings, seals and other componentry in mechanical drawings			IV	4	
MEM09211A	Produce drawings or models for industrial piping	Use Shipbuilding/Marine examples		IV	4	
MEM09212A	Produce detailed drawings of steel to non-steel connections	Inspect terminal objectives to validate non-steel connections are ship system related and not other commercial/industrial components.	Rev	IV	4	
MEM09213A	Produce schematic drawings for hydraulic and pneumatic fluid power systems			IV	4	
MEM09217A	Prepare plans for pipe and duct fabrication	Diagram/Arrangements/Fabrication/Installation		IV	4	
MEM09219A	Prepare drawings for fabricated sheet metal products	Include lockers, stowage, bunks, ventilation, etc	Rev	IV	4	
MEM30010A	Set up basic hydraulic circuits	Use Ship/Marine/MIL-Spec examples	Rev	IV	4	
MEM30011A	Set up basic pneumatic circuits	Use Ship/Marine/MIL-Spec examples	Rev	IV	4	
MEM30019A	Use resource planning software systems in manufacturing			IV	4	
MEM30024A	Participate in quality assurance techniques			IV	4	
MEM30025A	Analyse a simple electrical system circuit			IV	4	
MEM09201A	Work effectively in an engineering drafting workplace			IV	4	
MEM09221A	Create 3D model assemblies using computer aided design (CAD) systems	Require for Level V; Inspect termal objectives against MEM30033A		V	5	
MEM30033A	Use computer-aided design (CAD) to create and display 3D Models	Required for Level V; Inspect termal objectives against MEM09221A		V	5	
MEM09210A	Create 3D solid models using computer aided design (CAD) system	Required for Level V; Inspect termal objectives against MEM09221A		V	5	
MEM09220A	Apply surface modelling techniques to 3D drawings	Require for Level V; Inspect for drawing components or just CAD application	Rev	V	5	
MEM09216A	Interpret and produce curved 3D shapes and patterns	Create exercises relative to Hull design or other ship systems examples		VI	6	
New Unit	Introduction to a Model Based Enterprise	Engineering/design collaboration within the model files, introduction to model based outputs and outcomes (design, attributes, information control, CAM, quality, procurement, systems), applying part attr butes and annotations to items in a 3D model	HII IP / COTS	VI	6.1	
New Unit	Introduction to Product Lifecycle Management	Intruduction to the modeling process (conceptual, developemental, detailed, production, operations), concepts of information management relative to model files and part information, change management processes in design	HII / COTS	VI	6.2	
New Unit	Capstone - Model Based Design for Shipuilding Industry	Cohort of designers from various disciplines use industry equivalent design criteria to create a working model of a ship space complete with relevant systems, annotations, and attributes. Team shall use file management and change management practices and be able to report out on the various processes used to complete the project and provide a detailed description of their system using live CAD models. Outputs should also include: Bill of materials and manufacturing/assembly ready products.	DEV	VI	6.3	
CPCPCM4002A	Estimate and cost work					
MEM09207A	Produce drawings for reticulated services					
MEM09218A	Participate in drafting projects for building services					
MEM30013A	Assist in the preparation of a basic workplace layout					
MEM30016A	Assist in the analysis of a supply chain					
MEM30023A	Prepare a simple cost estimate for a manufactured product					

Unit Code	Unit Title	Notes	COURSE CONTENT Develop New - Dev Revise Existing - Rev COTS HII IP Available	Recommended Level	Recommended Learning Phase	E - Electrical G - General H - Hull/Structure HME - Hull, Mechanical, Electrical LAB - Field Work or Practical L - Apply Learner's Specialization M - Mechanical N/A - Not Applicable to Marine Design O - Outfitting P - Piping/Piping Systems V - Heat/Ventilation/Air Conditioning
MSAENV272B	Participate in environmentally sustainable work practices					
UEPMNT419B	Perform civil drafting					
MSS402030A	Apply cost factors to work practices	Replace with design for affordability/produceability concepts	DEV/COTS	**IV**		
MEM16003B	Provide advanced customer service			**IV**		
MSATCS504A	Detail ancillary steelwork	N/A - Should be Shipbuilding/Marine industry focused				
MEM09011B	Apply basic engineering design concepts	Add as requirement for level V		**V**		
MEM09155A	Prepare mechanical models for computer-aided engineering (CAE)	Add as requirement for level VI		**VI**		
New Unit	Australian Naval Heritage and Shipbuilding History	History of naval operations in Australia including significant achievements and milestones within industry and at sea.	DEV	**IV**		
New Unit	Introduction to Shipbuilding	Learner will be exposed to introductory processes, tools and outputs related to the shipbuilding industry, to include the following phases: Design, Plan, Build, Test, and Sustain. Learners will explore basic parts/features of a ship, to include: Terminology, Hull forms and structures, Ship Systems. This course also include onsite tour(s) of facilities and ships (upon availability) within industry. Course will also include case studies on significant achievements in shipbuilding and disasters at sea.	EV (with industry collaboratic	**IV**		
New Unit	Advanced Naval Architecture	Evaluation of multi-hull design, submersed flow, cavitation effects, laminar/turbulent transition, tow tank experimentation, shock requirements.	DEV/COTS	**VI**		
New Unit	Introduction to Naval Architecture	Hull shapes and characteristics, line drawings, views, structural components, shipboard compartmentation, deck structures, ship types, principle calculations for hull design, basic types of propulsion, power calculations, propeller types.	DEV/COTS	**IV**		
New Unit	Ship Drawing Interpretation	Reading and interpreting various drawings used within the shipbuilding industry. Familiarization of the various types of drawings, symbols, layouts, notes, and other features found on shipbuilding drawings.	DEV/COTS	**IV**		

Naval Shipbuilding College
Job Family Taxonomy

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
1	Engineering	Engineering Management	Administrator		##
2	Engineering	Engineering Management	Chief Engineer		##
3	Engineering	Engineering Management	Chief Engineer	Expat	##
4	Engineering	Engineering Management	Manager		##
5	Engineering	Engineering Management	Manager	Expat	##
6	Engineering	Engineering Management	General Manager		##
7	Engineering	Engineering Management	General Manager	Expat	##
8	Engineering	Combat Systems Engineering	Technical Officer	0-2 Yrs	##
9	Engineering	Combat Systems Engineering	Technical Officer	3-9 Yrs	##
10	Engineering	Combat Systems Engineering	Technical Officer	10+ Yrs	##
11	Engineering	Combat Systems Engineering	Technical Officer	Expat	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
12	Engineering	Combat Systems Engineering	Engineer	0-2 Yrs	##
13	Engineering	Combat Systems Engineering	Engineer	3-9 Yrs	##
14	Engineering	Combat Systems Engineering	Engineer	10+ Yrs	##
15	Engineering	Combat Systems Engineering	Engineer	Expat	##
16	Engineering	Electrical Engineering	Technical Officer	0-2 Yrs	##
17	Engineering	Electrical Engineering	Technical Officer	3-9 Yrs	##
18	Engineering	Electrical Engineering	Technical Officer	10+ Yrs	##
19	Engineering	Electrical Engineering	Technical Officer	Expat	##
20	Engineering	Electrical Engineering	Engineer	0-2 Yrs	##
21	Engineering	Electrical Engineering	Engineer	3-9 Yrs	##

Naval Shipbuilding College
Job Family Taxonomy

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
22	Engineering	Electrical Engineering	Engineer	10+ Yrs	##
23	Engineering	Electrical Engineering	Engineer	Expat	##
24	Engineering	Electronics Engineering	Technical Officer	0-2 Yrs	##
25	Engineering	Electronics Engineering	Technical Officer	3-9 Yrs	##
26	Engineering	Electronics Engineering	Technical Officer	10+ Yrs	##
27	Engineering	Electronics Engineering	Technical Officer	Expat	##
28	Engineering	Electronics Engineering	Engineer	0-2 Yrs	##
29	Engineering	Electronics Engineering	Engineer	3-9 Yrs	##
30	Engineering	Electronics Engineering	Engineer	10+ Yrs	##
31	Engineering	Electronics Engineering	Engineer	Expat	##
32	Engineering	Engineering Assurance	Technical Officer	0-2 Yrs	##
33	Engineering	Engineering Assurance	Technical Officer	3-9 Yrs	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
34	Engineering	Engineering Assurance	Technical Officer	10+ Yrs	##
35	Engineering	Engineering Assurance	Technical Officer	Expat	##
36	Engineering	Engineering Assurance	Engineer	0-2 Yrs	##
37	Engineering	Engineering Assurance	Engineer	3-9 Yrs	##
38	Engineering	Engineering Assurance	Engineer	10+ Yrs	##
39	Engineering	Engineering Assurance	Engineer	Expat	##
40	Engineering	ILS - Analysis	Technical Officer	0-2 Yrs	##
41	Engineering	ILS - Analysis	Technical Officer	3-9 Yrs	##
42	Engineering	ILS - Analysis	Technical Officer	10+ Yrs	##
43	Engineering	ILS - Analysis	Technical Officer	Expat	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
44	Engineering	ILS - Analysis	Engineer	0-2 Yrs	##
45	Engineering	ILS - Analysis	Engineer	3-9 Yrs	##
46	Engineering	ILS - Analysis	Engineer	10+ Yrs	##
47	Engineering	ILS - Analysis	Engineer	Expat	##
48	Engineering	ILS - Training	Technical Officer	0-2 Yrs	##
49	Engineering	ILS - Training	Technical Officer	3-9 Yrs	##
50	Engineering	ILS - Training	Technical Officer	10+ Yrs	##
51	Engineering	ILS - Training	Technical Officer	Expat	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
52	Engineering	ILS - Training	Engineer	0-2 Yrs	##
53	Engineering	ILS - Training	Engineer	3-9 Yrs	##
54	Engineering	ILS - Training	Engineer	10+ Yrs	##
55	Engineering	ILS - Training	Engineer	Expat	##
56	Engineering	ILS - Publications	Technical Officer	0-2 Yrs	##
57	Engineering	ILS - Publications	Technical Officer	3-9 Yrs	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
58	Engineering	ILS - Publications	Technical Officer	10+ Yrs	##
59	Engineering	ILS - Publications	Technical Officer	Expat	##
60	Engineering	ILS - Publications	Engineer	0-2 Yrs	##
61	Engineering	ILS - Publications	Engineer	3-9 Yrs	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
62	Engineering	ILS - Publications	Engineer	10+ Yrs	##
63	Engineering	ILS - Publications	Engineer	Expat	##
64	Engineering	Maintenance Engineering	Technical Officer	0-2 Yrs	##
65	Engineering	Maintenance Engineering	Technical Officer	3-9 Yrs	##
66	Engineering	Maintenance Engineering	Technical Officer	10+ Yrs	##
67	Engineering	Maintenance Engineering	Technical Officer	Expat	##
68	Engineering	Maintenance Engineering	Engineer	0-2 Yrs	##
69	Engineering	Maintenance Engineering	Engineer	3-9 Yrs	##
70	Engineering	Maintenance Engineering	Engineer	10+ Yrs	##
71	Engineering	Maintenance Engineering	Engineer	Expat	##

Naval Shipbuilding College
Job Family Taxonomy

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
72	Engineering	Materials Engineering	Technical Officer	0-2 Yrs	##
73	Engineering	Materials Engineering	Technical Officer	3-9 Yrs	##
74	Engineering	Materials Engineering	Technical Officer	10+ Yrs	##
75	Engineering	Materials Engineering	Technical Officer	Expat	##
76	Engineering	Materials Engineering	Engineer	0-2 Yrs	##
77	Engineering	Materials Engineering	Engineer	3-9 Yrs	##
78	Engineering	Materials Engineering	Engineer	10+ Yrs	##
79	Engineering	Materials Engineering	Engineer	Expat	##
80	Engineering	Mechanical Engineering	Technical Officer	0-2 Yrs	##
81	Engineering	Mechanical Engineering	Technical Officer	3-9 Yrs	##
82	Engineering	Mechanical Engineering	Technical Officer	10+ Yrs	##
83	Engineering	Mechanical Engineering	Technical Officer	Expat	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
84	Engineering	Mechanical Engineering	Engineer	0-2 Yrs	##
85	Engineering	Mechanical Engineering	Engineer	3-9 Yrs	##
86	Engineering	Mechanical Engineering	Engineer	10+ Yrs	##
87	Engineering	Mechanical Engineering	Engineer	Expat	##
88	Engineering	Naval Architecture	Technical Officer	0-2 Yrs	##
89	Engineering	Naval Architecture	Technical Officer	3-9 Yrs	##
90	Engineering	Naval Architecture	Technical Officer	10+ Yrs	##
91	Engineering	Naval Architecture	Technical Officer	Expat	##
92	Engineering	Naval Architecture	Engineer	0-2 Yrs	##
93	Engineering	Naval Architecture	Engineer	3-9 Yrs	##
94	Engineering	Naval Architecture	Engineer	10+ Yrs	##
95	Engineering	Naval Architecture	Engineer	Expat	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
96	Engineering	Production Engineering	Technical Officer	0-2 Yrs	##
97	Engineering	Production Engineering	Technical Officer	3-9 Yrs	##
98	Engineering	Production Engineering	Technical Officer	10+ Yrs	##
99	Engineering	Production Engineering	Technical Officer	Expat	##
100	Engineering	Production Engineering	Engineer	0-2 Yrs	##
101	Engineering	Production Engineering	Engineer	3-9 Yrs	##
102	Engineering	Production Engineering	Engineer	10+ Yrs	##
103	Engineering	Production Engineering	Engineer	Expat	##
104	Engineering	Project Engineering	Technical Officer	0-2 Yrs	##
105	Engineering	Project Engineering	Technical Officer	3-9 Yrs	##
106	Engineering	Project Engineering	Technical Officer	10+ Yrs	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
107	Engineering	Project Engineering	Technical Officer	Expat	##
108	Engineering	Project Engineering	Engineer	0-2 Yrs	##
109	Engineering	Project Engineering	Engineer	3-9 Yrs	##
110	Engineering	Project Engineering	Engineer	10+ Yrs	##
111	Engineering	Project Engineering	Engineer	Expat	##
112	Engineering	Reliability Engineering	Technical Officer	0-2 Yrs	##
113	Engineering	Reliability Engineering	Technical Officer	3-9 Yrs	##
114	Engineering	Reliability Engineering	Technical Officer	10+ Yrs	##
115	Engineering	Reliability Engineering	Technical Officer	Expat	##
116	Engineering	Reliability Engineering	Engineer	0-2 Yrs	##
117	Engineering	Reliability Engineering	Engineer	3-9 Yrs	##
118	Engineering	Reliability Engineering	Engineer	10+ Yrs	##
119	Engineering	Reliability Engineering	Engineer	Expat	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
120	Engineering	Safety Engineering	Technical Officer	0-2 Yrs	##
121	Engineering	Safety Engineering	Technical Officer	3-9 Yrs	##
122	Engineering	Safety Engineering	Technical Officer	10+ Yrs	##
123	Engineering	Safety Engineering	Technical Officer	Expat	##
124	Engineering	Safety Engineering	Engineer	0-2 Yrs	##
125	Engineering	Safety Engineering	Engineer	3-9 Yrs	##
126	Engineering	Safety Engineering	Engineer	10+ Yrs	##
127	Engineering	Safety Engineering	Engineer	Expat	##
128	Engineering	Signatures Engineering	Technical Officer	0-2 Yrs	##
129	Engineering	Signatures Engineering	Technical Officer	3-9 Yrs	##
130	Engineering	Signatures Engineering	Technical Officer	10+ Yrs	##
131	Engineering	Signatures Engineering	Technical Officer	Expat	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
132	Engineering	Signatures Engineering	Engineer	0-2 Yrs	##
133	Engineering	Signatures Engineering	Engineer	3-9 Yrs	##
134	Engineering	Signatures Engineering	Engineer	10+ Yrs	##
135	Engineering	Signatures Engineering	Engineer	Expat	##
136	Engineering	Software Engineering	Technical Officer	0-2 Yrs	##
137	Engineering	Software Engineering	Technical Officer	3-9 Yrs	##
138	Engineering	Software Engineering	Technical Officer	10+ Yrs	##
139	Engineering	Software Engineering	Technical Officer	Expat	##
140	Engineering	Software Engineering	Engineer	0-2 Yrs	##
141	Engineering	Software Engineering	Engineer	3-9 Yrs	##
142	Engineering	Software Engineering	Engineer	10+ Yrs	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
143	Engineering	Software Engineering	Engineer	Expat	##
144	Engineering	Structural Engineering	Technical Officer	0-2 Yrs	##
145	Engineering	Structural Engineering	Technical Officer	3-9 Yrs	##
146	Engineering	Structural Engineering	Technical Officer	10+ Yrs	##
147	Engineering	Structural Engineering	Technical Officer	Expat	##
148	Engineering	Structural Engineering	Engineer	0-2 Yrs	##
149	Engineering	Structural Engineering	Engineer	3-9 Yrs	##
150	Engineering	Structural Engineering	Engineer	10+ Yrs	##
151	Engineering	Structural Engineering	Engineer	Expat	##
152	Engineering	Systems Engineering	Technical Officer	0-2 Yrs	##
153	Engineering	Systems Engineering	Technical Officer	3-9 Yrs	##
154	Engineering	Systems Engineering	Technical Officer	10+ Yrs	##

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
155	Engineering	Systems Engineering	Technical Officer	Expat	##
156	Engineering	Systems Engineering	Engineer	0-2 Yrs	##
157	Engineering	Systems Engineering	Engineer	3-9 Yrs	##
158	Engineering	Systems Engineering	Engineer	10+ Yrs	##
159	Engineering	Systems Engineering	Engineer	Expat	##
160	Engineering	Welding Engineering	Technical Officer	0-2 Yrs	##
161	Engineering	Welding Engineering	Technical Officer	3-9 Yrs	##
162	Engineering	Welding Engineering	Technical Officer	10+ Yrs	##
163	Engineering	Welding Engineering	Technical Officer	Expat	##
164	Engineering	Welding Engineering	Engineer	0-2 Yrs	##
165	Engineering	Welding Engineering	Engineer	3-9 Yrs	##
166	Engineering	Welding Engineering	Engineer	10+ Yrs	##
167	Engineering	Welding Engineering	Engineer	Expat	##
168	Engineering	Technologist	Technical Officer	0-2 Yrs	##
169	Engineering	Technologist	Technical Officer	3-9 Yrs	##
170	Engineering	Technologist	Technical Officer	10+ Yrs	##
171	Engineering	Technologist	Technical Officer	Expat	##
172	Engineering	Technologist	Engineer	0-2 Yrs	##
173	Engineering	Technologist	Engineer	3-9 Yrs	##
174	Engineering	Technologist	Engineer	10+ Yrs	##
175	Engineering	Technologist	Engineer	Expat	##
176	Engineering	Design	Designer	0-2 Yrs	##

Naval Shipbuilding College
Job Family Taxonomy

NSC #	Job Family	Job Function	Job Role	Experience Level	ANZSCO Code
177	Engineering	Design	Designer	3-9 Yrs	##
178	Engineering	Design	Designer	10+ Yrs	##
179	Engineering	Design	Designer	Expat	##
180	Engineering	Configuration Management	Administrator		##
181	Engineering	Configuration Management	Engineer	0-2 Yrs	##
182	Engineering	Configuration Management	Engineer	3-9 Yrs	##
183	Engineering	Configuration Management	Engineer	10+ Yrs	##
184	Engineering	Configuration Management	Engineer	Expat	##
185	Engineering	Document Control	Administrator		##

Role Description	Qualification Required
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Providing governance and oversight of engineeering capability including internal engineering assurance, awarding of delegations, process formulation and adherence and design output integrity. Maintain close liaison with CoA counterpart to ensure ongoing compliance of engineering practices against the Defence Seaworthiness Management System (DSwMs).	Bachelor degree in a discipline of engineering sufficient to satisfy the entry requirements for membership in Engineers Australia at the membership grade of Chartered Professional (CPEng or RPEQ).
Leading an engineering team including capability development, financial mamnagement, providing oversight of engineering activities, and ensuring compliance with internal and CoA processes.	Bachelor degree in a discipline of engineering sufficient to satisfy the entry requirements for membership in Engineers Australia at the membership grade of Chartered Professional (CPEng or RPEQ).
Lead the Engineering Department overseeing strategy development, financial management, providing oversight of engineering activities, and ensuring compliance with internal and CoA processes.	Bachelor degree in a discipline of engineering sufficient to satisfy the entry requirements for membership in Engineers Australia at the membership grade of Chartered Professional (CPEng or RPEQ).
Provide fundamental technical knowledge and support to Combat System Department in order to deliver engineering products and services. Under supervision, make technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Minimum of Cert IV in Systems, Communications, Electronics, or ICT (such as software / computer science)
Provide technical profiency and support to Combat System Department in order to deliver engineering products and services. Undertake work at a system/assembly/detail design level with limited supervision and recognise and address issues and priorities, and overcome obstacles to complete tasks.	Minimum of Cert IV in Systems, Communications, Electronics, or ICT (such as software / computer science)
Provide technical expertise, leadership and support to Combat System Department in order to deliver engineering products and services. Perform professional work involving considerable independence in approach, recognising and addressing issues and supervising concurrent tasks on time and within budget.	Minimum of Cert IV in Systems, Communications, Electronics, or ICT (such as software / computer science)

Role Description	Qualification Required
Provide fundamental engineering knowledge and support to Combat System Department in order to deliver engineering products and services. Under supervision, project lead single-discipline tasks making technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Tertiary qualifications (degree or higher) in Systems, Communications, Electronics, or ICT Engineering.Eligible for membership of Engineers Australia
Provide engineering proficiency, leadership and support to Combat System Department and other departments, recognising and addressing all relevant engineering issues and provide direction and guidance to less experienced personnel. Define and execute multi-discipline tasks in-line with work breakdown structure (WBS) schedule elements, contributing to resource levelling, and reporting on earned value (EV) measures/variance.	Tertiary qualifications (degree or higher) in Systems, Communications, Electronics, or ICT Engineering.Eligible for membership of Engineers Australia
Provide engineering expertise and leadership to Combat System Department and other departments. Perform professional engineering work involving considerable independence in approach, undertaking a multitude of engineering tasks ranging from routine to complex, interdisciplinary or technically challenging engineering applications. Provids technical leadership to the discipline and guidance and mentorship of less experienced personnel. Define and execute large multi-discipline tasks in-line with work breakdown structure (WBS) schedule elements, contributing to resource levelling, and reporting on earned value (EV) measures/variance.	Tertiary qualifications (degree or higher) in Systems, Communications, Electronics, or ICT Engineering.Eligible for membership of Engineers Australia
Provide fundamental technical knowledge and support to Electrical Engineering Department in order to deliver engineering products and services. Under supervision, make technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Tertiary qualified in a relevant Engineering discipline.
Provide technical expertise and support to Electrical Engineering Department in order to deliver engineering products and services. Undertake work at a system/assembly/detail design level with limited supervision and recognise and address issues and priorities, and overcome obstacles to complete tasks.	Tertiary qualified in a relevant Engineering discipline.
Provide technical expertise, leadership and support to Electrical Engineering Department in order to deliver engineering products and services. Perform professional work involving considerable independence in approach, recognising and addressing issues and supervising concurrent tasks on time and within budget.	Tertiary qualified in a relevant Engineering discipline.
Provide fundamental engineering knowledge and support to Electrical Engineering Department in order to deliver engineering products and services. Under supervision, project lead single-discipline tasks making technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide engineering proficiency, leadership and support to Electrical Engineering Department and other departments, recognising and addressing all relevant engineering issues and provide directon and guidance to less experienced personnel. Define and execute large multi-discipline tasks in-line with work breakdown structure (WBS) schedule elements, contributing to resource levelling, and reporting on earned value (EV) measures/variance.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia

Role Description	Qualification Required
Provide engineering expertise and leadership to Electrical Engineering Department and other departments. Perform professional engineering work involving considerable independence in approach, undertaking a multitude of engineering tasks ranging from routine to complex, interdisciplinary or technically challenging engineering applications. Provides technical leadership to the discipline and guidance and mentorship of less experienced personnel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.

Role Description	Qualification Required
	Tertiary qualified in a relevant Engineering discipline.
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Responsible for supporting the team with the execution of integrated support plans and assist with logistics support and maintenance engineering analysis. The role is required to support the program ILS activities including development of ILS documentation, review of Prime Contractor deliverables and planning for transition of support.	Path 1: Dip/Advanced in i.e. Engineering/Logistics Path 2: Tertiary qualified in a relevant Engineering discipline. Path 3: Formal qualifications in ILS/LSA or IS Data Analytics preferred
Execution of integrated support plans and assist with logistics support and maintenance engineering analysis. The role is required to support the program ILS activities including development of ILS documentation, review of Prime Contractor deliverables and planning for transition of support.	Path 1: Tertiary qualified in a relevant Engineering discipline. Path 2: Formal qualifications in ILS/LSA or IS Data Analytics preferred
Management of an ILS technician team in execution of integrated support plans and assist with logistics support and maintenance engineering analysis. The role is required to support the program ILS activities including development of ILS documentation, review of Prime Contractor deliverables and planning for transition of support.	Tertiary qualified in a relevant Engineering discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred

Role Description	Qualification Required
Instruct and train ILS engineers in all areas of aspects of ILS planning, development and contract execution within the Project environment	Tertiary qualified in an Engineering or Logistics discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
Instruct and train ILS engineers in all areas of aspects of ILS planning, development and contract execution within the Project environment	Tertiary qualified in an Engineering or Logistics discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
Instruct and train ILS engineers in all areas of aspects of ILS planning, development and contract execution within the Project environment	Tertiary qualified in an Engineering or Logistics discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
Instruct and train ILS technicians in all areas of aspects of ILS planning, development and contract execution within the Project environment	Tertiary qualified in an Engineering or Logistics discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
Instruct and train ILS technicians in all areas of aspects of ILS planning, development and contract execution within the Project environment	Path 1: Tertiary qualified in a relevant Engineering discipline. Path 2: Formal qualifications in ILS/LSA or IS Data Analytics preferred
Instruct and train ILS technicians in all areas of aspects of ILS planning, development and contract execution within the Project environment	Path 1: Tertiary qualified in a relevant Engineering discipline. Path 2: Formal qualifications in ILS/LSA or IS Data Analytics preferred Project Management: Courses and or VET qualifications .

Role Description	Qualification Required
Instruct and train ILS engineers in all areas of aspects of ILS planning, development and contract execution within the Project environment	Tertiary qualified in an Engineering or Logistics discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
Instruct and train ILS engineers in all areas of aspects of ILS planning, development and contract execution within the Project environment	Tertiary qualified in an Engineering or Logistics discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
Instruct and train ILS engineers in all areas of aspects of ILS planning, development and contract execution within the Project environment	Tertiary qualified in an Engineering or Logistics discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
The role is required to support the program ILS activities including development of ILS documentation, review of Prime Contractor deliverables and planning for transition of support. Responsible for format and content or ILS publication and documents, ensuring that updates and authorised maintenance data is suitable.	Tertiary qualified in a relevant Engineering discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
The role is required to support the program ILS activities including development of ILS documentation, review of Prime Contractor deliverables and planning for transition of support. Responsible for format and content or ILS publication and documents, ensuring that updates and authorised maintenance data is suitable.	Tertiary qualified in a relevant Engineering discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred

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Role Description	Qualification Required
The role is required to support the program ILS activities including development of ILS documentation, review of Prime Contractor deliverables and planning for transition of support. Responsible for format and content or ILS publication and documents, ensuring that updates and authorised maintenance data is suitable.	Tertiary qualified in a relevant Engineering discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
The role is required to support the program ILS activities including development of ILS documentation, review of Prime Contractor deliverables and planning for transition of support. Responsible for format and content or ILS publication and documents, ensuring that updates and authorised maintenance data is suitable.	Tertiary qualified in a relevant Engineering discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
The role is required to support the program ILS activities including development of ILS documentation, review of Prime Contractor deliverables and planning for transition of support. Responsible for format and content or ILS publication and documents, ensuring that updates and authorised maintenance data is suitable.	Tertiary qualified in a relevant Engineering discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred

Naval Shipbuilding College
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Role Description	Qualification Required
The role is required to support the program ILS activities including development of ILS documentation, review of Prime Contractor deliverables and planning for transition of support. Responsible for format and content or ILS publication and documents, ensuring that updates and authorised maintenance data is suitable.	Tertiary qualified in a relevant Engineering discipline. Formal qualifications in ILS/LSA or IS Data Analytics preferred
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia

Role Description	Qualification Required
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide fundamental technical knowledge and support to Mechanical Engineering Department in order to deliver engineering products and services. Under supervision, make technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide technical expertise and support to Mechanical Engineering Department in order to deliver engineering products and services. Undertake work at a system/assembly/detail design level with limited supervision and recognise and address issues and priorities, and overcome obstacles to complete tasks.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide technical expertise, leadership and support to Mechanical Engineering Department in order to deliver engineering products and services. Perform professional work involving considerable independence in approach, recognising and addressing issues and supervising concurrent tasks on time and within budget.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia

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Role Description	Qualification Required
Provide fundamental engineering knowledge and support to Mechanical Engineering Department in order to deliver engineering products and services. Under supervision, project lead single-discipline tasks making technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide engineering proficiency, leadership and support to Mechanical Engineering Department and other departments, recognising and addressing all relevant engineering issues and provide directon and guidance to less experienced personnel. Define and execute large multi-discipline tasks in-line with work breakdown structure (WBS) schedule elements, contributing to resource levelling, and reporting on earned value (EV) measures/variance.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide engineering expertise and leadership to Mechanical Engineering Department and other departments. Perform professional engineering work involving considerable independence in approach, undertaking a multitude of engineering tasks ranging from routine to complex, interdisciplinary or technically challenging engineering applications. Provides technical leadership to the discipline and guidance and mentorship less experienced personnel	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia of
	Degree qualified in Naval Architecture or a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in Naval Architecture or a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in Naval Architecture or a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in Naval Architecture or a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in Naval Architecture or a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in Naval Architecture or a relevant Engineering discipline Eligible for membership of Engineers Australia

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Role Description	Qualification Required
Provide fundamental technical knowledge and support to Production Engineering Department in order to deliver engineering products and services. Under supervision, make technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Degree in engineering : (Mechanical, Mechatronics or Electrical)
Provide technical expertise and support to Production Engineering Department in order to deliver engineering products and services. Undertake work at a system/assembly/detail design level with limited supervision and recognise and address issues and priorities, and overcome obstacles to complete tasks.	Degree in engineering : (Mechanical, Mechatronics or Electrical)
Provide technical expertise, leadership and support to Production Engineering Department in order to deliver engineering products and services. Perform professional work involving considerable independence in approach, recognising and addressing issues and supervising concurrent tasks on time and within budget.	Degree in engineering : (Mechanical, Mechatronics or Electrical)
Provide fundamental engineering knowledge and support to Production Engineering Department in order to deliver engineering products and services. Under supervision, project lead single-discipline tasks making technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Degree in engineering : (Mechanical, Mechatronics or Electrical)
Provide engineering proficiency, leadership and support to Production Engineering Department and other departments, recognising and addressing all relevant engineering issues and provide directon and guidance to less experienced personnel. Define and execute large multi-discipline tasks in line with work breakdown structure (WBS) schedule elements, contributing to resource levelling, and reporting on earned value (EV) measures/variance	Degree qualified in a relevant Engineering discipline/ A qualification in project management (highly desirable)
Provide engineering expertise and leadership to Production Engineering Department and other departments. Perform professional engineering work involving considerable independence in approach, undertaking a multitude of engineering tasks ranging from routine to complex, interdisciplinary or technically challenging engineering applications. Provides technical leadership to the discipline and guidance and mentorship of less experienced personnel	Eligible for membership of Engineers Australia
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.

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Role Description	Qualification Required
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
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	Tertiary qualified in a relevant Engineering discipline.
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	Tertiary qualified in a relevant Engineering discipline.
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
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Role Description	Qualification Required
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.

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Role Description	Qualification Required
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide fundamental technical knowledge and support to Software Engineering Department in order to deliver engineering products and services. Under supervision, make technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide technical expertise and support to Software Engineering Department in order to deliver engineering products and services. Undertake work at a system/detail design level with limited supervision and recognise and address issues and priorities, and overcome obstacles to complete tasks.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide technical expertise, leadership and support to Software Engineering Department in order to deliver engineering products and services. Perform professional work involving considerable independence in approach, recognising and addressing issues and supervising concurrent tasks on time and within budget.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide fundamental engineering knowledge and support to Software Engineering Department in order to deliver engineering products and services. Under supervision, project lead single-discipline tasks making technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide engineering proficiency, leadership and support to Software Engineering Department and other departments, recognising and addressing all relevant engineering issues and provide directon and guidance to less experienced personnel. Define and execute large multi-discipline tasks in-line with work breakdown structure (WBS) schedule elements, contributing to resource levelling, and reporting on earned value (EV) measures/variance.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide engineering expertise and leadership to Software Engineering Department and other departments. Perform professional engineering work involving considerable independence in approach, undertaking a multitude of engineering tasks ranging from routine to complex, interdisciplinary or technically challenging engineering applications. Provides technical leadership to the discipline and guidance and mentorship of less experienced personnel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia

Role Description	Qualification Required
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Tertiary qualified in a relevant Engineering discipline.
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide fundamental naval systems related technical knowledge and support in order to deliver engineering products and services. Under supervision, make technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide naval systems related technical expertise and support in order to deliver engineering products and services. Undertake work at a system/detail design level with limited supervision and recognise and address issues and priorities, and overcome obstacles to complete tasks.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide naval systems related technical expertise, leadership and support in order to deliver engineering products and services. Perform professional work involving considerable independence in approach, recognising and addressing issues and supervising concurrent tasks on time and within budget.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia

Role Description	Qualification Required
Provide fundamental naval systems engineering knowledge and support in order to deliver engineering products and services. Under supervision, project lead single-discipline tasks making technical decisions that are safe, practical and suitable for implementation on board the naval vessel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide naval systems engineering proficiency, leadership and support to Engineering Department and other departments, recognising and addressing all relevant engineering issues and provide directon and guidance to less experienced personnel. Define and execute large multi-discipline tasks in-line with work breakdown structure (WBS) schedule elements, contributing to resource levelling, and reporting on earned value (EV) measures/variance.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Provide naval systems engineering expertise and leadership to Engineering Department and other departments. Perform professional engineering work involving considerable independence in approach, undertaking a multitude of engineering tasks ranging from routine to complex, interdisciplinary or technically challenging engineering applications. Provides technical leadership to the discipline and guidance and mentorship of less experienced personnel.	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
Design components or portions of systems and modifies existing designs to develop or improve products and facilitate manufacturing operations Utilises computer-aided design equipment and/or graphic tools such as, CAD, CAM or CATIA. Gather information, makes studies, computes calculations, and prepares original rough layouts, sketches to present design proposal. Coordinate design criteria with engineering, manufacturing, tooling, material, and planning group such as ease of manufacture, availability of materials, and contractual specifications..	Microsoft Office, NX Modelling, 2D and 3D AutoCAD

Role Description	Qualification Required
Design components or portions of systems and modifies existing designs to develop or improve products and facilitate manufacturing operations Utilises computer-aided design equipment and/or graphic tools such as, CAD, CAM or CATIA. Gather information, makes studies, computes calculations, and prepares original rough layouts, sketches to present design proposal. Coordinate design criteria with engineering, manufacturing, tooling, material, and planning group such as ease of manufacture, availability of materials, and contractual specifications..	Microsoft Office, NX Modelling, 2D and 3D AutoCAD
Provide guidance and assistance to members of the team in the resolution of problems and issues. Design components or portions of systems and modifies existing designs to develop or improve products and facilitate manufacturing operations. Utilises computer-aided design equipment and/or graphic tools such as, CAD, CAM or CATIA. Gather information, makes studies, computes calculations, and prepares original rough layouts, sketches to present design proposal. Coordinate design criteria with engineering, manufacturing, tooling, material, and planning group such as ease of manufacture, availability of materials, and contractual specifications. resource to others in the resolution of problems and issues. Consequence of Errors are very difficult to detect and would normally require significant expenditures to resolve.	Microsoft Office, NX Modelling, 2D and 3D AutoCAD
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia
	Degree qualified in a relevant Engineering discipline Eligible for membership of Engineers Australia

Competency Required	Unique ID	CEAS Role Description
Experience in the design, specification, development and implementation of complex electrical systems	1-1-1.01-4	
Minimum eight years systems engineering (or equivalent) experience within a Defence Program environment. Minimum four years as a team leader or manager leading a team of engineers and/or engineering officers.	1-4-2.02-1	
	1-4-2.02-2	
Minimum eight years systems engineering (or equivalent) experience within a Defence Program environment. Minimum four years as a team leader or manager leading a team of engineers and/or engineering officers.	1-25-7.11-0	
	2-26-4.02-1	
Minimum eight years systems engineering (or equivalent) experience within a Defence Program environment. Minimum four years as a team leader or manager leading a team of engineers and/or engineering officers.	1-22-2.02-1	
	1-22-2.02-2	
Extensive knowledge and demonstrated experience in working to strict engineering and government standards Experience in using onboard communication systems.	3-41-4.04-3	
Extensive knowledge and demonstrated experience in working to strict engineering and government standards Experience in using onboard communication systems. Experience in managing team to meet required outcomes whilst providing expertise within combat and communications related systems.	3-41-4.05-3	
Extensive experience in Engineering Management and Risk Mitigation and combat systems improvement methodologies.	3-41-4.04-4	
	3-41-4.05-4	

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Competency Required	Unique ID	CEAS Role Description
Strong understanding of combat systems and to onboard communication systems Understanding/experience implementation of combat systems within defence industy.	1-7-2.02-2	
Strong understanding of combat systems and to onboard communication systems. Understanding/experience implementation of combat systems within defence industy.	1-7-2.02-3	
Strong understanding of combat systems and to onboard communication systems. Understanding/experience implementation of combat systems within defence industy.	1-7-2.02-4	
	1-8-3.03-1	
Experience in the design, specification, development and implementation of complex electrical systems	3-42-7.11-0	
Experience in the design, specification, development and implementation of complex electrical systems	3-42-2.02-1	
Experience in the design, specification, development and implementation of complex electrical systems	3-42-2.02-2	
	3-42-2.02-3	
Experience in the design, specification, development and implementation of complex electrical systems	1-8-3.03-2	
Experience in the design, specification, development and implementation of complex electrical systems	1-8-3.03-3	

Competency Required	Unique ID	CEAS Role Description
Experience in the design, specification, development and implementation of complex electrical systems	1-8-3.03-4	
	1-8-2.02-1	
	3-42-2.02-4	
	3-42-1.11-0	
	3-42-1.11-4	
	3-42-1.11-4	
	3-42-1.13-1	
	1-8-2.02-2	
	1-8-2.02-3	
	1-8-2.02-4	
	1-9-3.03-1	
	3-42-1.13-2	
	3-42-1.13-3	

Competency Required	Unique ID	CEAS Role Description
	3-42-1.13-4	
	3-42-4.04-1	
	1-9-3.03-2	
	1-9-3.03-3	
	1-9-3.03-4	
	1-9-2.02-1	
Understanding contracted requirements and the application of technical specifications and standards. Be able to demonstrate understanding and application of predictive maintenance techniques.	3-42-4.05-1	
Experience in providing Subject Matter Expert (SME) advice and guidance to a range of stakeholders across the Company with respect to Reliability Engineering matters. Demonstrated exposure and experience in analysing system failures and, where applicable, perform Root Cause Analysis and update the system reliability model with operational data	3-42-4.04-2	
Proven track record and experience in executing contracted requirements and the application of technical specifications and standards. Be able to demonstrate understanding and application of predictive maintenance techniques.	3-42-4.05-2	
	3-42-4.04-3	

Competency Required	Unique ID	CEAS Role Description
Experience in analysing needs and system requirements, and allocation to specifications.	1-9-2.02-2	
High level of interpersonal, organisational and communication skills. Demonstrated skills regarding analysis of Engineering/Systems Management	1-9-2.02-3	
Experience in logistics support analyses with a focus on maintenance task analysis. Experience in reviewing integration & validation of complex support designs including plans and reports. Proven experience in providing clear and decisive leadership within a team,	1-9-2.02-4	
	1-10-3.03-1	
A high level of interpersonal, organisational and communication skills. Understanding and can conduct ILS/LSA activities that complement generation of support system data.	3-42-4.05-3	
Significant experience of specialist technical expertise in the application of Reliability, Availability & Maintainability (RAM) and Failure Modes Effects and Criticality Analysis (FMECA) to engineering projects. Experience with analysing needs and system requirements, and allocation to specifications. Experience in mentoring and developing other team members	3-42-4.04-4	
Reliability studies, maintenance requirements determination (MRD), inventory optimisation or field service studies in either a Systems Acquisition environment performing Systems Engineering; or in an In-Service Support (ISS) sustainment context. Be able to demonstrate understanding and application of predictive maintenance techniques. Understanding contracted requirements and the application of technical specifications and standards. Computer modelling and quantitative methods. Prior experience in Defence having executed the development of logistics support and system requirements for military systems is desirable	3-42-4.05-4	
	3-43-1.11-4	

Competency Required	Unique ID	CEAS Role Description
Experience in analysing needs and system requirements, and allocation to specifications.	1-10-3.03-2	
High level of interpersonal, organisational and communication skills. Demonstrated skills regarding analysis of Engineering/Systems Management	1-10-3.03-3	
Experience in logistics support analyses with a focus on maintenance task analysis. Experience in reviewing integration & validation of complex support designs including plans and reports. Proven experience in providing clear and decisive leadership within a team,	1-10-3.03-4	
	1-10-2.02-1	
Reliability studies, maintenance requirements determination (MRD), inventory optimisation or field service studies in either a Systems Acquisition environment performing Systems Engineering; or in an In-Service Support (ISS) sustainment context. Be able to demonstrate understanding and application of predictive maintenance techniques. Understanding contracted requirements and the application of technical specifications and standards. Computer modelling and quantitative methods. Prior experience in Defence having executed the development of logistics support and system requirements for military systems is desirable	3-43-1.13-4	
Reliability studies, maintenance requirements determination (MRD), inventory optimisation or field service studies in either a Systems Acquisition environment performing Systems Engineering; or in an In-Service Support (ISS) sustainment context. Be able to demonstrate understanding and application of predictive maintenance techniques. Understanding contracted requirements and the application of technical specifications and standards. Computer modelling and quantitative methods. Prior experience in Defence having executed the development of logistics support and system requirements for military systems is desirable	3-43-4.01-1	

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Competency Required	Unique ID	CEAS Role Description
Reliability studies, maintenance requirements determination (MRD), inventory optimisation or field service studies in either a Systems Acquisition environment performing Systems Engineering; or in an In-Service Support (ISS) sustainment context. Be able to demonstrate understanding and application of predictive maintenance techniques. Understanding contracted requirements and the application of technical specifications and standards. Computer modelling and quantitative methods. Prior experience in Defence having executed the development of logistics support and system requirements for military systems is desirable	3-43-4.05-1	
	3-43-1.11-0	
Reliability studies, maintenance requirements determination (MRD), inventory optimisation or field service studies in either a Systems Acquisition environment performing Systems Engineering; or in an In-Service Support (ISS) sustainment context. Be able to demonstrate understanding and application of predictive maintenance techniques. Understanding contracted requirements and the application of technical specifications and standards. Computer modelling and quantitative methods. Prior experience in Defence having executed the development of logistics support and system requirements for military systems is desirable	1-10-2.02-2	
Reliability studies, maintenance requirements determination (MRD), inventory optimisation or field service studies in either a Systems Acquisition environment performing Systems Engineering; or in an In-Service Support (ISS) sustainment context. Be able to demonstrate understanding and application of predictive maintenance techniques. Understanding contracted requirements and the application of technical specifications and standards. Computer modelling and quantitative methods. Prior experience in Defence having executed the development of logistics support and system requirements for military systems is desirable	1-10-2.02-3	

Competency Required	Unique ID	CEAS Role Description
Reliability studies, maintenance requirements determination (MRD), inventory optimisation or field service studies in either a Systems Acquisition environment performing Systems Engineering; or in an In-Service Support (ISS) sustainment context. Be able to demonstrate understanding and application of predictive maintenance techniques. Understanding contracted requirements and the application of technical specifications and standards. Computer modelling and quantitative methods. Prior experience in Defence having executed the development of logistics support and system requirements for military systems is desirable	1-10-2.02-4	
	1-11-3.03-1	
	3-43-4.01-2	
	3-43-5.01-1	
	3-43-5.01-2	
	3-43-5.01-3	
	1-11-3.03-2	
	1-11-3.03-3	
	1-11-3.03-4	
	1-11-2.02-1	

Competency Required	Unique ID	CEAS Role Description
	3-43-5.01-4	
	3-43-1.13-1	
	3-43-1.13-2	
	3-43-1.13-3	
	1-11-2.02-2	
	1-11-2.02-3	
	1-11-2.02-4	
	1-12-3.03-1	
Experience in the design, specification, development and implementation of complex mechanical systems	3-43-4.05-2	
Experience in the design, specification, development and implementation of complex mechanical systems	3-43-4.01-3	
Experience in the design, specification, development and implementation of complex mechanical systems	3-43-4.05-3	
	3-43-4.01-4	

Competency Required	Unique ID	CEAS Role Description
Experience in the design, specification, development and implementation of complex mechanical systems	1-12-3.03-2	
Experience in the design, specification, development and implementation of complex mechanical systems	1-12-3.03-3	
Experience in the design, specification, development and implementation of complex mechanical systems	1-12-3.03-4	
	1-12-2.02-1	
Experience in the design, specification, development and implementation of complex naval systems	3-43-4.05-4	
Experience in the design, specification, development and implementation of complex naval systems	4-44-7.11-0	
Experience in the design, specification, development and implementation of complex naval systems	4-44-1.11-0	
	4-44-1.11-4	
Experience in the design, specification, development and implementation of complex naval systems	1-12-2.02-2	
Experience in the design, specification, development and implementation of complex naval systems	1-12-2.02-3	
Experience in the design, specification, development and implementation of complex naval systems	1-12-2.02-4	
	1-13-3.03-1	

Competency Required	Unique ID	CEAS Role Description
Proven capacity to contribute to and implement strategic initiatives, including the capability to plan, manage change, improve performance and project manage	4-44-7.06-0	
Proven capacity to contribute to and implement strategic initiatives, including the capability to plan, manage change, improve performance and project manage	4-44-7.06-4	
Proven capacity to contribute to and implement strategic initiatives, including the capability to plan, manage change, improve performance and project manage	4-44-7.08-0	
	4-45-7.11-0	
Proven capacity to contribute to and implement strategic initiatives, including the capability to plan, manage change, improve performance and project manage	1-13-3.03-2	
Significant experience working in a heavy industrial or construction environment. substantial senior production leadership and operational management experience	1-13-3.03-3	
Significant experience working in a heavy industrial or construction environment. substantial senior production leadership and operational management experience	1-13-3.03-4	
	1-13-2.02-1	
	4-45-4.11-0	
	4-45-1.11-0	
	4-45-6.03-0	

Competency Required	Unique ID	CEAS Role Description
	4-45-3.04-0	
	1-13-2.02-2	
	1-13-2.02-3	
	1-13-2.02-4	
	1-14-3.03-1	
	5-46-7.12-0	
	5-46-1.16-0	
	5-46-1.11-0	
	5-47-4.19-0	
	1-14-3.03-2	
	1-14-3.03-3	
	1-14-3.03-4	
	1-14-2.02-1	

Competency Required	Unique ID	CEAS Role Description
	5-47-1.17-0	
	5-48-7.13-0	
	5-48-1.11-0	
	5-49-1-0	
	1-14-2.02-2	
	1-14-2.02-3	
	1-14-2.02-4	
	1-15-3.03-1	
	5-49-1.05-0	
	5-49-1.06-0	
	5-49-4.09-0	
	5-50-7.11-0	

Competency Required	Unique ID	CEAS Role Description
	1-15-3.03-2	
	1-15-3.03-3	
	1-15-3.03-4	
	1-15-2.02-1	
Experience in the design, specification, development and implementation of complex software	5-50-4.21-0	
Experience in the design, specification, development and implementation of complex software	5-50-1.11-0	
Experience in the design, specification, development and implementation of complex software	5-51-7.03-0	
	5-51-2.03-0	
Experience in the design, specification, development and implementation of complex software	1-15-2.02-2	
Experience in the design, specification, development and implementation of complex software	1-15-2.02-3	
Experience in the design, specification, development and implementation of complex software	1-15-2.02-4	

Competency Required	Unique ID	CEAS Role Description
	1-16-3.03-1	
	5-51-4.23-0	
	5-51-1.11-0	
	5-51-7.21-0	
	5-52-1.22-0	
	1-16-3.03-2	
	1-16-3.03-3	
	1-16-3.03-4	
	1-16-2.02-1	
Experience in the design, specification, development and implementation of complex systems	5-52-7.14-0	
Experience in the design, specification, development and implementation of complex systems	5-52-1.14-0	
Experience in the design, specification, development and implementation of complex systems	5-53-1.11-0	

Competency Required	Unique ID	CEAS Role Description
	5-53-4.15-0	
Experience in the design, specification, development and implementation of complex systems	1-16-2.02-2	
Experience in the design, specification, development and implementation of complex systems	1-16-2.02-3	
Experience in the design, specification, development and implementation of complex systems	1-16-2.02-4	
	1-17-3.03-1	
	5-53-4.16-0	
	5-53-7.19-0	
	5-54-1.04-0	
	5-54-1.11-0	
	1-17-3.03-2	
	1-17-3.03-3	
	1-17-3.03-4	
	1-17-2.02-1	
	5-54-7.17-0	
	5-55-7.11-0	
	5-55-4.22-0	
	5-55-1.11-0	
	1-17-2.02-2	
	1-17-2.02-3	
	1-17-2.02-4	
	1-18-3.03-1	
Extensive knowledge in specialised functions. A wide and comprehensive acquaintance with, and understanding of, both general and specific aspects of the job and their practical application to complex problems and situations ordinarily encountered.	1-6-2.02-2	

Competency Required	Unique ID	CEAS Role Description
Extensive knowledge in specialised functions. A wide and comprehensive acquaintance with, and understanding of, both general and specific aspects of the job and their practical application to complex problems and situations ordinarily encountered.	1-6-2.02-3	
Extensive knowledge in specialised functions. A wide and comprehensive acquaintance with, and understanding of, both general and specific aspects of the job and their practical application to complex problems and situations ordinarily encountered.	1-6-2.02-4	
	1-7-3.03-1	
	1-1-1.11-0	
Experience in the design, specification, development and implementation of complex systems	1-18-3.03-2	
Experience in the design, specification, development and implementation of complex systems	1-18-3.03-3	
Experience in the design, specification, development and implementation of complex systems	1-18-3.03-4	
	1-18-2.02-1	
	1-1-1.11-4	

General assumptions associated with the common taxonomy.

Primary purpose:

1. Allow the industry to work from a standardised list of job roles across the sector in order to:
    a. To have a common method and understanding of the unique resources/roles utilized
    b. Collect consistent workforce demand data across the industry
    c. Aggregate and analyze current and future role needs/trends and forecast resource r
    d. Identify priority job roles
    e. Perform workforce market analysis
    f. Conduct training needs analysis

Secondary uses:

1. Create alignment of career opportunities with educational programs
2. Develop candidate attraction strategies
3. Inform, educate and provide career guidance to future shipbuilders
4. Support state and federal government education funding decisions
5. Support state and federal government immigration discussions
6. Develop industry and role marketing materials

This document should be viewed from a role discipline approach as opposed to a role system.

d within the industry

equirements

NSC #	Job Family	Job Fam Code	Job Function	Job Fun Code
1	Engineering	1	Engineering Management	1
2	Engineering	1	Engineering Management	1
3	Engineering	1	Engineering Management	1
4	Engineering	1	Engineering Management	1
5	Engineering	1	Engineering Management	1
6	Engineering	1	Engineering Management	1
7	Engineering	1	Engineering Management	1
8	Engineering	1	Combat Systems Engineering	2
9	Engineering	1	Combat Systems Engineering	2
10	Engineering	1	Combat Systems Engineering	2
11	Engineering	1	Combat Systems Engineering	2
12	Engineering	1	Combat Systems Engineering	2
13	Engineering	1	Combat Systems Engineering	2
14	Engineering	1	Combat Systems Engineering	2
15	Engineering	1	Combat Systems Engineering	2
16	Engineering	1	Electrical Engineering	3
17	Engineering	1	Electrical Engineering	3
18	Engineering	1	Electrical Engineering	3
19	Engineering	1	Electrical Engineering	3
20	Engineering	1	Electrical Engineering	3
21	Engineering	1	Electrical Engineering	3
22	Engineering	1	Electrical Engineering	3
23	Engineering	1	Electrical Engineering	3
24	Engineering	1	Electronics Engineering	4
25	Engineering	1	Electronics Engineering	4
26	Engineering	1	Electronics Engineering	4
27	Engineering	1	Electronics Engineering	4
28	Engineering	1	Electronics Engineering	4
29	Engineering	1	Electronics Engineering	4
30	Engineering	1	Electronics Engineering	4
31	Engineering	1	Electronics Engineering	4
32	Engineering	1	Engineering Assurance	5
33	Engineering	1	Engineering Assurance	5
34	Engineering	1	Engineering Assurance	5
35	Engineering	1	Engineering Assurance	5
36	Engineering	1	Engineering Assurance	5
37	Engineering	1	Engineering Assurance	5
38	Engineering	1	Engineering Assurance	5
39	Engineering	1	Engineering Assurance	5
40	Engineering	1	ILS - Analysis	6
41	Engineering	1	ILS - Analysis	6
42	Engineering	1	ILS - Analysis	6
43	Engineering	1	ILS - Analysis	6
44	Engineering	1	ILS - Analysis	6
45	Engineering	1	ILS - Analysis	6
46	Engineering	1	ILS - Analysis	6
47	Engineering	1	ILS - Analysis	6
48	Engineering	1	ILS - Training	7
49	Engineering	1	ILS - Training	7
50	Engineering	1	ILS - Training	7
51	Engineering	1	ILS - Training	7
52	Engineering	1	ILS - Training	7
53	Engineering	1	ILS - Training	7
54	Engineering	1	ILS - Training	7

55	Engineering	1	ILS - Training	7
56	Engineering	1	ILS - Publications	8
57	Engineering	1	ILS - Publications	8
58	Engineering	1	ILS - Publications	8
59	Engineering	1	ILS - Publications	8
60	Engineering	1	ILS - Publications	8
61	Engineering	1	ILS - Publications	8
62	Engineering	1	ILS - Publications	8
63	Engineering	1	ILS - Publications	8
64	Engineering	1	Maintenance Engineering	9
65	Engineering	1	Maintenance Engineering	9
66	Engineering	1	Maintenance Engineering	9
67	Engineering	1	Maintenance Engineering	9
68	Engineering	1	Maintenance Engineering	9
69	Engineering	1	Maintenance Engineering	9
70	Engineering	1	Maintenance Engineering	9
71	Engineering	1	Maintenance Engineering	9
72	Engineering	1	Materials Engineering	10
73	Engineering	1	Materials Engineering	10
74	Engineering	1	Materials Engineering	10
75	Engineering	1	Materials Engineering	10
76	Engineering	1	Materials Engineering	10
77	Engineering	1	Materials Engineering	10
78	Engineering	1	Materials Engineering	10
79	Engineering	1	Materials Engineering	10
80	Engineering	1	Mechanical Engineering	11
81	Engineering	1	Mechanical Engineering	11
82	Engineering	1	Mechanical Engineering	11
83	Engineering	1	Mechanical Engineering	11
84	Engineering	1	Mechanical Engineering	11
85	Engineering	1	Mechanical Engineering	11
86	Engineering	1	Mechanical Engineering	11
87	Engineering	1	Mechanical Engineering	11
88	Engineering	1	Naval Architecture	12
89	Engineering	1	Naval Architecture	12
90	Engineering	1	Naval Architecture	12
91	Engineering	1	Naval Architecture	12
92	Engineering	1	Naval Architecture	12
93	Engineering	1	Naval Architecture	12
94	Engineering	1	Naval Architecture	12
95	Engineering	1	Naval Architecture	12
96	Engineering	1	Production Engineering	13
97	Engineering	1	Production Engineering	13
98	Engineering	1	Production Engineering	13
99	Engineering	1	Production Engineering	13
100	Engineering	1	Production Engineering	13
101	Engineering	1	Production Engineering	13
102	Engineering	1	Production Engineering	13
103	Engineering	1	Production Engineering	13
104	Engineering	1	Project Engineering	14
105	Engineering	1	Project Engineering	14
106	Engineering	1	Project Engineering	14
107	Engineering	1	Project Engineering	14
108	Engineering	1	Project Engineering	14
109	Engineering	1	Project Engineering	14
110	Engineering	1	Project Engineering	14
111	Engineering	1	Project Engineering	14

112	Engineering	1	Reliability Engineering	15
113	Engineering	1	Reliability Engineering	15
114	Engineering	1	Reliability Engineering	15
115	Engineering	1	Reliability Engineering	15
116	Engineering	1	Reliability Engineering	15
117	Engineering	1	Reliability Engineering	15
118	Engineering	1	Reliability Engineering	15
119	Engineering	1	Reliability Engineering	15
120	Engineering	1	Safety Engineering	16
121	Engineering	1	Safety Engineering	16
122	Engineering	1	Safety Engineering	16
123	Engineering	1	Safety Engineering	16
124	Engineering	1	Safety Engineering	16
125	Engineering	1	Safety Engineering	16
126	Engineering	1	Safety Engineering	16
127	Engineering	1	Safety Engineering	16
128	Engineering	1	Signatures Engineering	17
129	Engineering	1	Signatures Engineering	17
130	Engineering	1	Signatures Engineering	17
131	Engineering	1	Signatures Engineering	17
132	Engineering	1	Signatures Engineering	17
133	Engineering	1	Signatures Engineering	17
134	Engineering	1	Signatures Engineering	17
135	Engineering	1	Signatures Engineering	17
136	Engineering	1	Software Engineering	18
137	Engineering	1	Software Engineering	18
138	Engineering	1	Software Engineering	18
139	Engineering	1	Software Engineering	18
140	Engineering	1	Software Engineering	18
141	Engineering	1	Software Engineering	18
142	Engineering	1	Software Engineering	18
143	Engineering	1	Software Engineering	18
144	Engineering	1	Structural Engineering	19
145	Engineering	1	Structural Engineering	19
146	Engineering	1	Structural Engineering	19
147	Engineering	1	Structural Engineering	19
148	Engineering	1	Structural Engineering	19
149	Engineering	1	Structural Engineering	19
150	Engineering	1	Structural Engineering	19
151	Engineering	1	Structural Engineering	19
152	Engineering	1	Systems Engineering	20
153	Engineering	1	Systems Engineering	20
154	Engineering	1	Systems Engineering	20
155	Engineering	1	Systems Engineering	20
156	Engineering	1	Systems Engineering	20
157	Engineering	1	Systems Engineering	20
158	Engineering	1	Systems Engineering	20
159	Engineering	1	Systems Engineering	20
160	Engineering	1	Welding Engineering	21
161	Engineering	1	Welding Engineering	21
162	Engineering	1	Welding Engineering	21
163	Engineering	1	Welding Engineering	21
164	Engineering	1	Welding Engineering	21
165	Engineering	1	Welding Engineering	21
166	Engineering	1	Welding Engineering	21
167	Engineering	1	Welding Engineering	21
168	Engineering	1	Technologist	22

169	Engineering	1	Technologist	22
170	Engineering	1	Technologist	22
171	Engineering	1	Technologist	22
172	Engineering	1	Technologist	22
173	Engineering	1	Technologist	22
174	Engineering	1	Technologist	22
175	Engineering	1	Technologist	22
176	Engineering	1	Design	23
177	Engineering	1	Design	23
178	Engineering	1	Design	23
179	Engineering	1	Design	23
180	Engineering	1	Configuration Management	24
181	Engineering	1	Configuration Management	24
182	Engineering	1	Configuration Management	24
183	Engineering	1	Configuration Management	24
184	Engineering	1	Configuration Management	24
185	Engineering	1	Document Control	25
186	Operations	2	Planning	26
187	Operations	2	Planning	26
188	Operations	2	Planning	26
189	Operations	2	Planning	26
190	Operations	2	Planning	26
191	Operations	2	Operations Support	27
192	Operations	2	Operations Support	27
193	Operations	2	Operations Support	27
199	Operations	2	Operations Support	27
194	Operations	2	Operations Support	27
200	Operations	2	Operations Support	27
197	Operations	2	Operations Support	27
198	Operations	2	Operations Support	27
195	Operations	2	Operations Support	27
196	Operations	2	Operations Support	27
201	Operations	2	Operations Support	27
202	Operations	2	Operations Support	27
203	Operations	2	Operations Support	27
204	Operations	2	Operations Support	27
205	Operations	2	Operations Support	27
206	Operations	2	Operations Support	27
207	Operations	2	Operations Support	27
208	Operations	2	Electrical Operations	28
209	Operations	2	Electrical Operations	28
210	Operations	2	Electrical Operations	28
211	Operations	2	Electrical Operations	28
212	Operations	2	Electrical Operations	28
213	Operations	2	Electrical Operations	28
214	Operations	2	Welding Operations	29
215	Operations	2	Welding Operations	29
216	Operations	2	Welding Operations	29
217	Operations	2	Welding Operations	29
218	Operations	2	Welding Operations	29
219	Operations	2	Welding Operations	29
220	Operations	2	Light Fabrication	30
221	Operations	2	Light Fabrication	30
222	Operations	2	Light Fabrication	30
223	Operations	2	Light Fabrication	30
224	Operations	2	Light Fabrication	30
225	Operations	2	Light Fabrication	30

226	Operations	2	Heavy Fabrication	31
227	Operations	2	Heavy Fabrication	31
228	Operations	2	Heavy Fabrication	31
229	Operations	2	Heavy Fabrication	31
230	Operations	2	Heavy Fabrication	31
231	Operations	2	Heavy Fabrication	31
232	Operations	2	Mechanical Operations	32
233	Operations	2	Mechanical Operations	32
234	Operations	2	Mechanical Operations	32
235	Operations	2	Mechanical Operations	32
236	Operations	2	Mechanical Operations	32
237	Operations	2	Mechanical Operations	32
238	Operations	2	Piping Operations	33
239	Operations	2	Piping Operations	33
240	Operations	2	Piping Operations	33
241	Operations	2	Piping Operations	33
242	Operations	2	Piping Operations	33
243	Operations	2	Piping Operations	33
244	Operations	2	Operators	34
245	Operations	2	Operators	34
246	Operations	2	Operators	34
247	Operations	2	Operators	34
248	Operations	2	Operators	34
249	Operations	2	Operators	34
250	Operations	2	Facilities	35
251	Operations	2	Facilities	35
252	Operations	2	Facilities	35
253	Operations	2	Facilities	35
254	Operations	2	Facilities	35
255	Operations	2	Facilities	35
256	Operations	2	Facilities	35
257	Operations	2	Facilities	35
258	Operations	2	Facilities	35
259	Operations	2	Quality Control	36
260	Operations	2	Quality Control	36
261	Operations	2	Quality Control	36
262	Operations	2	Quality Control	36
263	Operations	2	Quality Control	36
264	Operations	2	Quality Control	36
265	Operations	2	Quality Control	36
266	Operations	2	Quality Control	36
267	Operations	2	Quality Control	36
268	Operations	2	Quality Control	36
269	Operations	2	Quality Control	36
270	Operations	2	Quality Control	36
271	Operations	2	Quality Control	36
272	Operations	2	Quality Control	36
273	Operations	2	Quality Control	36
274	Operations	2	Quality Assurance & Product Safety	37
275	Operations	2	Quality Assurance & Product Safety	37
276	Operations	2	Quality Assurance & Product Safety	37
277	Operations	2	Quality Assurance & Product Safety	37
278	Operations	2	Quality Assurance & Product Safety	37
279	Operations	2	Quality Assurance & Product Safety	37
280	Operations	2	Quality Assurance & Product Safety	37
281	Operations	2	Quality Assurance & Product Safety	37
282	Operations	2	Quality Assurance & Product Safety	37

283	Operations	2	Quality Assurance & Product Safety	37
284	Operations	2	Safety and Certification	38
285	Operations	2	Safety and Certification	38
286	Operations	2	Safety and Certification	38
287	Operations	2	Safety and Certification	38
288	Operations	2	Safety and Certification	38
289	Operations	2	Safety and Certification	38
290	Operations	2	Safety and Certification	38
291	Operations	2	Safety and Certification	38
292	Operations	2	Test and Activation	39
293	Operations	2	Test and Activation	39
306	Operations	2	Test and Activation	39
307	Operations	2	Test and Activation	39
308	Operations	2	Test and Activation	39
309	Operations	2	Test and Activation	39
310	Operations	2	Test and Activation	39
311	Operations	2	Test and Activation	39
312	Operations	2	Test and Activation	39
313	Operations	2	Test and Activation	39
314	Program Management	3	Commercial	40
315	Program Management	3	Commercial	40
316	Program Management	3	Commercial	40
317	Program Management	3	Program Office	41
318	Program Management	3	Program Office	41
319	Program Management	3	Program Office	41
320	Program Management	3	Program Office	41
321	Program Management	3	Program Office	41
322	Program Management	3	Program Office	41
323	Program Management	3	Program Office	41
324	Program Management	3	Program Office	41
325	Program Management	3	Program Office	41
326	Program Management	3	Program Office	41
327	Program Management	3	Program Office	41
328	Program Management	3	Program Office	41
329	Program Management	3	Program Office	41
330	Program Management	3	Program Office	41
331	Program Management	3	Program Office	41
332	Program Management	3	Program Office	41
336	Program Management	3	Program Office	41
333	Program Management	3	Program Office	41
337	Program Management	3	Program Office	41
334	Program Management	3	Program Office	41
338	Program Management	3	Program Office	41
335	Program Management	3	Program Office	41
339	Program Management	3	Program Office	41
340	Program Management	3	Project Management	42
341	Program Management	3	Project Management	42
342	Program Management	3	Project Management	42
343	Program Management	3	Project Management	42
344	Program Management	3	Project Management	42
345	Program Management	3	Project Management	42
346	Program Management	3	Project Management	42
347	Program Management	3	Project Management	42
348	Program Management	3	Project Management	42
349	Program Management	3	Project Management	42
350	Program Management	3	Project Management	42
351	Program Management	3	Project Management	42

355	Program Management	3	Project Management	42
352	Program Management	3	Project Management	42
356	Program Management	3	Project Management	42
353	Program Management	3	Project Management	42
357	Program Management	3	Project Management	42
354	Program Management	3	Project Management	42
358	Program Management	3	Project Management	42
364	Program Management	3	Project Scheduling & Estimating	43
372	Program Management	3	Project Scheduling & Estimating	43
359	Program Management	3	Project Scheduling & Estimating	43
373	Program Management	3	Project Scheduling & Estimating	43
363	Program Management	3	Project Scheduling & Estimating	43
360	Program Management	3	Project Scheduling & Estimating	43
365	Program Management	3	Project Scheduling & Estimating	43
366	Program Management	3	Project Scheduling & Estimating	43
367	Program Management	3	Project Scheduling & Estimating	43
368	Program Management	3	Project Scheduling & Estimating	43
369	Program Management	3	Project Scheduling & Estimating	43
370	Program Management	3	Project Scheduling & Estimating	43
371	Program Management	3	Project Scheduling & Estimating	43
374	Program Management	3	Project Scheduling & Estimating	43
361	Program Management	3	Project Scheduling & Estimating	43
375	Program Management	3	Project Scheduling & Estimating	43
362	Program Management	3	Project Scheduling & Estimating	43
376	Program Management	3	Project Scheduling & Estimating	43
377	Supply Chain	4	Purchasing & Subcontracts	44
378	Supply Chain	4	Purchasing & Subcontracts	44
379	Supply Chain	4	Purchasing & Subcontracts	44
380	Supply Chain	4	Purchasing & Subcontracts	44
381	Supply Chain	4	Purchasing & Subcontracts	44
382	Supply Chain	4	Purchasing & Subcontracts	44
383	Supply Chain	4	Inventory, Warehousing & Logistics	45
384	Supply Chain	4	Inventory, Warehousing & Logistics	45
385	Supply Chain	4	Inventory, Warehousing & Logistics	45
386	Supply Chain	4	Inventory, Warehousing & Logistics	45
387	Supply Chain	4	Inventory, Warehousing & Logistics	45
388	Support	5	Business Development	46
389	Support	5	Business Development	46
390	Support	5	Business Development	46
391	Support	5	Business Improvement	47
392	Support	5	Business Improvement	47
393	Support	5	Communications	48
394	Support	5	Communications	48
395	Support	5	Corporate Executive	49
396	Support	5	Corporate Executive	49
397	Support	5	Corporate Executive	49
398	Support	5	Corporate Executive	49
399	Support	5	Human Resources	50
400	Support	5	Human Resources	50
401	Support	5	Human Resources	50
402	Support	5	Legal	51
403	Support	5	Legal	51
404	Support	5	Legal	51
405	Support	5	Legal	51
406	Support	5	Legal	51
407	Support	5	Risk & Insurance	52
408	Support	5	Risk & Insurance	52

409	Support	5	Risk & Insurance	52
410	Support	5	WHS&E	53
411	Support	5	WHS&E	53
412	Support	5	WHS&E	53
413	Support	5	WHS&E	53
414	Support	5	Security	54
415	Support	5	Security	54
416	Support	5	Security	54
417	Support	5	Training Services	55
418	Support	5	Training Services	55
419	Support	5	Training Services	55
420	Support	5	Training Services	55
421	Support	5	Administration	56
422	Support	5	Administration	56
423	Support	5	Administration	56
424	Support	5	Finance	57
425	Support	5	Finance	57
426	Support	5	Finance	57
427	Support	5	Finance	57
428	Support	5	Finance	57
429	Support	5	Finance	57
430	Support	5	IT	58
431	Support	5	IT	58
432	Support	5	IT	58
433	Support	5	IT	58
434	Support	5	IT	58
435	Support	5	IT	58
437	Support	5	IT	58
436	Support	5	IT	58
438	Support	5	IT	58
439	Support	5	IT	58
440	Support	5	IT	58
441	Support	5	IT	58

Job Role	Role Code	Experience Level	Exp Code	Unique ID
Administrator	7.11		0	1-1-7.11-0
Chief Engineer	1.01		0	1-1-1.01-0
Chief Engineer	1.01	Expat	4	1-1-1.01-4
Manager	1.11		0	1-1-1.11-0
Manager	1.11	Expat	4	1-1-1.11-4
General Manager	1.07		0	1-1-1.07-0
General Manager	1.07	Expat	4	1-1-1.07-4
Technical Officer	3.03	0-2 Yrs	1	1-2-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-2-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-2-3.03-3
Technical Officer	3.03	Expat	4	1-2-3.03-4
Engineer	2.02	0-2 Yrs	1	1-2-2.02-1
Engineer	2.02	3-9 Yrs	2	1-2-2.02-2
Engineer	2.02	10+ Yrs	3	1-2-2.02-3
Engineer	2.02	Expat	4	1-2-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-3-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-3-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-3-3.03-3
Technical Officer	3.03	Expat	4	1-3-3.03-4
Engineer	2.02	0-2 Yrs	1	1-3-2.02-1
Engineer	2.02	3-9 Yrs	2	1-3-2.02-2
Engineer	2.02	10+ Yrs	3	1-3-2.02-3
Engineer	2.02	Expat	4	1-3-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-4-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-4-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-4-3.03-3
Technical Officer	3.03	Expat	4	1-4-3.03-4
Engineer	2.02	0-2 Yrs	1	1-4-2.02-1
Engineer	2.02	3-9 Yrs	2	1-4-2.02-2
Engineer	2.02	10+ Yrs	3	1-4-2.02-3
Engineer	2.02	Expat	4	1-4-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-5-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-5-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-5-3.03-3
Technical Officer	3.03	Expat	4	1-5-3.03-4
Engineer	2.02	0-2 Yrs	1	1-5-2.02-1
Engineer	2.02	3-9 Yrs	2	1-5-2.02-2
Engineer	2.02	10+ Yrs	3	1-5-2.02-3
Engineer	2.02	Expat	4	1-5-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-6-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-6-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-6-3.03-3
Technical Officer	3.03	Expat	4	1-6-3.03-4
Engineer	2.02	0-2 Yrs	1	1-6-2.02-1
Engineer	2.02	3-9 Yrs	2	1-6-2.02-2
Engineer	2.02	10+ Yrs	3	1-6-2.02-3
Engineer	2.02	Expat	4	1-6-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-7-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-7-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-7-3.03-3
Technical Officer	3.03	Expat	4	1-7-3.03-4
Engineer	2.02	0-2 Yrs	1	1-7-2.02-1
Engineer	2.02	3-9 Yrs	2	1-7-2.02-2
Engineer	2.02	10+ Yrs	3	1-7-2.02-3

Engineer	2.02	Expat	4	1-7-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-8-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-8-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-8-3.03-3
Technical Officer	3.03	Expat	4	1-8-3.03-4
Engineer	2.02	0-2 Yrs	1	1-8-2.02-1
Engineer	2.02	3-9 Yrs	2	1-8-2.02-2
Engineer	2.02	10+ Yrs	3	1-8-2.02-3
Engineer	2.02	Expat	4	1-8-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-9-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-9-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-9-3.03-3
Technical Officer	3.03	Expat	4	1-9-3.03-4
Engineer	2.02	0-2 Yrs	1	1-9-2.02-1
Engineer	2.02	3-9 Yrs	2	1-9-2.02-2
Engineer	2.02	10+ Yrs	3	1-9-2.02-3
Engineer	2.02	Expat	4	1-9-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-10-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-10-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-10-3.03-3
Technical Officer	3.03	Expat	4	1-10-3.03-4
Engineer	2.02	0-2 Yrs	1	1-10-2.02-1
Engineer	2.02	3-9 Yrs	2	1-10-2.02-2
Engineer	2.02	10+ Yrs	3	1-10-2.02-3
Engineer	2.02	Expat	4	1-10-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-11-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-11-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-11-3.03-3
Technical Officer	3.03	Expat	4	1-11-3.03-4
Engineer	2.02	0-2 Yrs	1	1-11-2.02-1
Engineer	2.02	3-9 Yrs	2	1-11-2.02-2
Engineer	2.02	10+ Yrs	3	1-11-2.02-3
Engineer	2.02	Expat	4	1-11-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-12-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-12-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-12-3.03-3
Technical Officer	3.03	Expat	4	1-12-3.03-4
Engineer	2.02	0-2 Yrs	1	1-12-2.02-1
Engineer	2.02	3-9 Yrs	2	1-12-2.02-2
Engineer	2.02	10+ Yrs	3	1-12-2.02-3
Engineer	2.02	Expat	4	1-12-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-13-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-13-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-13-3.03-3
Technical Officer	3.03	Expat	4	1-13-3.03-4
Engineer	2.02	0-2 Yrs	1	1-13-2.02-1
Engineer	2.02	3-9 Yrs	2	1-13-2.02-2
Engineer	2.02	10+ Yrs	3	1-13-2.02-3
Engineer	2.02	Expat	4	1-13-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-14-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-14-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-14-3.03-3
Technical Officer	3.03	Expat	4	1-14-3.03-4
Engineer	2.02	0-2 Yrs	1	1-14-2.02-1
Engineer	2.02	3-9 Yrs	2	1-14-2.02-2
Engineer	2.02	10+ Yrs	3	1-14-2.02-3
Engineer	2.02	Expat	4	1-14-2.02-4

Technical Officer	3.03	0-2 Yrs	1	1-15-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-15-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-15-3.03-3
Technical Officer	3.03	Expat	4	1-15-3.03-4
Engineer	2.02	0-2 Yrs	1	1-15-2.02-1
Engineer	2.02	3-9 Yrs	2	1-15-2.02-2
Engineer	2.02	10+ Yrs	3	1-15-2.02-3
Engineer	2.02	Expat	4	1-15-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-16-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-16-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-16-3.03-3
Technical Officer	3.03	Expat	4	1-16-3.03-4
Engineer	2.02	0-2 Yrs	1	1-16-2.02-1
Engineer	2.02	3-9 Yrs	2	1-16-2.02-2
Engineer	2.02	10+ Yrs	3	1-16-2.02-3
Engineer	2.02	Expat	4	1-16-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-17-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-17-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-17-3.03-3
Technical Officer	3.03	Expat	4	1-17-3.03-4
Engineer	2.02	0-2 Yrs	1	1-17-2.02-1
Engineer	2.02	3-9 Yrs	2	1-17-2.02-2
Engineer	2.02	10+ Yrs	3	1-17-2.02-3
Engineer	2.02	Expat	4	1-17-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-18-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-18-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-18-3.03-3
Technical Officer	3.03	Expat	4	1-18-3.03-4
Engineer	2.02	0-2 Yrs	1	1-18-2.02-1
Engineer	2.02	3-9 Yrs	2	1-18-2.02-2
Engineer	2.02	10+ Yrs	3	1-18-2.02-3
Engineer	2.02	Expat	4	1-18-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-19-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-19-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-19-3.03-3
Technical Officer	3.03	Expat	4	1-19-3.03-4
Engineer	2.02	0-2 Yrs	1	1-19-2.02-1
Engineer	2.02	3-9 Yrs	2	1-19-2.02-2
Engineer	2.02	10+ Yrs	3	1-19-2.02-3
Engineer	2.02	Expat	4	1-19-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-20-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-20-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-20-3.03-3
Technical Officer	3.03	Expat	4	1-20-3.03-4
Engineer	2.02	0-2 Yrs	1	1-20-2.02-1
Engineer	2.02	3-9 Yrs	2	1-20-2.02-2
Engineer	2.02	10+ Yrs	3	1-20-2.02-3
Engineer	2.02	Expat	4	1-20-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-21-3.03-1
Technical Officer	3.03	3-9 Yrs	2	1-21-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-21-3.03-3
Technical Officer	3.03	Expat	4	1-21-3.03-4
Engineer	2.02	0-2 Yrs	1	1-21-2.02-1
Engineer	2.02	3-9 Yrs	2	1-21-2.02-2
Engineer	2.02	10+ Yrs	3	1-21-2.02-3
Engineer	2.02	Expat	4	1-21-2.02-4
Technical Officer	3.03	0-2 Yrs	1	1-22-3.03-1

Technical Officer	3.03	3-9 Yrs	2	1-22-3.03-2
Technical Officer	3.03	10+ Yrs	3	1-22-3.03-3
Technical Officer	3.03	Expat	4	1-22-3.03-4
Engineer	2.02	0-2 Yrs	1	1-22-2.02-1
Engineer	2.02	3-9 Yrs	2	1-22-2.02-2
Engineer	2.02	10+ Yrs	3	1-22-2.02-3
Engineer	2.02	Expat	4	1-22-2.02-4
Designer	3.01	0-2 Yrs	1	1-23-3.01-1
Designer	3.01	3-9 Yrs	2	1-23-3.01-2
Designer	3.01	10+ Yrs	3	1-23-3.01-3
Designer	3.01	Expat	4	1-23-3.01-4
Administrator	7.11		0	1-24-7.11-0
Engineer	2.02	0-2 Yrs	1	1-24-2.02-1
Engineer	2.02	3-9 Yrs	2	1-24-2.02-2
Engineer	2.02	10+ Yrs	3	1-24-2.02-3
Engineer	2.02	Expat	4	1-24-2.02-4
Administrator	7.11		0	1-25-7.11-0
Planner	4.02	0-2 Yrs	1	2-26-4.02-1
Planner	4.02	3-9 Yrs	2	2-26-4.02-2
Planner	4.02	10+ Yrs	3	2-26-4.02-3
Planner	4.02	Expat	4	2-26-4.02-4
Manager	1.11		0	2-26-1.11-0
Operations Support	6.04		0	2-27-6.04-0
Area Manager	1.23		0	2-27-1.23-0
Ship Manager	1.15		0	2-27-1.15-0
Operations Manager	1.12		0	2-27-1.12-0
Ship Manager	1.15	Expat	4	2-27-1.15-4
Operations Manager	1.12	Expat	4	2-27-1.12-4
General Manager	1.07		0	2-27-1.07-0
General Manager	1.07	Expat	4	2-27-1.07-4
Fabrication Manager	1.21		0	2-27-1.21-0
Construction Manager	1.18		0	2-27-1.18-0
Production Controller	4.03	0-2 Yrs	1	2-27-4.03-1
Production Controller	4.03	3-9 Yrs	2	2-27-4.03-2
Production Controller	4.03	10+ Yrs	3	2-27-4.03-3
Production Controller	4.03	Expat	4	2-27-4.03-4
Superintendent	1.26		0	2-27-1.26-0
Superintendent	1.26	Expat	4	2-27-1.26-4
Dockmaster	4.07		0	2-27-4.07-0
Apprentice	6.05		0	2-28-6.05-0
Tradesperson	6.01		0	2-28-6.01-0
Team Lead	1.28		0	2-28-1.28-0
Supervisor	1.27		0	2-28-1.27-0
Superintendent	1.26		0	2-28-1.26-0
Trade Manager	1.24		0	2-28-1.24-0
Apprentice	6.05		0	2-29-6.05-0
Tradesperson	6.01		0	2-29-6.01-0
Team Lead	1.28		0	2-29-1.28-0
Supervisor	1.27		0	2-29-1.27-0
Superintendent	1.26		0	2-29-1.26-0
Trade Manager	1.24		0	2-29-1.24-0
Apprentice	6.05		0	2-30-6.05-0
Tradesperson	6.01		0	2-30-6.01-0
Team Lead	1.28		0	2-30-1.28-0
Supervisor	1.27		0	2-30-1.27-0
Superintendent	1.26		0	2-30-1.26-0
Trade Manager	1.24		0	2-30-1.24-0

Apprentice	6.05		0	2-31-6.05-0
Tradesperson	6.01		0	2-31-6.01-0
Team Lead	1.28		0	2-31-1.28-0
Supervisor	1.27		0	2-31-1.27-0
Superintendent	1.26		0	2-31-1.26-0
Trade Manager	1.24		0	2-31-1.24-0
Apprentice	6.05		0	2-32-6.05-0
Tradesperson	6.01		0	2-32-6.01-0
Team Lead	1.28		0	2-32-1.28-0
Supervisor	1.27		0	2-32-1.27-0
Superintendent	1.26		0	2-32-1.26-0
Trade Manager	1.24		0	2-32-1.24-0
Apprentice	6.05		0	2-33-6.05-0
Tradesperson	6.01		0	2-33-6.01-0
Team Lead	1.28		0	2-33-1.28-0
Supervisor	1.27		0	2-33-1.27-0
Superintendent	1.26		0	2-33-1.26-0
Trade Manager	1.24		0	2-33-1.24-0
Operator - Technical	6.02		0	2-34-6.02-0
Operator - General	6.03		0	2-34-6.03-0
Team Lead	1.28		0	2-34-1.28-0
Supervisor	1.27		0	2-34-1.27-0
Superintendent	1.26		0	2-34-1.26-0
Trade Manager	1.24		0	2-34-1.24-0
Operator	6.03		0	2-35-6.03-0
Tradesperson	6.01		0	2-35-6.01-0
Engineer	2.02	0-2 Yrs	1	2-35-2.02-1
Engineer	2.02	3-9 Yrs	2	2-35-2.02-2
Engineer	2.02	10+ Yrs	3	2-35-2.02-3
Team Lead	1.28		0	2-35-1.28-0
Supervisor	1.27		0	2-35-1.27-0
Administrator	7.11		0	2-35-7.11-0
Manager	1.11		0	2-35-1.11-0
Administrator	7.11		0	2-36-7.11-0
Analyst	5.02		0	2-36-5.02-0
Inspector	4.14		0	2-36-4.14-0
NDT Technician	3.02	0-2 Yrs	1	2-36-3.02-1
NDT Technician	3.02	3-9 Yrs	2	2-36-3.02-2
NDT Technician	3.02	10+ Yrs	3	2-36-3.02-3
Surveyor	4.18	0-2 Yrs	1	2-36-4.18-1
Surveyor	4.18	3-9 Yrs	2	2-36-4.18-2
Surveyor	4.18	10+ Yrs	3	2-36-4.18-3
Dimensional Control Manager	1.19		0	2-36-1.19-0
Quality Control Tech	3.04	0-2 Yrs	1	2-36-3.04-1
Quality Control Tech	3.04	3-9 Yrs	2	2-36-3.04-2
Quality Control Tech	3.04	10+ Yrs	3	2-36-3.04-3
Manager	1.11		0	2-36-1.11-0
Manager	1.11	Expat	4	2-36-1.11-4
Engineer	2.02	0-2 Yrs	1	2-37-2.02-1
Engineer	2.02	3-9 Yrs	2	2-37-2.02-2
Engineer	2.02	10+ Yrs	3	2-37-2.02-3
Engineer	2.02	Expat	4	2-37-2.02-4
Manager	1.11		0	2-37-1.11-0
Manager	1.11	Expat	4	2-37-1.11-4
Product Safety Officer	7.05		0	2-37-7.05-0
Product Safety Officer	7.05	Expat	4	2-37-7.05-4
Quality Assurance Officer	7.07		0	2-37-7.07-0

Quality Assurance Team Lead	4.12		0	2-37-4.12-0
Engineer	2.02	0-2 Yrs	1	2-38-2.02-1
Engineer	2.02	3-9 Yrs	2	2-38-2.02-2
Engineer	2.02	10+ Yrs	3	2-38-2.02-3
Engineer	2.02	Expat	4	2-38-2.02-4
Manager	1.11		0	2-38-1.11-0
Manager	1.11	Expat	4	2-38-1.11-4
Subsafe Superintendent	1.25		0	2-38-1.25-0
Technical Officer	3.03		0	2-38-3.03-0
Manager	1.11		0	2-39-1.11-0
Manager	1.11	Expat	4	2-39-1.11-4
Technical Officer	3.03	0-2 Yrs	1	2-39-3.03-1
Technical Officer	3.03	3-9 Yrs	2	2-39-3.03-2
Technical Officer	3.03	10+ Yrs	3	2-39-3.03-3
Technical Officer	3.03	Expat	4	2-39-3.03-4
Engineer	2.02	0-2 Yrs	1	2-39-2.02-1
Engineer	2.02	3-9 Yrs	2	2-39-2.02-2
Engineer	2.02	10+ Yrs	3	2-39-2.02-3
Engineer	2.02	Expat	4	2-39-2.02-4
Contracts Administrator	7.01		0	3-40-7.01-0
Commercial Manager	1.08		0	3-40-1.08-0
Manager	1.11		0	3-40-1.11-0
Administrator	7.11		0	3-41-7.11-0
Engineer	2.02	0-2 Yrs	1	3-41-2.02-1
Engineer	2.02	3-9 Yrs	2	3-41-2.02-2
Engineer	2.02	10+ Yrs	3	3-41-2.02-3
Engineer	2.02	Expat	4	3-41-2.02-4
Manager	1.11		0	3-41-1.11-0
Manager	1.11	Expat	4	3-41-1.11-4
Program Manager	1.09	0-2 Yrs	1	3-41-1.09-1
Program Manager	1.09	3-9 Yrs	2	3-41-1.09-2
Program Manager	1.09	10+ Yrs	3	3-41-1.09-3
Program Manager	1.09	Expat	4	3-41-1.09-4
Project Manager	1.13	0-2 Yrs	1	3-41-1.13-1
Project Manager	1.13	3-9 Yrs	2	3-41-1.13-2
Project Manager	1.13	10+ Yrs	3	3-41-1.13-3
Project Manager	1.13	Expat	4	3-41-1.13-4
Project Planner	4.04	0-2 Yrs	1	3-41-4.04-1
Project Scheduler	4.05	0-2 Yrs	1	3-41-4.05-1
Project Planner	4.04	3-9 Yrs	2	3-41-4.04-2
Project Scheduler	4.05	3-9 Yrs	2	3-41-4.05-2
Project Planner	4.04	10+ Yrs	3	3-41-4.04-3
Project Scheduler	4.05	10+ Yrs	3	3-41-4.05-3
Project Planner	4.04	Expat	4	3-41-4.04-4
Project Scheduler	4.05	Expat	4	3-41-4.05-4
Administrator	7.11		0	3-42-7.11-0
Engineer	2.02	0-2 Yrs	1	3-42-2.02-1
Engineer	2.02	3-9 Yrs	2	3-42-2.02-2
Engineer	2.02	10+ Yrs	3	3-42-2.02-3
Engineer	2.02	Expat	4	3-42-2.02-4
Manager	1.11		0	3-42-1.11-0
Manager	1.11	Expat	4	3-42-1.11-4
Project Manager	1.13	0-2 Yrs	1	3-42-1.13-1
Project Manager	1.13	3-9 Yrs	2	3-42-1.13-2
Project Manager	1.13	10+ Yrs	3	3-42-1.13-3
Project Manager	1.13	Expat	4	3-42-1.13-4
Project Planner	4.04	0-2 Yrs	1	3-42-4.04-1

Project Scheduler	4.05	0-2 Yrs	1	3-42-4.05-1
Project Planner	4.04	3-9 Yrs	2	3-42-4.04-2
Project Scheduler	4.05	3-9 Yrs	2	3-42-4.05-2
Project Planner	4.04	10+ Yrs	3	3-42-4.04-3
Project Scheduler	4.05	10+ Yrs	3	3-42-4.05-3
Project Planner	4.04	Expat	4	3-42-4.04-4
Project Scheduler	4.05	Expat	4	3-42-4.05-4
Manager	1.11	Expat	4	3-43-1.11-4
Project Manager	1.13	Expat	4	3-43-1.13-4
Estimator	4.01	0-2 Yrs	1	3-43-4.01-1
Project Scheduler	4.05	0-2 Yrs	1	3-43-4.05-1
Manager	1.11		0	3-43-1.11-0
Estimator	4.01	3-9 Yrs	2	3-43-4.01-2
Cost Analyst	5.01	0-2 Yrs	1	3-43-5.01-1
Cost Analyst	5.01	3-9 Yrs	2	3-43-5.01-2
Cost Analyst	5.01	10+ Yrs	3	3-43-5.01-3
Cost Analyst	5.01	Expat	4	3-43-5.01-4
Project Manager	1.13	0-2 Yrs	1	3-43-1.13-1
Project Manager	1.13	3-9 Yrs	2	3-43-1.13-2
Project Manager	1.13	10+ Yrs	3	3-43-1.13-3
Project Scheduler	4.05	3-9 Yrs	2	3-43-4.05-2
Estimator	4.01	10+ Yrs	3	3-43-4.01-3
Project Scheduler	4.05	10+ Yrs	3	3-43-4.05-3
Estimator	4.01	Expat	4	3-43-4.01-4
Project Scheduler	4.05	Expat	4	3-43-4.05-4
Administrator	7.11		0	4-44-7.11-0
Manager	1.11		0	4-44-1.11-0
Manager	1.11	Expat	4	4-44-1.11-4
Purchasing Officer	7.06		0	4-44-7.06-0
Purchasing Officer	7.06	Expat	4	4-44-7.06-4
Subcontracts Administrator	7.08		0	4-44-7.08-0
Administrator	7.11		0	4-45-7.11-0
Inventory Controller	4.11		0	4-45-4.11-0
Manager	1.11		0	4-45-1.11-0
Operator	6.03		0	4-45-6.03-0
Quality Control Tech	3.04		0	4-45-3.04-0
Business Development Officer	7.12		0	5-46-7.12-0
Business Development Manager	1.16		0	5-46-1.16-0
Manager	1.11		0	5-46-1.11-0
Business Improvement Specialist	4.19		0	5-47-4.19-0
Business Improvement Manager	1.17		0	5-47-1.17-0
Communications Officer	7.13		0	5-48-7.13-0
Manager	1.11		0	5-48-1.11-0
Chief Executive Officer	1.00		0	5-49-1-0
Deputy Chief Executive Officer	1.05		0	5-49-1.05-0
Director	1.06		0	5-49-1.06-0
Internal Auditor	4.09		0	5-49-4.09-0
Administrator	7.11		0	5-50-7.11-0
HR Specialist	4.21		0	5-50-4.21-0
Manager	1.11		0	5-50-1.11-0
Export Controls Officer	7.03		0	5-51-7.03-0
Lawyer	2.03		0	5-51-2.03-0
Legal Support	4.23		0	5-51-4.23-0
Manager	1.11		0	5-51-1.11-0
Workers Comp & Claims Officer	7.21		0	5-51-7.21-0
Insurance Manager	1.22		0	5-52-1.22-0
Insurance Officer	7.14		0	5-52-7.14-0

Risk Manager	1.14	0	5-52-1.14-0
Manager	1.11	0	5-53-1.11-0
Occupational Health Nurse	4.15	0	5-53-4.15-0
Rehabilitation Coordinator	4.16	0	5-53-4.16-0
WHS&E Officer	7.19	0	5-53-7.19-0
Chief Security Officer	1.04	0	5-54-1.04-0
Manager	1.11	0	5-54-1.11-0
Security Officer	7.17	0	5-54-7.17-0
Administrator	7.11	0	5-55-7.11-0
Instructor	4.22	0	5-55-4.22-0
Manager	1.11	0	5-55-1.11-0
Training Developer	4.24	0	5-55-4.24-0
Administrator	7.11	0	5-56-7.11-0
Contracts Administrator	7.01	0	5-56-7.01-0
Manager	1.11	0	5-56-1.11-0
Accountant	2.01	0	5-57-2.01-0
Accounts Administrator	7.09	0	5-57-7.09-0
Chief Financial Officer	1.02	0	5-57-1.02-0
Finance Officer	7.04	0	5-57-7.04-0
Manager	1.11	0	5-57-1.11-0
Payroll Officer	7.16	0	5-57-7.16-0
Business Analyst	5.03	0	5-58-5.03-0
Chief Information Officer	1.03	0	5-58-1.03-0
Database Administrator	7.02	0	5-58-7.02-0
Developer	4.06	0	5-58-4.06-0
Enterprise Architect	4.08	0	5-58-4.08-0
Manager	1.11	0	5-58-1.11-0
Project Manager	1.13	0	5-58-1.13-0
Network Administrator	7.15	0	5-58-7.15-0
Security Specialist	4.17	0	5-58-4.17-0
Solutions Architect	4.13	0	5-58-4.13-0
Support Technician	3.05	0	5-58-3.05-0
Systems Administrator	7.18	0	5-58-7.18-0

DATE	Job Family	Job Function
25-Feb	Filtered to show Operations	Filtered to hide Facilities, Planning, QA and Product Safety, Quality Control, Safety and Certification, and Test and Activation
26-Feb		Talked with worforce planning manager for clarification of variuos titles
26-Feb		
27-Feb		

Job Role	Experience Level	ANZSCO Code	ANZSCO Title
Filtered to hide apprentice, dockmaster, team lead, and tradesperson			
		searched ANZCO site for understanding of codes and to help inform role descriptions	

Role Description	Qualification Required	Competency Required	Unique ID
Added recommendation for description change based on input from HII SMEs and formal descriptions			
Review and revise for: 1) applicability in Australian shipbuilding context, 2) explanation of duties, responsibility and scope (some have frontline management responsibilities listed, yet the role may need to be described for 2nd or 3rd level of management) updated General Manager in Operations category	If job level did not have experience level listed, then used the requirement from the previous level		

s47F

Document 5

From: s47F
Sent: Thursday, 25 July 2019 4:04 PM
To: s47F
Cc:
Subject: RE: FW: Detailed Design Capability Discussion [SEC=UNCLASSIFIED]

s47F

Yes I will attend, just as a team of 1, HR is better placed to arrange the logistics. However, I will have a majority of the input.

s47F

Transfer of Technology Training Manager
Naval Group Australia

Postal: PO Box 3065, Rundle Mall SA 5000
Office: Level 2, 1 Richmond Road, Keswick SA 5035
s47F

NAVAL GROUP

s47F

Date: 25/07/2019 09:19 AM
Subject: RE: FW: Detailed Design Capability Discussion [SEC=UNCLASSIFIED]

UNCLASSIFIED

s47F will you be at the meeting?

On the same point when do you think I will have a copy of the Kinnexus report I requested last week?

Same for the presentation.

Regards

s47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
s47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

s47F

Sent: Thursday, 25 July 2019 8:51 AM

s47F

Subject: Re: FW: Detailed Design Capability Discussion [SEC=UNCLASSIFIED]

s47F

Apologies if you understood that from Monday's meeting. I was referring to the workforce which had CAD design experience, and that experience being mostly related to 2D. We discussed the automotive sector as having experience with 3D and PLM, (essential combination of skills) of course these people were trained somewhere on the market, either by an RTO or university.

I showed a macro view the Diploma of Engineering compared to the prerequisite skills required to enter into NG training (level 3). On a detailed level of the report (extract below), we can see the data correlates to what you have described.
Design a drawing using a CAD software [redacted] MEM09221A Create 3-D model assemblies using computer-a

I appreciate the offer of assistance to encourage the NSC. You may have seen that HR will lead the discussion with NSC on this matter, the output of the TNA - the training action plan - will provide input to such discussions.

Regards,

s47F
Transfer of Technology Training Manager
Naval Group Australia

Postal: PO Box 3065, Rundle Mall SA 5000
s47F 35

W: www.naval-group.com.au

s47F

Date: 24/07/2019 12:25 PM
Subject: FW: Detailed Design Capability Discussion [SEC=UNCLASSIFIED]

UNCLASSIFIED

s47F

On Monday you mentioned that there is no course in Australia teaching 3D Models, however I would just like to come back to you on this point that the MEM50212 Diploma of Engineering – Technical actually includes 3-D Models within its units, see below and attached.

MEM30033A Use computer-aided design (CAD) to create and display 3-D models
MEM09221A Create 3-D model assemblies using computer-aided design (CAD) system

If there is a shortfall in the 3D model units of the Diploma of Engineering let me know so I can encourage the Naval Shipbuilding Office to investigate the development of a unclass digital mock-up for training of designers.

Regards

s47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
s47F

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s47F

Sent: Tuesday, 23 July 2019 1:43 PM
s47F

Subject: Re: Detailed Design Capability Discussion

s47F

HR will support this initiative from a recruitment perspective and I am happy to lead the NGA participation.

Do you intend for the external provider of the workforce analysis to present at the meeting and talk to their analysis data?

Also, if you can provide a detailed agenda I can ensure the right people are available to support this meeting.

Perhaps a meeting in the week post the report being delivered would be most appropriate?

I will wait to hear from you.

s47F

Resource and Recruitment Manager
Naval Group Australia

Postal: PO Box 3065, Rundle Mall SA 5000
Office: Level 2, 1 Richmond Road, Keswick SA 5035
s47F

s47F

Date: 19/07/2019 04:01 PM
Subject: Detailed Design Capability Discussion

Hi All,

The College has been asked by s47F SEA1000 Program Office, to discuss with NGA workforce planning/skilling for Detailed Design Capability in Australia.

To support this initiative, it is suggested that we conduct a workshop which includes NGA, NSC and CASG SEA1000.

Attached are the following documents to support this action:
1. Taxonomy Master file
2. Design Performance Needs Analysis report
3. CAD Tech Assistance Guide
4. Designer Short Course white paper – DRAFT
5. NGA Workforce demand data – Will be sent in a separate email to NGA staff only s47F – Please confirm if I should send data file to you for distribution to other NGA staff or if it is acceptable for me to send to the NGA staff on this email.

Designer labour market analysis - currently in scoping discussions with an external provider to undertake market analysis. The purpose of the market supply data is to provide a perspective on the immediate and ongoing availability and sustainability of workforces within the relevant job codes. This data may then provide industry (primes, OEM's and supply chains) and other stakeholders with supporting information for naval shipbuilding programs. It will become an integrated element of the Naval Shipbuilding College or Government programs for workforce skilling, development and other market interventions. Anticipate receipt of the DRAFT market analysis report for designers to be supplied to the College from our vendor by August 9th.

Please advise if NGA would like our assistance to conduct a workshop to address the designer workforce. Also, please advise proposed dates for the workshop that support NGA's detailed design capability plan to CASG.

Regards,

s47F

Workforce Planning Manager

630 Mersey Road, Osborne, SA 5017 AUSTRALIA
s47F
www.navalshipbuildingcollege.com.au

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[attachment "CAD Tech Assist Guide V 1.2.pdf" deleted by s47F

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s47F

Document 6

From: s47F
Sent: Monday, 6 January 2020 2:00 PM
To: s47F
Subject: FW: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

UNCLASSIFIED

Best regards,
s47F

s47F
Director – Australian Industry
Future Submarine Program
s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
s47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule'.

From: s47F
Sent: Friday, 26 July 2019 3:31 PM
To: s47F
Cc: s47F
s47F
Subject: RE: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

Hi s47F

Sorry for the misunderstanding. I'm not thinking that there is no interest to do so, but I'm more concerned by the timeframe until the WFR. Anyway, as ToT is not in charge of the sourcing for detailed design subcontractors and in the absence of s47F should will you to explain what has been already done on that topic.

Regards

NAVAL GROUP

s47F
AFS - ToT Delivery Manager
—
Cherbourg
s47F
www.naval-group.com

De : s47F
A :
Cc :
Date : 25/07/2019 01:39
Objet : RE: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hi s47F

It's looking good.

Re point #4, I think it would be very useful for NG to ask for Expressions of Interest on ICN. It would be a very good way to exhaustively explore the whole Australian market very quickly. In this way, NG could say that they have fully explored the entire Australian market. Even if you are not convinced, the CoA would like to have it done so we fully understand what is in the Australian market and it is no longer a matter of conjecture. It takes very little effort on the behalf of NG and is of course free for NG and for the respondants. And it could be done in the next two days so that all the information is back with you upon your return from leave. What do you think?

Best regards,
s47F

s47F
Director – Australian Industry
Future Submarine Program
s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
PO Box 169 | Kilburn North SA 5084 | **Australia**
s47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule'.

From: s47F
Sent: Thursday, 25 July 2019 3:02 AM
To: s47F
Cc:
s47F

Subject: RE: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

Hi s47F

Please find my answers to your different questions.

1°) SAME definition, OK with your wording, considering that we are talking in each case about level 3 training, that means NG specific submarine training. You're right, if we could find people experienced in submarine detailed design, the training path would be limited to level 3 training to be able to consider them as M or E level according their past experience. I would like to emphasize that experience in full detailed design concerns people who have started from a white page the arrangement of a submarine.

2°) Training Needs Analysis for Detailed Design anticipated delivery

I consider this request in relation to the action 14 of the intermediate WFOR MoM:

14.	NG to provide an overview of the current assessment of Australian Industry Capability for this workforce across all levels of "SAME" ratio. This should include providing evidence to the CoA for validation of relevant information such as the market analysis reports carried out by NG-A and subcontractors to inform NG of the current capability in Australia. For example the Training Needs analysis and Market Analysis performed by NG-A HR. s47C, s47G	NG	CoA	Separate document for End of Sept. 2019

s47C, s47G

According to the baseline DC CWS1, the TNA Detailed Design is planned to be delivered by end of September, which is consistent with our commitment through the above action. We already received some inputs from our suppliers (those presented s47F to you this week) but they do not yet fullfill our requirements and we will need further iterations to ensure consistency between level 2 and level 3 data. So I will come back to you with a proposal by the end of the week but I will prioritize completnness and consistency of the data prior to an anticipated delivery potentially leading to wrong conclusions.

Even if I understand the interest to provide this data prior to the WFR, I would like to remind that the TNA was not identified as an input for the WFR. Our current reference is what is required through the DID ToT 130 TWFOR. This DID requests already data regarding the expected and available workforce. We should not mix the content of the TNA and TWFOR. For instance, it is not the purpose of the TNA to perform an HR workforce planning analysis. The outcomes of the TNA were agreed within the TNA Business case in March.

3°) NG current assessment of Australian Industry Capability for this workforce across all levels of "SAME" ratio : I confirm we asked TAFE to provide the workforce evaluation in the SAME Framework

4°) ICN Data validating what Australian Industry is available at your "SAME" rule: I consider that the TNA market analysis should provide this information as the overall industry capability is supposed to be scanned, including our potential future subcontractors. I need to consult the NGA teams in charge of that kind of Expression of Interest to be able to provide you with an answer.

Please call me tomorrow if you need more precisions

Regards

NAVAL GROUP

s47F

AFS - ToT Delivery Manager

—

Cherbourg

s47F

www.naval-group.com

De : s47F
A :
Cc :

s47F

s47F

Date : 24/07/2019 04:33
Objet : RE: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

UNCLASSIFIED

s47F

Sorry missed the point around "SAME" so that we make sure we have the exact understanding for not just Detailed Design but other areas such as build.

The CoA understanding of the NG "SAME" rule as described within the Draft Way Forward Report is as follows:

S = The person has followed a theoretical course relevant for the role or prerequisite
A = The person has followed a theoretical course as well as a practical course relevant for the role or prerequisite
M = The person has followed a theoretical and Practical course relevant for the role or prerequisite plus one year of on the job training
E = The person has theoretical and practical course relevant for the role or prerequisite and 7 years' experience on the job (For design this means start to finish of a Submarine Detailed Design Phase)

Also we understand that it is possible to take someone from a non-Naval Group program (For example UK Submarine Program) who has carried out a full Submarine Detailed Design program to be classed as a M or E and that the "SAME" rule is not specific to only NG training and experience but these people would just need some level of training at the level 3 so that they are familiarised with NG process.

Can you please just validate we have the same understanding?

Regards

s47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
s47F

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From: s47F
Sent: Wednesday, 24 July 2019 10:37 AM
To: s47F
Cc:
s47F

Subject: RE: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

UNCLASSIFIED

Bonjour s47F

Just to follow on from our discussion last night around action 14 from the Intermediate Way Forward Review, the CoA is going to want to see the following information which will be used as part of our evaluation of the Way Forward Report:

- Training Needs Analysis for Detailed Design including supporting reports from TAFE /AFPA(covering all the prerequisites for the DP4 phase, job roles numbers and qualifications then how to train and gap analysis)
- NG current assessment of Australian Industry Capability for this workforce across all levels of "SAME" ratio (For clarity I have re stated the SAME rule below to confirm we are 100% correct understanding)
- Kinexus report for Detailed Design Workforce issued by NGA-HR (Both general report 1st issue and the 2nd issue which will look at the "SAME" ratio)
- ICN Data validating what Australian Industry is available at your "SAME" rule. (I can only see this being done by putting out an expression of interest out for Detailed Design and request a response with "SAME" rule)

As stated last night I don't see how I will be able to commence the evaluation of the ToT Way Forward Report until this information is delivered to the CoA or we acquire ourselves and can validate the NG ToT Way Forward Report delivered in September. To avoid any hold ups in the CoA being able to make a quick decision can you please ensure this data is available ASAP.

Regards

s47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
s47F

s47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

From: s47F
Sent: Friday, 19 July 2019 2:57 PM
To: s47F
Cc:
s47F

Subject: RE: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

UNCLASSIFIED
Bonjour s47F

Any luck working with the AIC team to put together an Expression of Interest on ICN for the Detailed Design work. As I mentioned below I think this would be the best way to get an understanding of the Subcontractor workforce throughout Australia and their current capability IAW the NG "SAME" ratio.

I'm certain the CoA is going to want to see this data as part of the Way Forward Report otherwise we have further actions to get this information before the CoA make a decision.

On another note I had a meeting with the Naval Shipbuilding College this week and they are putting together a package with all the information they have on Design workforce along with some extra elements such as their current working proposals being delivered to government for training of arrangers in Australia. They currently have the College on standby to support NG with any further data or modifications you require.

Let me know if I can assist in any way.

Bon Weekend.

Regards

s47F
Manager – Transfer of Technology

Industry Group
Future Submarine Program
s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
s47F

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From: s47F
Sent: Tuesday, 16 July 2019 12:00 PM
To: s47F
Cc:
s47F

Subject: PPMR Milestones related to Detailed Design [SEC=UNCLASSIFIED]

UNCLASSIFIED
Hi s47F

I have just been reviewing the status CMS and associated PPMR and would like to point to a couple of items which if delivered would address action 14 from the Intermediate ToT Way Forward Review.

- Market and skills analysis report updated completion date 25 Mar 19 (PPMR ID Milestone 104212965024)
- Required skills on Detailed Design analysis report completion date 27 June 19 (PPMR ID Milestone 104234226624)
- Market and skills analysis report for Detailed Design completion date 9 July 19 (PPMR ID Milestone 105028178424)
- Skills gap analysis for Detailed Design issued due for completion 22 July 19 (PPMR ID Milestone 104234600524)

Further to this list I understand that Naval Group Australia HR and ToT have subcontracted Kinexus to carry out a study of the Australian Workforce to provide a market analysis of Detailed Design workforce in Australia. Can This also be provided to the CoA if not already one of the items above?

Finally it would also be useful as suggested in action 14 for NG to engage with ICN (Industry Capability Network) for an evaluation of the current subcontractor workforce in Australia capable of supporting the

Detailed Design. This service is free to the program and you could potentially do an Expression of Interest (EOI) on ICN requesting registered interested parties to supply NG information on their current capability, such as levels of people they have within their organisation with experience aligned to your "SAME" ratio. I will S47F from AIC on this email as they will be familiar with ICN and its capabilities and can brief you if you would like more info.

Regards

s47F
Manager – Transfer of Technology
Industry Group
Future Submarine Program
s47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
s47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

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Australian Government
Department of Defence

Objective ID: BM8539960

s47F

Naval Group S.A.
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75015 Paris,
FRANCE

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SEA 1000 FUTURE SUBMARINE PROGRAM – SUBMARINE DESIGN CONTRACT – CONTRACT CHANGE PROPOSAL REQUEST FOR CORE WORK SCOPE 1 (CWS1) – TRANSFER OF TECHNOLOGY WAY FORWARD REVIEW CCP

References:

A. Minutes of Meeting – Intermediate Way Forward Review, dated 27 June 2019, (Objective ID: BM7089977)

B. Naval Group Submarine Design Contract Deliverable Data Item - DID-TOT-TWFOR (TOT-130) - DRAFT Transfer of Technology Way Forward Options Report, received 1 July 2019, (Objective ID: BM7098624)

C. SEA1000 Future Submarine Program - Submarine Design Contract (Contract No. CASG/FSP/Con9044/2), between the Commonwealth and Naval Group SA, dated 1 March 2019 (Objective ID: fAB5458026) (**Submarine Design Contract**)

D. Commonwealth Letter titled "SEA1000 Future Submarine Program – Submarine Design Contract– Draft ToT Way Forward Review Options Report – Commonwealth Response" dated 8 July 2019 (Objective ID: BM7147176)

E. Commonwealth Letter titled "CCP Request for CWS1 (ICT, PMO Costs & Infrastructure)" dated 13 August 2019 (Objective ID: BM8431794)

1. At the Intermediate ToT WFR meeting on 27 June 2019, Naval Group requested the Commonwealth to confirm the Contract Change Proposal (CCP) input requirement for the Transfer of Technology Way Forward Review (TOT WFR), as captured in Action Item 4 of the Minutes of Meeting (at Reference A).

2. In response Action Item 4 of Reference A, the Commonwealth requests Naval Group to deliver a CCP to s47, s47C
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which will enable the Commonwealth to undertake an informed value for money assessment. The Commonwealth understands that this analysis will be delivered through submission of the Final TWFOR and later presented at the TOT WFR, s47

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4. The Commonwealth acknowledges that at References A and B, Naval Group have stated that s47, s47C
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e. provide all necessary information to satisfy Naval Group's remaining actions, at Reference A (including but not limited to providing an assessment of the current Australian arranger workforce across the Naval Group "SAME" skill categorisation system).

6. Naval Group is advised that should it notify the Commonwealth, as described in paragraph 2, this s47, s47C . As a

result the Parties will need to work collaboratively to minimise any consequent impacts to the Contract and Program schedule.

7. Naval Group is to ensure that the CCP addresses the Commonwealth's requirements in relation to the changes requested above in accordance with Enclosure 1 and that the

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detailed Price and Delivery schedule, with applicable risks captured in the Risk Register (MGT-420).

8. The Commonwealth requests that this CCP be provided by the 6th of September 2019. For clarity, this CCP will be separate to the combined CCP requested by the Commonwealth at Reference E.

9. If you have any questions, the Commonwealth point of contact is S47F

Yours sincerely

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C.D. BOURKE
Commodore, Royal Australian Navy
Director General Future Submarine Program
Capability Acquisition and Sustainment Group
Future Submarine Program Office
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S47F

14 August 2019

Enclosure:
1. Requested CCP proposal – Combined CCP to the Submarine Design Contract

For information:

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Enclosure 1 to
BM8539960

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AUSTRALIAN FUTURE SUBMARINE PROGRAM

ToT Way Forward Options Report

Final Version for Approval

This document contains Naval Group SA Background IP and Foreground

Prepared for:

Future Submarine Project Office

Australian Department of Defence

Prepared by:

Naval Group

40-42 Rue du Docteur Finlay

75015 Paris, FRANCE

Approval

	Name	Date	Signature
Drafted by	s47F	13/12/2019	Visa acquis
Validated by	s47F	17/12/2019	Visa acquis
Approved by	s47F	19/12/2019	Visa acquis

Revision Index

Revision	Date	Revision Content
A	24/06/2019	Draft
B	30/08/2019	Final
C	19/12/2019	Final

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Table 34.
Table 35.

1 Executive Summary (FGD - ~~FOUO~~)

Obtaining sovereignty to operate and sustain the Attack Class Submarine (ACS) implies to correctly size and adequately train a dedicated design authority for sustainment in Australia. Therefore, the Australian Design Authority (ADA) is being developed and will have competencies to perform the following strategic objectives:

- Monitor the ACS construction;
- Master regular In Service Support (ISS); and
- Master significant evolutions implemented throughout the batches.

Contribution to the initial Detailed Design phase is one of the enablers as it allows the future ADA to:

- get acquainted with the involved technologies on board the ACS;
- learn and practice the detailed arrangement skills and rules; and
- acquire and develop an overall knowledge of the ACS architecture, functional performances and General Transverse Requirements of the ACS.

The arrangement activity within the Detailed Design phase is separated into two main parts:

Part 1: Locating, in principle, all the equipment into the digital mock-up, whilst integrating all the preliminary design constraints (DP4.1). It is considered that this first part requires a significant portion of experience; and

Part 2: Preparing the production engineering through populating the relevant Product Lifecycle Management (PLM) databases (DP4.2).

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Naval Group emphasizes that all options include in parallel:

- arrangement On the Job Training (OJT) of Australian teams in France, during the Basic Design Phase (DP3);
- a progressive transfer of functional & transverse capabilities and the associated accountability for Naval Group Australia, as the growing design authority for sustainment. This occurs as soon as the Detailed Design begins (after the Preliminary Design Review); and
- downstream production engineering, which is 100% performed in Australia by Australian teams.

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2 Introduction (FGD - ~~FOUO~~)

The ToT Way Forward Options Report (TWFOR) defines and analyses the workshare related to the detailed design phase (DP4) to ensure that:

- a capability is transferred from Naval Group SA to Naval Group Australia to ensure an establishment of a sovereign capability to operate and sustain the future submarine; and
- maximise opportunities for the involvement of the Australian industry through all phases of the FSP, without unduly compromising the Commonwealths requirements relating to capability, cost and schedule.

The total capability which is transferred to Naval Group Australia is achieved not only through the arrangement studies (focused on in this report), but also on the studies undertaken by the rest of the ADA. Figure 1 shows the ramp-up of the total engineering studies in Australia and it can be seen that arrangement engineers only make up a portion of the design team for sustainment. The total number of arrangement designers required for the sustainment period is approximately 53 resources.

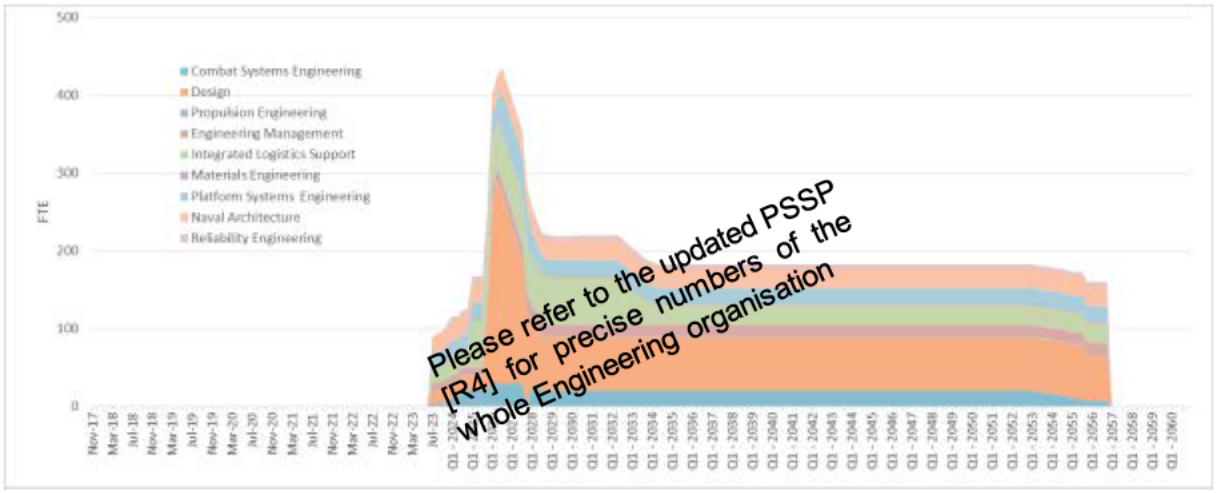

Figure 1. ADA for Sustainment for the entirety of the FSP

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2.1 Purpose of the Document

The ToT Way Forward Options Report (TWFOR) is used:

a. to summarise the current baseline for the ToT program, as set out in the Approved ToT Strategy, the Approved ToT Plan, the Approved ToT Master Training Plan (MTP), the approved IMS and the Approved Program Cost Estimate (PCE) ('Approved ToT Baseline Data Items');

b. to identify the options against the current baseline for the ToT program set out in the Approved ToT Baseline Data Items, including the associated costs, benefits and risks, in relation to:
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c. as one of the inputs to the ToT Way Forward Review (WFR) to enable decisions to be taken in relation to the location(s) for conducting the detailed design work and the implementation of the associated ToT program for the Australian Subsidiary and the broader Australian industrial base; and

d. to assist with setting the direction for the ToT program and other affected elements of the FSP, which include (for example):
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The Contractor uses the TWFOR to:

a. describe the Detailed Design DP4 Phase to the extent necessary to be able to identify and describe the implications for, and the linkages associated with the ramp up and achievement of the following ToT Capabilities:
   (v). Capability to Carry Out Detailed Design; and
   (vi). Design Authority for Sustainment.
b. identify and describe the options for the ToT Program against the baseline set out in the Approved ToT Baseline Data Items in relation to:
   (vii). the locations for conducting any detailed design work that is not currently programmed to be conducted in Australia, including identifying the broader implications for the FSP; and
   (viii). the envisaged implementation of the ToT program for each of the location options, including possible alternatives (e.g., in relation to Training and the involvement of Australian industry) and the associated implications for other parts of the FSP, including the relation to cost, benefit and risk;
c. provide sufficient information to achieve the objectives of the ToT WFR, as set out in clause 14.5.4 of the Submarine Design Contract (SDC) Scope of Work (SOW); and
d. facilitate the subsequent development of an update to the Transfer of Technology Plan (ToTP) and the associated Contract Change Proposal (CCP) to bring the full scope of the ToT program for the Australian Subsidiary into the Contract.

The Commonwealth uses the TWFOR:

a. to understand and evaluate the Contractor's approach to conducting detailed design, particularly in relation to the implications for achieving the Sovereignty requirements of the FSP and the Contract;
b. to understand and evaluate the Contractor's approach to meeting the ToT requirements of the FSP and the Contract in relation to the ToT Capabilities of Capability to Carry Out Detailed Design and Design Authority for Sustainment;
c. to understand and evaluate all of the implications for the FSP associated with the different options for the ToT program, including in relation to the location(s) for conducting the detailed design work;
d. to assist with setting the direction for the ToT program and other related elements of the FSP; and
e. as an input into its own planning.

2.2 Background

2.3 Overview of the Data Item

The TWFOR is subordinate to the following data items, where these data items are required under the Contract:

a. Project Management Plan (PMP).

The TWFOR inter-relates with the following data items, where these data items are required under the Contract:

a. Transfer of Technology Strategy (ToTS);
b. Transfer of Technology Plan (ToTP);
c. Transfer of Technology Master Training Plan (ToT MTP);
d. Australian Subsidiary Capability Realisation Plan (ASCRP);
e. Australian Industry Capability Strategy (AICS);
f. Australian Industry Capability Plan (AICP);
g. ICT Delivery Plan;
h. Contractor IPDSE Development Plan (CIDP);
i. Engineering Management Plan (EMP);
j. Risk Management Plan (RMP);
k. Program Cost Estimate (PCE);
l. Program Staff Skills Profile (PSSP); and
m. Integrated Master Schedule (IMS).

2.4 Referenced Documents

[R1] DID-ToT-TWFOR
[R2] Strategic Partnering Agreement (SPA)
[R3] Engineering Management Plan (Ref DOC-2017-700831)
[R4] Program Staff Skills Profiles (Ref DOC-2017-703189)

2.5 Definitions

The following key terms are used throughout this document.

Table 1: *Key Terms*

Key Term	Meaning
Commonwealth Contractor	Means any person, other than the Contractor, engaged by the Commonwealth in connection with the FSP, including the CSI.
Contract	Means the COC, the Attachments including the Statement of Work, and any document expressly incorporated as part of the Contract.
Contract Data Requirements List or CDRL	Means Annex C to the SOW.
Customer, Commonwealth	Department of Defence of the Commonwealth of Australia, ABN 68 706 814 312
Contractor	Means Naval Group.
Data Item review	In relation to a data item, has the meaning given in clause 1.6.3 of the SOW.
DP	Naval Group Design Process, part of Naval Group Business Management System (BMS)

Key Term	Meaning
Effective Date or ED	The date on which the Contract signed by the parties enters into force
Engagement Plan	Is the schedule of the management meetings and joint workshops between Naval Group and the other primary stakeholders
Future Submarine or FSM	Means the submarines to be acquired by the Australian Government for service in the Royal Australian Navy under the Future Submarine Program.
Future Submarine Program or FSP	Means the Commonwealth's Future Submarine Program and includes all activities connected with that Program, including all elements of the design, development, build, operation, sustainment and disposal of the Materiel System during its life of type
IDD	Interface Description Document
Intellectual Property or IP	Means all present and future rights conferred by law in or in relation to any of the following: • copyright; • rights in relation to a Circuit Layout, Patent, Registrable Design or Trade Mark (including service marks); or • any other rights resulting from intellectual activity in the industrial, scientific, literary and artistic fields recognised in domestic law anywhere in the world whether registered or unregistered.
PR	Naval Group production process, part of Naval Group BMS
Program	Means the Future Submarine Program or FSP
Program Contract	Means any contract, agreement or arrangement with the Commonwealth for the FSP to which the Contractor is a party, or which otherwise states that it is a Program Contract for the FSP, including the: • contract; • Strategic Partnering Agreement or SPA; • Tripartite Co-operative Agreement or TCA; • Design Contract; and • any other relevant contracts for the completion of design and initial production, and the completion of production, of the Future Submarines
Project	Means the Design Management Contract (DMC).
Proxindus	Means the direct support team of the production, which • has responsibility to take immediate decisions to manage production's difficulties; or • manages the interface with the design team when the decision needs the approval of the Design Authority.
SEMP	Systems Engineering Management Plan.

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4 General

4.1 Objectives and Constraints (FGD - ~~TCUC~~)

4.1.1 Objectives

The objectives taken into account for the analysis of the different transfer options of the detailed design from France to Australia are:

a. ensure feasible Program execution;
b. minimise overall risks;
c. respect the IMS (date of delivery of the FoC);
d. maximise the work done by Australians (either in France or in Australia);
e. deliver sovereignty: prepare the Design Authority capability for operation and sustainment to Naval Group Australia (detailed design constitutes one out of several enablers for this); and
f. minimise the overall cost without unduly jeopardizing above criteria.

4.1.2 Constraints

The following constraints have been identified and are used for the comparison of the different options:

- the organisation between Naval Group SA and Naval Group Australia has to be as simple as possible;
- the retention of the Australian workforce trained in France or in Australia;
- the impact on the ICT;
- the workload with respect to other Naval Group programs;
- the difficulties to send Australians to France for training; and
- the difficulties to send experienced French people to Australia[1].

4.2 Lessons Learned from Previous Programs (NAVAL GROUP SA BGD - DR)

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[1] This covers two issues:
- finding enough experienced people willing to come to Australia; and
- allowing them to work in the shipyard, and not only provide technical assistance.

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5.3 Milestones (NAVAL GROUP SA BGD - DR)

The official milestones of the DP4 phase are:

- Critical Design Review (CDR): Detail design review; and
- Critical Manufacturing Review (CMR): Detailed production engineering review.

5.3.1 CDR

Critical Design Review (CDR): this detailed design review requires lower-level CDRs to already have been performed. The purpose of the CDR is to;

- evaluate the impact of the system component detailed design on its architecture and ensure they do not compromise the solution;
- evaluate the detailed design for the solution, including all components and interfaces; and
- ensure that detailed design meets requirements of the solution;
- ensure that the baseline for the definition Product Baseline (PBL) is complete.

The Whole Warship CDR does not correspond to the end of the detailed studies but to the achievement of a readiness level from which the production, assembly, integration and tests can be started without unmanaged risk on the final performance levels of the product and to be in accordance with the cost and lead time constraints.

At the WW CDR, the arrangement input data is set, the detailed arrangement studies continue at the same time as the detailed production engineering activities.

5.3.2 CMR

Critical Manufacturing Review (CMR): for the detailed production engineering review, the lower-level CMRs must have already been performed. The purpose of the CMR is to ensure that the upper-level production engineering can be consolidated:

- evaluate the detailed production engineering for the solution, including all components and interfaces;
- ensure that detailed production engineering meets requirements of the solution;
- evaluate the completeness and robustness of production engineering data; and
- ensure that the baseline for production engineering Manufacturing Baseline (MBL) is complete.

5.4 Input and Output data for DP4 (NAVAL GROUP SA BGD - DR)

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5.7 Whole Warship Engineering organisation (FGD – ~~FOUC~~)

The Engineering organisation in force is described in the Engineering Management Plan [R3]. An extract is presented in the figure 5 hereunder. The detailed Engineering organisation and worksharing for DP4 will be described in the Detail Design Transition Plan. The overall estimated numbers of personnel required across the phase is provided in the PSSP [R4]. The detailed allocation of people per sub-phase will be possible once the transition plan will be available.

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5.8 NGA Workforce Needed for DP4 (FGD - ~~FOUO~~)

5.8.1 Proposed Organisation

This section provides the proposed skills for the Naval Group Australia engineering entity.

The proposed organisation in this document may be required to be updated according to the needs of the program, or to increase the efficiency of the organisation:

- for example, the interface between design and production engineering may require some adaptation of the organisation;
- the skills and organisation proposed for the PLTBF and ALTBF will be updated when:
  - the full operational needs of the PLTBF have been defined and agreed; and
  - the scope and definition of the ALTBF has been agreed.

5.8.2 Organisation chart

Figure 6 presents the proposed organisation of engineering department and the expected numbers of level A, M & E people.

At this point in time the PLBTF and ALBTF are attached to the engineering organisation.

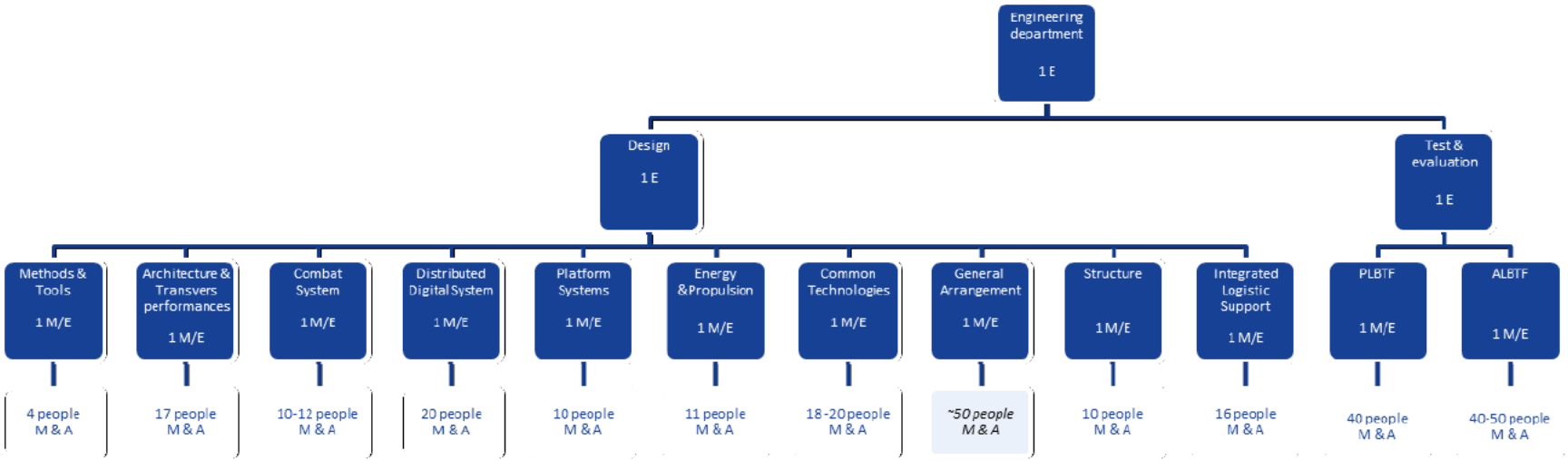

Figure 6. Engineering Department Organisation

5.8.3 Proposed Engineering Office

This section presents the skills for the different technical departments or groups of the Naval Group Australia Engineering Office.

5.8.3.1 Technical Management

The Chief Technical Officer (CTO) is responsible for the technical management of the engineering department.

Department (or group) leaders support the CTO for their respective technical domain. Department leaders will be the recipients of the design authority delegated to Naval Group Australia for their respective domains.

At this stage, the engineering Method and Tools group is directly attached to the CTO.

5.8.3.2 Architecture / Transverse Activities

This department hosts the architects, the systems engineering team and the transverse team:

- Architects:
  - Program CTO (Whole of Warship Architect);
  - Naval architects; and
  - Weight & stability engineers.
- Systems Engineering;
- Seaworthiness;
- Human System Interface; and
- Military performances:
  - Shock; and
  - Acoustic signature.

5.8.3.3 Platform Systems

The department is managed by a department leader who is responsible for the organisation of the department and for the verification of technical documents.

The engineers will be split in two main categories:

- system leads, in charge of one system group (WATS, MOBI, ACCM, SFTY); and
- engineers attached to the department, working for the different system leads.

5.8.3.4 Energy & Propulsion System

The department is managed by a department leader who is responsible for the organisation of the department and for the verification of technical documents.

The engineers will be split in two main categories:

- system leads, in charge of one system group (PROP,DGAU,BATT,PGEN, ELEC); and
- engineers attached to the department, working for the different system leads.

5.8.3.5 Common Technologies

This department is managed by a department leader who is responsible for the organisation of the department and for the verification of technical documents.

This department is responsible for the qualification of Common Technologies, either because of obsolescence or for new requests. The technologies are:

- fluid;
- electrical;
- instrumentation;
- material and welding;
- paint;
- floor covering;
- insulation (thermal, soundproofing, etc.); and
- noise and vibration.

5.8.3.6 Combat System

This department is managed by a department leader who is responsible for the organisation of the department and for the verification of technical documents.

This department is responsible for the physical integration of the combat system and for the activities related to Naval Group Combat System subsystems (weapon launching system, masts, etc.).

5.8.3.7 Structure

This department is managed by a department leader who is responsible for the organisation of the department and for the verification of technical documents.

This department is responsible for the activities related to resistant and non-resistant structures.

5.8.3.8 Arrangement

This department is managed by a department leader who is responsible for the organisation of the department and for the verification of technical documents.

This department is responsible for the arrangement activities (3D mock up), and will also provide the drawings required by the detailed production engineering team (attached to the production).

The size of the team during DP4 depends on the options as presented in this report. Following the DP4 phase, there is a requirement for a minimum of 50 people to manage the sustainment of the FSM.

The required positions and skills are:

- Whole Warship arrangement leader;
- sector arrangement designers: responsible for a geographical sector of the boat;
- arrangement designers: responsible for one, or several compartments; and
- CAD designers who work for the Arrangement designers. The different skills required are:
  - Pipe CAD designer;
  - Electric CAD designer,
  - Ventilation CAD designer;
  - Seating CAD designer; and
  - Seating FEA engineer.

5.8.3.9 DDiS

This department is managed by a department leader who is responsible for the organisation of the department and for the verification of technical documents.

This department is responsible for the Ship Management System and Cyber activities.

5.8.3.10 Integrated Logistic Support

This department is managed by a department leader who is responsible for the organisation of the department and for the verification of technical documents.

This department is responsible for the ILS activities.

5.8.3.11 Test and Evaluation

The organisation required to manage the Test and Evaluation will be:

- Test qualification and acceptance of the FSM:
  - IVV manager; and
  - IVV test engineers.
- Platform Land Based Test Facility:
  - PLTBF Manager;
  - Test leaders;
  - Mechanical System Manager supported by DGR and maintenance specialists; and
  - Electrical & Propulsion managers supported by MEM, MSB and electrical specialists.
- Adelaide Land Based Test (ALBTF) Facility:
  - ALTBF manager;
  - Diving safety team;
  - Noise and vibration team[2]; and
  - Welding team.

[2] This team will also support the PLTBF tests.

5.8.4 Justification of the Proposed Organisation

To identify the required skills, Naval Group used:

- an analysis of the design office of the Naval Group Division Services in France, which is in charge of the sustainment; and
- an analysis of the workload for the design activities transferred to Australia.

5.8.5 Tasks already started in Australia

Naval Group Australia already started some design activities, under the French design authority:

- Sourcing and qualification of Common Technologies (CT),
- Support to sourcing and qualification of Critical and Main (C&M) equipment (including the PLBTF equipment),
- Participation of the development and validation of the Ship Management System (SMS).

5.8.5.1 Common Technologies

Common Technologies are equipment that can be used by all system leaders and their team to design the submarine systems and subsystems.

The sourcing of Fluid and Electrical Common Technologies is an activity that started in Australia during the Design and Mobilisation Contract (DMC) and will continue all along the program:

- Sourcing and qualification of initial equipment
- Ongoing work to answer to the request coming from the design team,
- Management of the obsolescence of the qualified technologies.

The technologist team from Naval group Australia works under the design authority of the French technologist team. The transfer of responsibility will happen before the start of the sustainment phase of the FSM.

5.8.5.2 Critical and Main equipment

C&M equipment are specified by the French system leaders according to the design of the systems.

Naval Group Australia Procurement team is in charge of the sourcing of these pieces of equipment in Australia, and is supported by the engineering team. France will stay the design authority for C&M equipment until the start of the sustainment phase.

This activity started during CWS1 of the Design Contract.

5.8.5.3 Ship Management System

The strategy to transfer the knowledge for the SMS is that Naval Group Australia participates to the design of the system, under the design authority of the French team.

The work has been shared between the two teams, and Naval Group Australia is in charge of

- the V&V for the whole SMS,
- the development of some of the software.

The work has started during CWS1 of the DC and the cooperation is supported by a common working environment provided by the Application Life Management (ALM) tool.

5.8.5.4 Integrated Logistic Support

ILS activities starts in Australia during CWS1 and supports the PLBTF and SCY equipment. Australian engineers also go to France (the first one went in 2018) to be embedded in the French ILS team. The bulk of ILS activities will be transferred to Australia during the DP4 phase.

5.8.6 Functions performed by the Design Authority For Sustainment

Naval Group Australia will be the Design Authority for the sustainment of the FSM. The different activities to be performed will be:

- Design of the second batch of the FSM,
- Engineering support after the delivery of the submarines:
- Management of the configuration of the submarine,
- Design of the modifications requested by the CoA,
- Management of the technical interface with the Combat System Integrator (CSI), this may include design of modifications requested by the CSI
- Analysis of the technical events (failures, loss of performance…),
- Management of the technical obsolescence,
- Engineering preparation and support to the intermediate maintenance,
- Engineering preparation and support of the FCD, the preparation of the first FCD will start about two years before the FCD.

In this perspective, the Australian DA team will be trained in France:

- Theoretical training (3 to 4 months),
- On the Job Training (OJT) embedded with the French design team.

This training will provide the required competencies:

- knowledge required for the design of the second batch:
  - Design process,
  - Naval group Technical instructions,
  - Understanding of the design of the FOC,
  - Understanding of the technologies, equipment.
- knowledge required for the Engineering support after the delivery:
  - Naval group Technical instructions,
  - Understanding of the design of the FOC,
  - Understanding of the technologies, equipment.
- Knowledge required for the Engineering of the MCD and FCD and support to the maintenance shipyard:
  - Naval group Technical instructions,
  - Understanding of the design of the FOC,
  - Understanding of the technologies, equipment.

5.8.7 Transition activities

Before transferring the Design Authority to Australia for the sustainment of the FSM, part of the future DAFS will perform the following activities:

- PLBTF: support provided during the tests of the Energy and Propulsion system,
- HQTS: in country engineering support to production,
- Qualification of the PLM: part of the DA team will run the test cases for the qualification of the PLM in Australia,
- Prototype CS raft: the design of the prototype CS raft will be completely done in Australia (DP4.1 / DP4.2…..),

5.8.8 Sourcing of subcontractors for the detailed design

Naval Group Australia started the sourcing process for subcontractors for:

- Arrangement studies,
- Functional and structure studies.

The sourcing for arrangement studies started in 2018 (EOI, analysis of the answers, RFI, analysis of the supplier's answers) and is continuing (short list of suppliers, RFTD, meeting with the suppliers early 2020), the objective is to provide a short list and a procurement strategy mid 2020.

The sourcing for functional and structure studies started in 2019 (EOI, analysis of the answers, RFI, analysis of the supplier's answers) and will be performed by the end of 2019 / early 2020. Then the process will continue on the same basis of the arrangement studies.

A tentative roadmap for Detailed Design sourcing activities is presented below. This roadmap may be updated after validation by all stakeholders.

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Part of the arrangement designers that will be trained in France will be subcontractors: 48 Naval Group employees and 48 subcontractors will be trained and will have OJT in France.

If the Australian subcontractors are subsidiaries of French companies, then these companies will be asked to organise the training of their Australian employees in the parent company in France.

We encourage and pay attention to suppliers in Australia who present strategic plans to acquire competencies for submarine detailed design prior to the beginning of AFS detailed design activities. At present, one potential supplier has presented this type of plan which is considered with interest by Naval Group

5.8.9 Detailed Design Transition Plan

s47, s47C, s47G

This document will provide for each family of technical activities (architecture, transverse, functional, structure, arrangement…):

- The responsibilities of the French and the Australian teams,
- The tasks performed either in Australia or in France,
- The organisation / methods between the teams,
- The use cases to test the methods and validate the PLM,
- The workload for each team,

This work will happen in the first half of 2020 (pending a decision on the design option no later than end of November).

A tentative schedule of this work is:

- Organisation of the work: November / December 2019
- Kick off meeting: end of January 2020,
- Intermediate workshop: March 2020,
- End of the work: end of May 2020.

The suggested interactions with the CoA are:

- First meeting after the Kick off meeting: February 2020,
- Second meeting after the intermediate workshop: April 2020,
- Third meeting after the end of the work: June 2020.

5.8.10 Technical and Further Education Providers

All options require training to be organised in Australia for arrangement studies and detailed design engineering training. As described in Figure 8, Naval Group has established a contractual organisation between TAFE SA and AFPA to be able to develop a Training Need Analysis (DOC-2019-702157) in the field of the detailed design.

The TNA will provide the critical input of the competency gap between what currently exists in Australia and what is required to perform detailed design activities. It will also examine the potential employment market for detailed design activities. Naval Group will further developed the TNA in the next phase concerning the establishment of the trained workforce in Australia, combining the contribution of external RTOs (Registered Training Organizations) and execution of internal NG Detailed Training Plan (DTP).

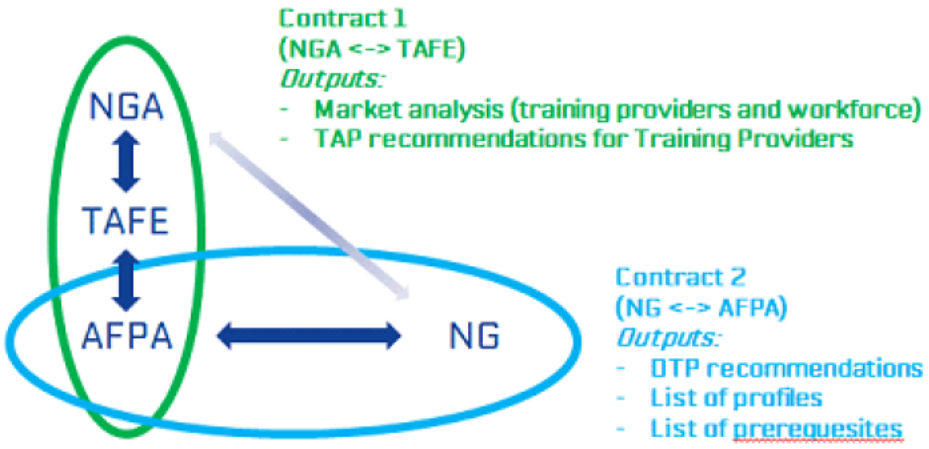

Figure 8. Contract Description with TAFE and AFPA

5.8.11 Existing Drafter Workforce in Australia

As part of the TNA, and to help inform the workforce development planning, Naval Group engaged Kinexus to undertake a detailed analysis of the Australian drafter workforce. The complete outcome of this report is embedded in the Detailed Design TNA report.

The total size of the drafting workforce in Australia has been assessed as just below 11,000 people, of which, approximately 7200 have an experience in an area with links to Naval Group Australia needs. The data is shown in Table 2 and Table 3.

It is noted that the Level M's considered in the tables below would still require a basic training to learn Naval Group's design process, tools and methods.

Experience (SAME) of the Drafter workforce

	Piping	Electrical	HVAC	Outfitting	Fire	PLM	Naval Experience	Siemens NX Software	Shipbuilding Specific Software	Product data Management	3D Design	Total	%
S	387	273	142	182	59	0	134	0	0	0	0	1177	16%
A	640	112	106	0	15	25	124	124	862	47	3942	5997	83%
M	11	8	4	0	3	0	17	0	0	0	10	53	1%
E	0	0	0	0	0	0	0	0	0	0	0	0	0%
											TOTALS	7227	

Location of the Drafter workforce

Location	Number	%
Adelaide	505	6%
Melbourne	2084	23%
Perth	1575	17%
Brisbane	1762	19%
Sydney	1855	20%
Rest	1290	14%
Total	9071	

The two main outcomes from the Kinexus report are:

- the analysis could not find any Level E drafters in Australia; and
- Melbourne has the largest supply of drafters in Australia, and Adelaide has a relatively small drafter workforce with only 6% of the workforce.

These main outcomes from the Kinexus report support the assumptions taken into account in the ToT-WF Report:

- all level E people will be provided by Naval Group SA; and
- a second location would be required for options s47, s47C, s47G

5.9 Significant ICT Resources needed for DP4 (FGD ~~– FOUO~~)

Key ICT resources enable the execution of the design process. The collaboration and knowledge transfer will be mainly focussed on the PLM, ERP and OPTI. A SM Pilot is also forecasted to be deployed in Australia to ease the transfer of technology and to anticipate any required change management around methods and tools.

s47, s47C, s47G

The key assumptions for basic design are;

- 3DX instances in France only;
- OPTI Instance in France to control program « cost & schedule »;
- OPTI Instance in Australia to schedule submarine Assembly Yard activities;
- Articles are created only in PIM FR;
- ERP (Oracle) in Australia to supply and procure parts; and
- Unlike DP3, it is possible to manage purchase orders in degraded mode, (only critical items).

And the key assumption for the end of DP4 is:

- All tools in AU with remote access from FR

The localization of key ICT resources for the different scenarios during the detailed design phase are described in the ICT assessment for each option.

The schedule of deployment can be different for the different options, but the ICT masterplan is sized on the most constraining cases, to keep compatible with the design process and TOT activities.

s47, s47C, s47G

6 ToT Strategy Options (FGD - ~~FOUO~~)

6.1 Rules and Assumptions

To reduce the risk associated with the design during DP4 and its impact on the schedule and production (namely re-work for the FoC), the workforce needed to perform the design has to undergo preliminary training and gain appropriate experience on working on a submarine design. Depending on the different skills required, there are specific Submarine Designer rules and guidelines, which are defined, to reduce the risk on the design and schedule. Such rules and guidelines are defined in the following sections of this document and are considered as applicable for the analysis of all considered options.

Other assumptions, which are not considered to be ToT specific, are also defined.

6.1.1 Rule 1 (ToT) – S.A.M.E Levels

The requirements to achieve the S.A.M.E levels are the following:

- S: has completed a theoretical course;
- A: level S plus completed a practical course;
- M: level A plus one year of on the job training on the same activity;
- E: level M plus an experience on the same activity already performed on a program with a full DP4 cycle.

The assumption is that all the Level E arrangement designers will need to be provided by Naval Group SA since there are no Level E people existing in Australia, this is supported in Section 5.8.11. The exception will be if Naval Group Australia is able to recruit people from other countries' programs who have undertaken a detailed design phase.

6.1.2 Rule 2 (ToT) – S.A.M.E Ratios

Stemming from previous Naval Group experiences, the adequate ratio for each category of S.A.M.E to achieve the DP4 Arrangement is as shown in Figure 11 below.

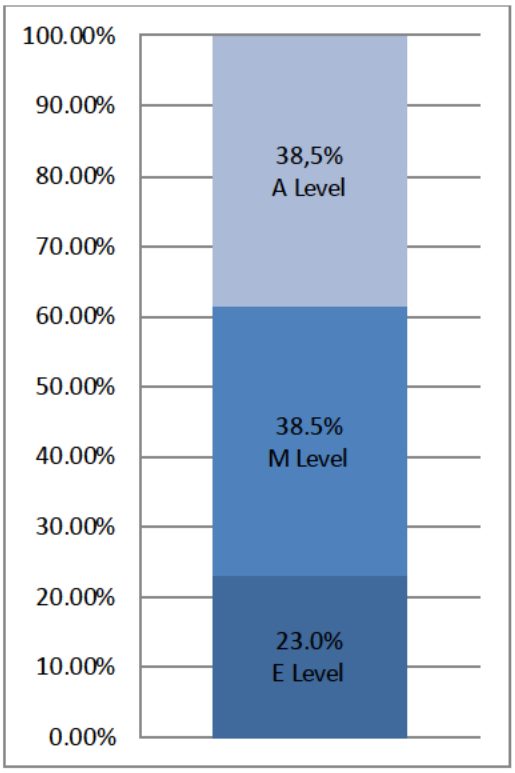

Figure 11. S.A.M.E Ratio in Australia for the Different Options

It is noted that this is the required ratio for the whole team, in France plus in Australia for the core work, back office and technical assistance combined. Furthermore, it is possible to adjust the ratio within France or Australia depending on the complexity of the work. For clarity, Table 4 demonstrates the composition of the whole team for all the data presented later in this report.

s47, s47C, s47G

s47, s47C, s47G

6.1.3 Rule 3 (ToT) – On the Job Training Ratios

On The Job Training (OJT) is considered to be achievable if the team satisfy the following conditions:

- minimum of 1/3 of skilled workers;
- maximum of 1/3 of skilled subcontractors; and
- maximum of 1/3 trainees.

6.1.4 Rule 4 (ToT) – Technical Assistance Ratios

For arrangement, the level of technical assistance versus the size of the team is:

- 10% if the team has already done OJT on the activity with same methods and tools; and
- 20% if the OJT has not been performed in the previous conditions (not exactly the same activity or not the same methods and tools).

For industrialisation, the level of technical assistance versus the size of the team is:

- 50% for the bill of materials activities in option s47, s47C, s47G since no similar activity is performed in France in the OJT; and
- 25% for all others cases.

6.1.5 Rule 5 (ToT) – Counselling Ratios

The student counselling ratio during the OJT is 1 mentor for 10 students.

6.1.6 Rule 6 (ToT) – Front Office vs Back Office Ratio

To support a front office efficiently, a dedicated Back Office team must be set up in France. This team will manage the interfaces between the two teams, for instance, this team will manage the questions and answers process between the Front Office in Australia, composed by the ToT Team including the Technical Assistance and the ADA, and the design authority, which will remain in France.

A ratio of 1/3 to the total number of people in the permanent ToT Team and TA is required.

6.1.7 Rule 7 (ToT) – DP4.3 Production Expert Ratio

For DP4.3 Detailed Production Engineering, the ratio is 1 Expert per speciality (Hull & Structure, Piping & HVAC, Mechanic, Electricity, Light Materials).

One third of this team needs to be (M+E). Only the Naval Group Australia M Level people will perform OJT in France.

6.1.8 Assumption 1 (Program Execution and Human Resource Input) – Attrition

To account for attrition, the following attrition ratios need to be further applied to the roadmaps:

- the proposed ratio for Australians relocating to France for training (level M) is 20%. This takes into account family issues (sickness, family not settling in, etc.) and people not suited to the design activities (either people not passing the final exam or people not satisfied by the positions);
- the proposed ratio for Australians trained in Australia (levels S and A) is 20%. This takes into account that not all trainees will pass the final exam and that these people will probably be younger and will be more likely to change jobs if they do not like what they do; and
- the proposed ratio for the French relocating to Australia is 10%. This takes into account only family and health issues, as these people will know the work.

It is noted that these ratios will need to be monitored throughout the phases. It is also considered that the ADA Engineers feedback will provide valuable evidence to be able to update these assumptions.

The mechanism to update these ratios, if the attrition rate is higher, will be to increase the required number of Australian people that will be recruited in the earliest batch possible (for France and Australia). If it is identified that the real attrition rate is lower, the last cohort(s) will be adjusted.

For the purpose of this report, the attrition ratios are only applied to the costing section. All other graphs do not consider attrition, and present only the required number of people to perform the design activities.

6.1.9 Assumption 2 (Program Execution and Human Resource Input) – Location of the Design Teams

The following major assumptions deal with the geographical organisation of the whole design team. The specific aspects of this assumption are broken into three being essential, nice to have and opportunities:

- the following assumptions are considered essential. Without them, the data presented in this document are invalid, i.e. additional resources would be required to manage the interfaces between locations (as well as constraints on the infrastructure, ICT and human resourcing management) and impacts on the schedule are foreseen:
  - co localisation of detailed design arrangement and General Production engineering;
  - co localisation of Detailed production engineering and production;
  - co localisation of "Proxindus" and production; and
  - functional studies: the physical integration team has to be collocated with the arrangement.
- the following assumptions improve the efficiency of the whole process. However these options are "nice to have" and are not "road blocks":
  - co localisation of detailed design arrangement and detailed production engineering;
  - co localisation of all design teams; and
  - co localisation of General Production engineering and production.
- the final assumptions are also "nice to have" but their consequences on the global efficiency of the design team are minimal. They are opportunities as they would allow for more flexibility within the location of each team (with some small decreases in efficiencies):
  - functional studies (not related to physical integration) may not be collocated with arrangement studies. If they are not collocated, there is an impact on the overall efficiency of the team, but it is feasible; and
  - transverse studies do not have to be collocated with arrangement studies.

s47, s47C, s47G

6.1.10 Assumption 3 (Program Execution and Human Resource Input) – Locations for DP4

s47, s47C, s47G

s47C

6.1.11 Assumption 4 (Program Execution) – Schedule

The analysis s47, s47C, s47G is completed without changing the schedule. When a risk to the schedule is identified a risk mitigation action is proposed.

6.2 Options for DP4

6.2.1 General Comments about DP4

s47, s47C, s47G

6.2.1.1

6.2.1.2 Physical integration of the Combat System

The physical integration of the combat system is managed through two kinds of activities:

- a technical management team, which manages the overall schedule and organisation to keep the drum beat for the exchange of data between the CSI and the PSI; and
- a dedicated technical team, which is in charge of the physical integration.

This second team works closely with the arrangement designers to ensure that the design takes into account the physical integration requirements.
s47, s47C, s47G

6.2.1.3 Arrangement Studies

The DP4.1 sub phase requires experienced submarine arrangement designers who do not currently exist in Australia. The required specific skills and experiences do not exist in other industries, even in surface naval combatants.

This is due to the high density and to the specific technologies required in a submarine.

The required skills are different for a DP3 or a DP4 phase, so people trained during the DP3 will still need to be trained to be competent to perform the activities required in DP4. This experience cannot be provided through training alone, the previous experience of a design phase is required, for at least for a percentage of the team as defined in Rule 3 of Section 6.1.3.

If this experience cannot be provided beforehand, then the number of Naval Group technical assistance has to be increased, as described in Rule 4 of Section 6.1.4.

6.2.1.4 Structural Studies

All structural related design studies are planned to be finished at the end of DP4.1.
s47, s47C, s47G

6.2.1.5 Detailed Production Engineering

In each scenario, detailed production engineering is supposed to be undertaken in the same location as where the manufacturing occurs. Whatever the option, the training and OJT scenario will be the same including a first session in France based on the HQTS and then training sessions in Australia.

This part of the ToT is not considered as a risk and was not considered in the analysis. The hours related to this however were considered in the cost and Australian Involvement sections of the report and the detailed roadmap will be provided in the next version of the document.

6.2.2 Geographical Breakdown Structure

To perform arrangement studies, the submarine is divided in geographical zones. These zones are studied according to the time requirements of the build strategy (the production pulls the design at this stage of the program). s47, s47C, s47G

s47, s47C, s47G

s47, s47C, s47G

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s47, s47C, s47G

s47, s47C, s47G

6.3 Introduction to the Analysis of the Options

The analysis of each option will follow an iterative approach. This document considers five input streams, which are ToT, ICT, Program Execution and Human Resource Input, Australian Involvement and Cost. The approach of this document is to individually assess each of these streams against each option, to determine the feasibility. If all five streams are considered as feasible, the option is considered for the Multi Criteria in Section 7, of which the results of this section will identify the recommended option. Figure 13 details this approach.

s47, s47C, s47G

Figure 13. Assessment Approach

The approaches of each assessment are identified in the following sections.

6.3.1 ToT – Assessment Criteria Definition

The ToT stream is assessed using the following criteria:

- Criteria 1: Training – Evaluate the capability of the Australian Detail Design Arrangement workforce to reach the level M following the training course and the OJT. This criteria requires 1 year of OJT undertaken in DP4 as per requirement expressed in ToT Rule 1 for S.A.M.E Levels (See section 6.1.1);
- Criteria 2: OJT – The ratio between trainees and the trainers. This needs to be considered because if the ratio is too high, there is a risk that the OJT training will not be effective (as the trainers will be focussing on the real work), or the opposite (the real work will not be done as the trainers are too focused on the trainees); and
- Criteria 3: Technical Data Package (TDP) – The amount of documents which need to prepared to describe the trade and the methods. This is assessed against the scope of each option and then the maturity.

The scoring method against these criteria is as follows:

- 1 = Most difficult (Highest level of risk);
- 3 = Hard;
- 6 = Medium;
- 9 = Easiest (Least level of risk); and
- 0 = Not feasible.

6.3.2 ICT – Assessment Criteria Definition

The capacity of ICT to handle the different work-sharing scenarios is driven by:

Business complexity drivers, highlighting how methods and tools should be adapted to cope with a more or less complex scheme of interactions between the different stakeholders. The business complexity drivers for the ICT stream are assessed using the following criteria:

- Criteria 1: Time interaction – manage the transfer of responsibility according to design maturity DP4.4 is shared between the French and the Australian teams;
- Criteria 2: Geography interaction – manage physical interfaces between adjacent zones;
- Criteria 3: Functional interaction – manage functional interfaces, esp. for transverse systems split in several arrangement zones; and
- Criteria 4: Skills interactions: manage concurrent activities on the same objects but with different point of view (ex: eBoM versus mBoM).

NB: all these interactions are exacerbated by the increasing number of generated data over time and the level of modification to cope with it.

The information system complexity drivers for the ICT stream are assessed using the following criteria:

- Criteria 5: Data synchronization stakes – required performance level of the IT solutions to propose efficient exchange mechanisms;
- Criteria 6: Data migration stakes – quantity of data to migrate versus time lapse to achieve it and associated risk of non-quality; and
- Criteria 7: IT Deployment stakes – capacity to master developments in terms of feasibility, cost and schedule.

The scoring method against these criteria is as follows:

- 1 = Most difficult (Highest level of risk);
- 3 = Hard;
- 6 = Medium;
- 9 = Best (Least level of risk); and
- 0 = Not feasible.

6.3.3 Program Execution and Human Resource Input – Assessment Criteria Definition

The Program Execution and Human Resource Input stream is assessed using the following criteria:

- Criteria 1: Availability of French Resources to perform and support the Activities both in France and in Australia ;
- Criteria 2: Availability of Australian Resources to perform the Activities both in France and in Australia including attrition risk;
- Criteria 3: Quality– Ability to perform the task efficiently and to ensure a high standard.

The scoring method against these criteria is as follows:

- 1 = Most difficult (Highest level of risk);
- 3 = Hard;
- 6 = Medium;
- 9 = Best (Least level of risk); and
- 0 = Not feasible.

For each criterion, it is not possible to have an identical level on the same line (i.e. no two options can have the same rating).

s47, s47C, s47G

s47, s47C, s47G

6.3.4 Australian Involvement – Assessment Criteria Definition

The Australian Involvement Input considers that only one criterion exists:

- Criteria 1: Percentage of Hours by Australian – The percentage of hours indicates the exposure the Australians have had to DP4 activities and will directly correlate to the amount of skills transferred.

The scoring method against these criteria is as follows:

- 1 = Most work done by French (Highest level of risk);
- 3 = Balanced – French bias;
- 6 = Balanced – Australian bias;
- 9 = Most work done by Australians; and
- 0 = Not feasible.

For each criterion, it is not possible to have an identical level on the same line (i.e. no two options can have the same rating).

It is noted in the conclusion that this criteria does not assess the ability to maintain this workforce over the duration of the FSP (including batching)

6.3.5 Cost – Assessment Criteria Definition

The initial cost estimate is based on the actual data of all expatriates (French and Australians) on the FSP program. For example if Engineer X moves from Australia to France (or vice versa), Naval Group can easily work out the total difference which includes the salary difference plus the agreed HR package plus all other associated costs (visa costs, social security costs, etc.).

It is noted that there are additional costs which are not included in this comparison (for example if two offices are required in Adelaide and another location), however this method is considered as a good way to approximately compare the cost magnitude of each option. It is

also noted that this cost only focuses on the cost for s47, s47C, s47G s47, s47C, s47G

The costing factors are defined as follows:

- Australian in Australia = 1.0 (baseline cost);
- Australian in France = 2.0 (approximate cost including relocation and expatriate entitlements);
- French in France = 0.8; and
- French in Australia = 2.1 (approximate cost including relocation and expatriate entitlements).

The cost is then defined as the percentage of hours (defined in the Australian Involvement Input), multiplied by the costing factor. The scoring method against these criteria is then as follows:

- 1 = Most expensive;
- 3 = Expensive;
- 6 = Cheap; and
- 9 = Cheapest.

s47, s47C, s47G

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A Acronyms

A

ABL	Allocated Baseline
ABN	Australian Business Number
ACS	Attack Class Submarine
ADA	Australian Design Authority
AICP	Australian Industry Capability Plan
AICS	Australian Industry Capability Strategy
ALBTF	Adelaide Land Based Test Facility
ASC	Australian Shipbuilding Company
ASCRP	Australian Subsidiary Capability Realisation Plan
AU	Arrangement Unit

B

BMS	Business Management System

C

CCP	Contract Change Proposal
CDR	Contractual Data Requirement
CDRL	Contract Data Requirements List
CIDP	Contractor IPDSE Development Plan
CM	Configuration Management
CMR	Critical Manufacturing Review
CoA	Commonwealth of Australia
COC	Conditions of Contract
COS	Construction Order Specification
CS	Combat System
CSI	Combat System Integrator
CSPI	Combat System Physical Integration

D

DA	Design Authority
DAFS	Design Authority for Sustainment (non-arrangement engineers from France)
DDA	Detailed Design Authority
DID	Data Item Description
DMC	Design Mobilisation Contract
DMU	Digital Mock Up
DP	Design Process
DSJF	Design Selection Justification File
DTP	Detailed Training Plan

E

ED	Effective Date
EMP	Engineering Management Plan

F

FoC	First of Class
FSM	Future Submarine
FSP	Future Submarine Program

H

HR	Human Resources

I

ICD	Interface Control Document
ICT	Information and Communication Technology
IDD	Interface Definition Document
IMS	Integrated Master Schedule
IP	Intellectual Property
IPDSE	Integrated Product Development and Support Environment
ITAR	International Traffic In Arms Regulations

L

LMA	Lockheed Martin Australia

M

MBL	Manufacturing Baseline
MSODD	Mission System Operational Description Document
MTP	Master Training Plan

O

ODPP	Output Data Production Plan
OJT	On the Job Training

P

PBL	Product Baseline
PCE	Program Cost Estimate
PLBTF	Platform Land Based Test Facility
PLM	Product Lifecycle Management
PMP	Project Management Plan
PR	Program Review
PSSP	Program Staff/ Skills Profile

R

RMP	Risk Management Plan
ROM	Rough Order of Magnitude
RTO	Registered Training Organisation

S

SDC	Submarine Design Contract
SEMP	Systems Engineering Management Plan
SOW	Statement Of Work
SPA	Strategic Partnering Agreement
SSDD	System/Subsystem Design Description
STW	Setting To Work

T

T&E	Test and Evaluation
TAFE	Technical and Further Education
TCA	Tripartite Co-operative Agreement
TNA	Training Needs Analysis
ToT	Transfer of Technology
ToTP	ToT Plan
ToTS	Transfer of Technology Strategy
TWFOR	ToT Way Forward Options Report

V

V&VP	Verification and Validation Plan

W

WFR	Way Forward Review
WW	Whole Warship

B DID Requirements Traceability Matrix

DID Para	DID Para Title or Description	Cross Reference
	Detailed Design DP4 Phase	
	the objectives of the phase, including the required inputs and the associated outcomes to be achieved	5.1 to 5.4
	a brief description of any sub-phases and the major activities conducted during those sub-phases	5.5
	a detailed schedule for the phase and each sub-phase, using the current IMS as the baseline, but including at least two more levels of detail than shown in the current IMS (except where otherwise agreed by the Commonwealth) and identifying any key linkages with other elements of the FSP (eg, in relation to the implementation of the Contractor-provided ICT and Contractor IPDSE)	5.6
	a summary of the workforce required to conduct both the Detailed Design DP4 Phase and the baseline ToT Program, as derived from the Approved ToT Baseline Data Items (to the extent applicable), including	
	• estimated numbers of personnel required across the phase and each sub-phase, using the same breakdown for the labour categories and skill levels used in the PSSP	Annexes D-G
	• proposed organisational structure, including a summary of the position descriptions for each of the management positions; and	5.8
	• justification for the proposed organisation and personnel numbers, citing similar industry workforces and studies (eg, any comparison with RAND studies or with workforces within the Australian Submarine Corporation (ASC));	5.8
	a summary of the ICT and other significant resources required to carry out the work, including the identification of any elements that may be only available in one location and/or could be a constraint on the design process due to limited availability; and	5.9
	a Rough Order of Magnitude (ROM) price for the baseline program for the phase, as identified in the current IMS and costed in the current PCE	9.2
	ToT Strategy Options	
	The TWFOR shall describe the ToT strategy options in relation to any detailed design work that is not currently programmed to be conducted in Australia (as set out in the Approved ToT Baseline Data Items), including in relation to	
	• the alternative locations and associated timings for conducting the detailed design work for the Whole Warship (e.g, as between France or Australia, or partly in both locations), including the rationale for selecting each of the alternatives; and	6.4 to 6.7
	• a description of the essential characteristics of each of the alternatives	6.4 to 6.7
	The TWFOR shall describe each of the ToT Capability options considered in relation to implementing the Capability to Carry Out Detailed Design and the Design Authority for Sustainment, particularly in relation to the provision of Training (including OJT), including	
	• an overview of the engagement with Australian industry to determine the current capabilities available in Australia to support the conduct of detailed design work and/or the implementation of the ToT Capabilities, including (for example) in relation to Training: ▪ working with ASC and BAE Systems for OJT; and ▪ utilising Technical and Further Education (TAFE) S.A. to deliver Training	5.8.8
	• the methodology used to identify the implementation options considered	6.1

DID Para	DID Para Title or Description	Cross Reference
	a description of each of the implementation options, including: ▪ the location(s) to which the option is applicable; ▪ an overview of the essential characteristics, including in relation to: ◦ the impact on the FSP schedule set out in the latest version of the IMS; and ◦ the number of labour hours of effort and the costs in both Australia and France; ▪ the implications for the option in relation to both Sovereignty and Australian industry content, including an estimate of the Australian content in both hours and costs; ▪ the implications of the option for other elements of the FSP, including in relation to Contractor-provided ICT and the Contractor IPDSE; ▪ the implications of the option for Export Approvals or related considerations; ▪ the implications of the option in relation to the workforce requirements in both Australia and France, including: ◦ the workforce required – by location over time and, for the Australian workforce, identifies the split between the Australian Subsidiary and other Australian suppliers; ◦ a description of the Training to be done – by location and by course / OJT; and ◦ a description of the work to be done by the trained personnel after OJT; and ▪ the benefits, costs (including opportunity costs) and risks associated with the option, which in relation to: ◦ cost, shall be identified against the baseline ROM cost identified in response to clause 11 above; and ◦ risks, shall be analysed in accordance with the Approved RMP, including the identification of any proposed risk treatments and the pre- and post-treatment impacts.	6.4 to 6.7
	Summary and Recommendations	
	The TWFOR shall provide a summary of the findings in tabular format to facilitate ease of comparison	7.
	The TWFOR shall identify the Contractor's recommended ToT strategy options, and shall provide justification for the recommendations	8.
	The TWFOR shall include a roadmap for the delivery of the ToT Capability Plan(s) to be documented in an update to the ToTP in accordance with the SDC SOW	5.8.9 9.3

C Design Activities other than DP4 of the FSM (FGD - [redacted])

DP4 design activities are not the only design activities performed in Australia, other design activities have already started or will start progressively:

- Qualification of Common Technologies;
- system engineering (analysis of the Mission System Operational Description Document (MSODD));
- participation of the development of the Ship Management System (SMS); and
- Detail design (DP4) of the PLBTF;
- Support to the Hull Qualification Section;
- Prototype Combat System raft; and
- This section presents an overview of these activities and their connections with the Submarine DP4 phase.

These activities do not depend on the choice of the option to transfer detailed design to Australia; they will start at the same date s47, s47C, s47G

Some of these activities provide support to the transfer of capability to Naval Group Australia.

C.1 Design activities starting during the Design Contract

The qualification of common technologies, systems engineering and development of the SMS are described in the DC offer and SoW.

C.1.1 Development of the Ship Management System

Naval Group Australia is responsible for some activities for the development of the Ship Management System (SMS) in Australia.

For this activity, Naval group proposed that the work is split between the French team and the Australian one, France remaining the Design Authority. This organisation provides the transfer of the knowledge to Naval Group Australia, needed to become the Sustainment Design Authority of the FSM.

The work starts in CWS1 and will continue during CWS2 and the detailed design phase.

C.1.2 PLBTF

The main ToT activity for the PLBTF is planned to occur in 2021, with the commencement of the Detail Design (DP4) activities in Australia. The current agreed strategy is to employ the services of a third party contractor to carry out the test bench detail design, procurement and installation using an Engineering, Procurement and Construction (EPC) contractor. The building is planned to be available at the end of 2021 and the test bench installation will commence in mid-2022.

In order to ensure this transition to Australia, work to source the EPC contractor commenced in the FS phase. This will continue via the standard approved procurement process (RFI, RFP, RFQ) until late 2020, when the contract will be awarded.

In parallel, NGA will hire a team of five engineers in 2020. It's intended that these people will have combined skill sets in submarine propulsion and electrical engineering, testing & commissioning of electrical installations and project management. This group will be required to spend time in the Naval Group Indret facility, France for the latter half of the DP3 phase of the project and will return to Australia to manage the EPC subcontractor for the remainder of the PLBTF build program, they will then transition into the role of managing the test activities within the PLBTF. It is expected that the entire workforce for the design and build of the PLBTF will be established by the EPC subcontractor and that there is no opportunity to train detailed design arrangement designers on this task as the task is considered a normal industrial activity with no relation to the arrangement of a submarine.

The ICT arrangements related to the PLBTF are currently being developed. At the conclusion of DP3, a Technical Data Package (TDP) will be transferred to NGA with the work undertaken to that point and everything the EPC Contractor needs to commence DP4. The details of the TDP are not fully developed at this time and will depend somewhat on the chosen contracting partner. In terms of technical and data management during DP4, there are many scenarios that can be envisaged, but the final scenario will be dependent on the agreed levels of Design Authority between NG SA and NGA.

Additionally, NGA Technologists are currently providing (and will continue to provide) technical support to the Procurement Team for the sourcing of the critical and main equipment items required for the PLBTF.

Finally, the NGA Engineering Team are providing technical support to the SCY Team for the PLBTF infrastructure activities, when requested.

Overall, the ToT strategy for the PLBTF will see Australian engineers gain hands-on experience in France in the Test Bench design, by being embedded in the Design Team. They will extend and expand this experience and the knowledge transfer throughout the period of the EPC contract in Australia. The knowledge gained by the Australian Technologist Team through the equipment procurement process will be used to supplement the PLBTF Team during this time to ensure the design, installation and commissioning activities in Australia are successful.

It is expected that support from NG SA will be available throughout the PLBTF development phase, including when the integration testing activities are conducted. This will be the form of "back-office" support, including the presence of NG SA experts in Australia at strategic times and an NG SA presence for extended periods if required.

The skills required for the PLTBF comprises:

- a Chief Operating Officer;
- Test leaders;
- Mechanical engineers;
- Electrical engineers;
- Mechanical system manager;
- DGR specialist;
- General Maintenance Specialist;
- General Technicians;
- Electrical & Propulsion manager;
- MEM specialists;
- MSB specialists; and
- Electrical specialists.

It is assumed that there will be about 25 people from the engineering team in the PLBTF. There will be also some support functions and some resources form the production team (about 8 to 10 people).

When the precise agenda and workload of the PLTBF will be known, it will be possible to optimise this team with the rest of the engineering department.

C.1.3 Hull Qualification Section

The Hull Qualification section has initially the following objectives:

- qualify the Australian shipyard to the efficient implementation of the Naval Group building procedures; and
- verify that the Submarine Construction Yard as Build System fits for purpose. This includes testing and checking the complete process from Design data to Production and from Production to Conformity building.

The Hull Qualification section aims at qualifying the Australian Shipyard in the following fields:

- hull and structure field trade (fabricated structure, grinding, oxygen cutting, machining, forming, welding, pre-heating, production inspection, etc.);
- piping field trade (manufacturing, positioning, mounting and welding);
- mechanical field trade (mounting, machining);
- electrical field trade (cable routing, termination and testing); and
- quality Control, Dimensional Control and NDT Inspections.

The objective of this Hull section, beyond the fields above, is to carry out all the Naval Group processes in a nominal way, relying on all the IT tools, industrials means and the Shipyard Organisation which will be implemented for the Design, the Production engineering and the Construction of the 1st FSM.

Therefore, the Hull qualification section is an opportunity to support after a first set of theoretical training sessions and OJT on the following DP4 sub-processes:

- DP4.1 Carrying out the detailed design of solution;
- DP4.2 Conducting the detailed arrangement studies;
- DP4.3 Performing detailed production engineering for solution;
- DP4.4 Defining the general procedures for integration, verification and validation of the solution; and
- DP4.6 Performing detailed production engineering for production in progress.

s47, s47C, s47G

s47, s47C, s47G

C.1.4 Prototype Combat System Rafts

C.1.4.1 Opportunity

The design of the prototype combat system rafts will provide the first opportunity to perform detailed design activities in Australia, even if this will be on a limited scope. According to the present design of the FSM, the scope of work will cover the three combat system rafts.

It is foreseen that a team of about 15 people will start the detailed design of these rafts in Australia in early 2024. This team will be composed of arrangement designers and some structural engineers.

C.1.4.2 References

The following documents define a first workshare between LMA and Naval Group:

- Naval Group Combat System Physical Integration (CSPI) Plan;
- LMA:
  - CSPI Plan;
  - CSI strategy; and
  - V&V strategy.

During the Detailed Design (DP4) Phase, the Technical Data exchanged between Naval Group and LMA will deal with four main topics:

- documents required to perform Installation on rafts and platform, Setting To Work (STW) and pre-delivery maintenance of equipment;
- interface data required to conduct Test and Evaluation (T&E)/Verification and Validation (V&V);
- data to elaborate Sustainment products before FSM delivery to CoA; and
- information related to the management (as example, schedule) of the current and following phases.

C.1.4.3 Objective of the Prototype Combat System raft

The objective of the prototype Combat System (CS) raft is to:

- Provide rafts to LMA to qualify the Combat System and train their personnel before the availability of the rafts for the FoC; and
- Test and qualify the workshare and the methods that will be used for the detailed design, production and test of the first boat.

This means that we will have to qualify the exchange of data needed during the:

- detailed design phase;
- build phase; and
- setting to work and test and trial phases.

s47, s47C, s47G

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s47, s47C, s47G

s47, s47C, s47G

s47, s47C, s47G

s47, s47C, s47G

s47, s47C, s47G

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s47, s47C, s47G

s47, s47C, s47G

Australian Government
Department of Defence

Objective ID: BM7751131

S47F

Naval Group SA
40-42 Rue du Docteur Finlay
75015 Paris
FRANCE

S47F

SEA 1000 FUTURE SUBMARINE PROGRAM – SUBMARINE DESIGN CONTRACT – DELIVERABLES RESPONSE - TOT-130 - TOT WAY FORWARD OPTIONS REPORT - FINAL VERSION

References:

A. Commonwealth Letter titled "SEA1000 Future Submarine Program – Submarine Design Contract– Transfer of Technology – Way forward Review – Mandated System Review – Delay" dated 13 September 2019 (Objective ID: BM9423690)

B. SDC Deliverable Data Item – TOT-130 - ToT Way Forward Options Report - Final version, received 3 September 2019.

C. SEA1000 Future Submarine Program - Submarine Design Contract (Contract No. CASG/FSP/Con9044/2), between the Commonwealth and Naval Group SA, dated 1 March 2019 (Submarine Design Contract). (Objective ID: BM485579)

D. Commonwealth Letter titled "SEA1000 Future Submarine Program – Submarine Design Contract– Contract Change Proposal Request for Core Work Scope 1 (CWS1) – Transfer of Technology Way forward Review CCP" dated 14 July 2019 (Objective ID: BM8539960)

1. As per advice provided at Reference A, the Commonwealth informed Naval Group that accordance with clauses 2.1.1.2 and 2.4 of the Submarine Design Contract (SDC) Statement of Work (SOW), the status of the deliverable ToT-130 Transfer of Technology Way Forward Report (Reference B) is:

Deliverable Data Item	Status
TOT-130 - ToT Way Forward Options Report Final version	s47C, s47G

2. s47C, s47G
s47C, s47G

3. As part of the review of Reference B, the Commonwealth provides Naval Group with comments as detailed at Enclosure 1.

4. The point of contact for this deliverable is S47F

Yours sincerely,

S22

For

C.D. BOURKE
Commodore, Royal Australian Navy
Director General Future Submarine Program
Capability Acquisition and Sustainment Group

Future Submarine Program
PO Box 169
Kilburn North SA 5084

S47F

16 October 2019

Enclosure:

1. Commonwealth comments against TOT-130 - ToT Way Forward Options Report - Final version, dated 17 September 2019.

For Information:

S47F

Naval Group SA
40-42 Rue du Docteur Finlay
75015 Paris, FRANCE

S47F

Naval Group SA
40-42 Rue du Docteur Finlay
75015 Paris, FRANCE

S47F

Naval Group Australia
1 Richmond Road,
Keswick, Australia 5035

Mr John Davis
Naval Group Australia
1 Richmond Road,
Keswick, Australia 5035

~~For Official Use Only~~

Future Submarine Program

Deliverable Data Item Review Comments

CDRL Document Title	TOT-130 - ToT Way Forward Options Report (TWFOR)	**Objective ID (of PDF Deliverable)**	BM9148248
CDRL Version Information	Final version – ToT WFR-20 (CDRL Ref b) - Revision B	**Date Received / Registered**	3 September 2019
CoA Action required	☐ Review ☒ Approval ☐ Non Official Deliverable (NOD)	**Total Review Period (e.g. Working Days (WDs))**	20 Working Days
Review Lead	S47F	**Final Stream Review Date**	27 September 2019
Control Account / Director Approver	S47F	**Commonwealth Approval Timeframe (DGFSP)**	2 Working Days
Overall Rating / Comments	s47C, s47G s47C, s47G	**Final Date for Reply (to be sent to NG/LMA)**	1 October 2019

s47, s47C, s47G

Priority[2]		Total Number of Priority Comments
1	**Highest priority** - must be addressed. Has the potential to provide incorrect direction or guidance.	s47C, s47G
2	**Medium priority** - should be addressed in future updates. If left document may not be incorrect but may be ambiguous.	
O	**Observation** - Typical of typographical and grammatical errors. Should only be addressed when a future update is required or other higher priority comments are being addressed.	

S47, S47C, S47G

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S47, S47C, S47G

S47, S47C, S47G

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S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

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S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

Australian Government
Department of Defence

Objective ID: BM9354397

S47F

Naval Group S.A.
40-42 Rue du Docteur Finlay
75015 Paris,
FRANCE

Dear S47F

SEA 1000 FUTURE SUBMARINE PROGRAM – SUBMARINE DESIGN CONTRACT – TRANSFER OF TECHNOLOGY – WAY FORWARD REVIEW - MANDATED SYSTEM REVIEW - DELAY

References:

A. Naval Group Submarine Design Contract Deliverable Data Item - DID-TOT-TWFOR (TOT-130) - FINAL Transfer of Technology Way Forward Options Report, received 3 September 2019, (Objective ID: BM9146483).

B. Commonwealth Letter titled "SEA1000 Future Submarine Program – Submarine Design Contract– Contract Change Proposal Request for Core Work Scope 1 (CWS1) – Transfer of Technology Way forward Review CCP" dated 14 July 2019 (Objective ID: BM8539960)

C. SEA1000 Future Submarine Program - Submarine Design Contract (Contract No. CASG/FSP/Con9044/2), between the Commonwealth and Naval Group SA, dated 1 March 2019 (**Submarine Design Contract**). (Objective ID: BM485579).

D. Naval Group Letter titled "Australian Future Submarine Program – Submarine Design Contract – Contractor ToT Offer", dated 6 September 2019, Naval Group Reference (COR-2019-703727), Commonwealth Reference (Objective ID: BM9273894)

1. The Commonwealth acknowledges the delivery of ToT-130 Transfer of Technology Way Forward Report (Reference A). The Commonwealth advises that in accordance with clauses 2.1.1.2 and 2.4 of the Submarine Design Contract (SDC) Statement of Work (SOW), the the s47C, s47G

2. s47C, s47G
s47C, s47G

3. The Commonwealth has reviewed Reference A and confirms that it s47C, s47G
s47C, s47G

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s47C, s47G

6. If you have any questions, the Commonwealth point of contact is S47F who can be contacted via S47F

Yours sincerely

S47F

for

C.D. BOURKE
Commodore, Royal Australian Navy
Director General Future Submarine Program
Capability Acquisition and Sustainment Group

Future Submarine Program Office
PO Box 169,
Kilburn North SA 5084

S47F

13 September 2019

For information:

S47F

Naval Group S. A.
40-42 Rue du Docteur Finlay
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75015 Paris,
FRANCE

Mr John Davis
Naval Group Australia
1 Richmond road
Keswick, 5035
AUSTRALIA

S47F

Document 13

From: S47F
Sent: Thursday, 19 September 2019 1:52 PM
To: S47F
Cc:
Subject: RE: Reminder Presentation [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

Thanks guys, it looks great and shame it didn't make it as an attachment within the TWFOR.

My question is why isn't this information, in particular the prerequisites against Vocational education packages, within the report?

It seems the Detailed Design Arranger (DDA) Course could be carried out in Australia leaving just the OJT in France?

Regards

S47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

S47F

Sent: Thursday, 19 September 2019 11:54 AM
S47F

Subject: RE: Reminder Presentation [SEC=UNCLASSIFIED]

S47F

It should be done within a few minutes.

With regards,

S47F

Naval Group, Office: Level 2, 1 Richmond Road, Keswick SA 5035 / PO Box 3065, Rundle Mall SA 5000
S47F

S47F

Date: 19/09/2019 10:21 AM
Subject: RE: Reminder Presentation [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F please let me know when this is uploaded to Govteams?

Regards

S47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

S47F

Sent: Wednesday, 18 September 2019 5:25 PM
S47F

Subject: RE: Reminder Presentation [SEC=UNCLASSIFIED]

S47F

The presentation delivered yesterday via Govteam is the correct one. The prerequisites for arrangers you refer to, was an extract of an excel file and was to illustrate what were the input data used to perform the analysis.
You will receive this prerequisite file and the kinexus report tomorrow through Govteam.

For your information, all this documentation, including the Kinexus report, will be delivered to the CoA through the final Detailed Design TNA.

With regards,

S47F

Naval Group, Office: Level 2, 1 Richmond Road, Keswick SA 5035 / PO Box 3065, Rundle Mall SA 5000
S47F

S47F

Date: 18/09/2019 08:54 AM
Subject: RE: Reminder Presentation [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F thanks for transferring this presentation to me it saved a lot of time formally requesting.

After reviewing the presentation I have noted that this is not the correct version delivered during the meeting and is missing slides. I am particularly referring to the table which had the prerequisites for arrangers / drafters up the top and list of current Australian Qualifications which could deliver against this prerequisite.

Can you please provide this table to me along with the two documents referred to on slide 3 being:

- Drafter Skill Set – Kinexus Workforce Mapping (May 2019), and
- Detailed Drafter Workforce Report (July 2019)

This should all be Forground IP produced by NGA so I don't think there should be a problem.
Regards

S47F
Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

S47F

Sent: Tuesday, 17 September 2019 12:24 PM

S47F

Subject: RE: Reminder Presentation [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

Can you please confirm this presentation will be loaded onto Govteams today?

I need to close this out.

Regards

S47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program

S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group

S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

IMPORTANT: This email remains the property of the Department of Defence. Unauthorised communication and dealing with the information in the email may be a serious criminal offence. If you have received this email in error, you are requested to contact the sender and delete the email immediately.

S47F

Sent: Monday, 16 September 2019 10:06 AM

S47F

Subject: RE: Reminder Presentation [SEC=UNCLASSIFIED]

S47F

S47F has requested the document to be delivered to you via Govteams. It should be available to you soon.

Regards,

S47F

Transfer of Technology Training Manager
Naval Group Australia

Postal: PO Box 3065, Rundle Mall SA 5000
Office: Level 2, 1 Richmond Road, Keswick SA 5035
S47F

W: www.naval-group.com.au

S47F

Date: 16/09/2019 09:34 AM
Subject: RE: Reminder Presentation [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

Can you please give me an update as to when this presentation will be delivered?

I have been told to formally request by letter if it wasn't here today.

Regards

S47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

S47F

Sent: Thursday, 12 September 2019 11:21 AM
S47F

Subject: RE: Reminder Presentation [SEC=UNCLASSIFIED]

UNCLASSIFIED

Correct I still need this presentation.

I do not recall a hard copy version of the document being provided however I do recall NG agreeing to send the presentation to the CoA so we could digest the information.

Regardless the CoA should always be given copies of presentations prior to being presented information, if for nothing else but to store for future program reference, particularly when the work has been paid for by the program and delivered under the program scope.

Regards

S47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

S47F

Sent: Thursday, 12 September 2019 11:12 AM
S47F

Subject: Re: Reminder Presentation [SEC=UNCLASSIFIED]

S47F

I understand the need for the data, however, please note that the presentation was developed from the Kinexus report which we gave to you in hard copy. Actually, the one we gave to you was updated and provides a more accurate and detailed picture of the workforce for DD in the frame of SAME.

with this in mind, do you still have a need for the presentation?

Regards,
S47F

Transfer of Technology Training Manager
Naval Group Australia

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Office: Level 2. 1 Richmond Road. Keswick SA 5035
S47F

W: www.naval-group.com.au

NAVAL GROUP

S47F

Date: 11/09/2019 01:43 PM
Subject: Reminder Presentation [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

Just a reminder we are still waiting for NG to send us the Presentation on the Kinexus presentation presented a few months ago
S47F and NG-A HR to me.

Can you please send this through to me so we can close out this action?

Regards

S47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

S47F

Document 18

From: S47F
Sent: Monday, 21 October 2019 12:05 PM
To: S47F
Subject: FW: EOI authority - Sourcing for design studies [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

S47F

FYI the below.

Is this in relation to getting the SAME data for Australian Industry as requested within the ToT Way Forward, or if not could it?

Regards

S47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

S47F

Sent: Monday, 21 October 2019 8:13 AM
S47F

Subject: FW: EOI authority - Sourcing for design studies [SEC=UNCLASSIFIED]

UNCLASSIFIED

fyi

S47F
Procurement Manager
S47F
Industry Group
Future Submarine Program

Department of Defence | Capability Acquisition and Sustainment Group
S47F

"The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule."

S47F

Sent: Monday, 21 October 2019 8:13 AM
S47F

Subject: RE: EOI authority - Sourcing for design studies [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

Thanks for your email.

Yes, please proceed with the EOI as stated below.

Best Regards,

S47F
Procurement Manager
S47F
Industry Group
Future Submarine Program

Department of Defence | Capability Acquisition and Sustainment Group
S47F

"The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule."

S47F

Sent: Friday, 18 October 2019 7:59 AM
S47F

Subject: EOI authority - Sourcing for design studies

S47F can you provide authorisation to post the following EOI on ICN?

1. Functional studies:
Naval Group Australia will subcontract some discrete engineering activities to support the detailed design phase of the Attack Class Submarine. The subcontractors will support the design of platform systems (cooling, ventilation, hydraulics, electrical distribution, propulsion...) and will have to update electrical or mechanical drawings, database, write justification file, test procedures...

2. Structural studies:
Naval Group Australia will subcontract some discrete engineering activities during the detailed design phase of the Attack Class Submarine. The subcontractors will support the design of some of the submarine's metallic structures (seatings...) and will write justification files, computation reports...

S47F

S47F

Procurement Manager FSM
Naval Group Australia

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Office: Level 2, 1 Richmond Road, Keswick SA 5035
S47F

W: www.naval-group.com.au

S47F

S47F

Date: 17/10/2019 02:02 PM
Subject: Re: Sourcing for design studies

S47F

S47F Could you please use the following EOI descriptions to request the CoA to arrange them to be posted to the ICN Gateway.

1. Functional studies:

Naval Group Australia will subcontract some discrete engineering activities to support the detailed design phase of the Attack Class Submarine. The subcontractors will support the design of platform systems (cooling, ventilation, hydraulics, electrical distribution, propulsion...) and will have to update electrical or mechanical drawings, database, write justification file, test procedures...

2. Structural studies:
Naval Group Australia will subcontract some discrete engineering activities during the detailed design phase of the Attack Class Submarine. The subcontractors will support the design of some of the submarine's metallic structures (seatings...) and will write justification files, computation reports...

Cheers

S47F
Senior Subcontracts Manager FSM – Energy & Propulsion/Technical Services
Naval Group Australia

Postal: PO Box 3065, Rundle Mall SA 5000
Office: Level 2, 1 Richmond Road, Keswick SA 5035
S47F

W: www.naval-group.com.au

S47F

Date: 16/10/2019 03:04 PM
Subject: Re: Sourcing for design studies

S47F

It's OK.

You can proceed on the ICN with the EOI, I'll update the RFI (I have also received some data from France, so I may take some of them into account).

Cheers

S47F
Warsh p Program Director
Naval Group Australia

Postal: PO Box 3065, Rundle Mall SA 5000
Office: Level 2, 1 Richmond Road, Keswick SA 5035
S47F

W: www.naval-group.com.au

S47F

Date: 14/10/2019 03:01 PM
Subject: Re: Sourcing for design studies

S47F

Apologies for the delay in responding.

To ensure that we don't confuse the detailed design contractors with which we are current dealing could you please advise if the following revised EOI descriptions are acceptable:
1. Functional studies:
Naval Group Australia will subcontract some discrete engineering activities to support the detailed design phase of the Attack Class Submarine. The subcontractors will support the design of platform systems (cooling, ventilation, hydraulics, electrical distribution, propulsion...) and will have to update electrical or mechanical drawings, database, write justification file, test procedures...

2. Structural studies:
Naval Group Australia will subcontract some discrete engineering activities during the detailed design phase of the Attack Class Submarine. The subcontractors will support the design of some of the submarine's metallic structures (seatings...) and will write justification files, computation reports...

With your concurrence we will issue the EOI request.

I also propose that the RFI be updated accordingly.

Further should the scope of work and deliverables also include an updated BOM?

Please also advise if the red updates below are acceptable to the RFI:

Work to be done by the supplier and required deliverables

The supplier will be responsible to supply the following:

- The specified work.

- Providing a schedule of activities and oversight of progress

- Managing the configuration of its work

- All calculations, updated drawings, database, design documents and test procedures in the required formats.

Skills

The supplier has to provide evidences that he has the required skills for one or both domains (functional / structure).

The supplier must provide the number of personnel that the company reasonably expects to be available to it to commence the scope of work from Q4 of 2023. The supplier's response should be based on the known personnel available to the company today and assume continuity of service of personnel.

Thank you and happy to discuss.

Cheers

S47F
Senior Subcontracts Manager FSM – Energy & Propulsion/Technical Services
Naval Group Australia

Postal: PO Box 3065, Rundle Mall SA 5000
Office: Level 2, 1 Richmond Road, Keswick SA 5035
S47F

W: www.naval-group.com.au

S47F

Date: 30/09/2019 01:51 PM
Subject: Sourcing for design studies

S47F

Thanks for the meeting this morning.

Here is the draft of the RFI [attachment "100925_RFI for detailed design_0.1_NGA_WW_RFI.docx" deleted by S47F

And my proposals for the EOI

Functional studies:
Naval Group Australia will subcontract some design activities during the detailed design phase of the Attack Class Submarine. The subcontractors will support the design of platform systems (cooling, ventilation, hydraulics, electrical distribution, propulsion...) and will have to update electrical or mechanical drawings, database, write justification file, test procedures...

Structural studies:
Naval Group Australia will subcontract some design activities during the detailed design phase of the Attack Class Submarine. The subcontractors will support the design of some of the submarine's metallic structures (seatings...) and will write justification files, computation reports...

Is it clear enough? Let me know if you need something different.

Cheers

S47F
Warsh p Program Director
Naval Group Australia

Postal: PO Box 3065, Rundle Mall SA 5000
Office: Level 2, 1 Richmond Road, Keswick SA 5035
S47F

S47F

W: www.naval-group.com.au

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S22 Document 19

S22

S22

S47F

Sent: Thursday, 14 November 2019 8:36 PM
S47F

Subject: RE: Invitation : Next steps from last Friday's discussion on ToT Detailed Design (DD) and Design Authority (DA) (13 Nov 14:00 CET) [SEC=UNCLASSIFIED]

UNCLASSIFIED

Thank you S47F

I'm adding other interested parties to the distribution for awareness.

We will receive and consider your letter. Just as a reminder from our discussions yesterday, we will be looking for in the content of your extension request the elements/aspects of the ToT 130 report you plan on strengthening through the extension period. In the end we are seeking an ability to move forward and get to the ToT Way Forward Review (meeting all entrance requirements) taking full advantage of the discussions we have been having in recent weeks which in the ideal will synchronise us. The importance of having a matched view on the way forward on this exceptionally important topic cannot be overstated.

I look forward to your next suggested meeting time (hopefully soon) so we can continue making progress.

Thanks and best regards,

S47F

S47F

Sent: Thursday, November 14, 2019 10:49 AM

S47F

Subject: RE: Invitation : Next steps from last Friday's discussion on ToT Detailed Design (DD) and Design Authority (DA) (13 Nov 14:00 CET) [SEC=UNCLASSIFIED]

S47F

Thank you for your time yesterday, we had another interesting dicussions.

Following the meetings held since the end of October regarding the update of the ToT-130, NG is requesting to the CoA that the revised ToT-130 be delivered on the **December 20th**

Naval Group will send a letter today to ask for this extension.

We understood that the purpose of this email was also to propose the next meeting, we will come back to you on this point as soon as possible because we need further internal discussions.

Regards

S47F

AFS - ToT Delivery Manager

Cherbourg

S47F

www.naval-group.com

S47F

Date : 13/11/2019 09:08
Objet : RE: Invitation : Next steps from last Friday's discussion on ToT Detailed Design (DD) and Design Authority (DA) (13 Nov 14:00 CET) [SEC=UNCLASSIFIED]

S22

S22

S22

Pensez à l'environnement : avez-vous besoin d'imprimer ce message ?
Think about the environment : Do you need to print message ?

S47F

Document 20

From: S47F
Sent: Monday, 6 January 2020 1:59 PM
To: S47F
Subject: FW: TOT WFOR [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

Director – Australian Industry
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule'.

S47F

Sent: Thursday, 24 October 2019 12:48 AM
S47F

Subject: TOT WFOR

S47F

Further to our call today, and further to the discussion which took place also today between S47F , I can confirm you the VTC on Tuesday Oct 29th from 8:00 to 9:00 French time (5:30 pm to 6:30 pm Adelaide time) between Cherbourg and Adelaide on the topic of TOT WFOR.

As we discussed, the objective of this meeting will be

1 - To agree on the answer that Naval Group will send responding to CoA's comment sheet on TOT 130.
The objective is to be able to send you an official letter which will be acceptable by the CoA so that the CoA agrees to hold formally the TOT Way Forward Review.
I plan to send through GovTeam by end of this week a draft of comment sheet with our comments on the items noted 1

During the VTC we would have to focus only on the most critical items.

2 - To agree on the principle S47, S47C which could be shared at the TOT Way Forward Review

3 - To agree on sequencing and scheduling of TOT WFOR review and associated CCP

I send an invitation for this VTC meeting

S47F

Australian Government
Department of Defence

Objective ID: BM10298509

S47F

Naval Group S.A.
40-42 Rue du Docteur Finlay
75015 Paris,
FRANCE

S47F

SEA1000 FUTURE SUBMARINE PROGRAM – SUBMARINE DESIGN CONTRACT - RESPONSE TO LETTER TITLED AUSTRALIAN FUTURE SUBMARINE PROGRAM TOT WAY FORWARD

References:

A. Naval Group letter titled "Australian Future Submarine Program ToT Way Forward", dated 18 October 2019, (COR-2019-704485), (Objective ID: BM10256677)

B. Commonwealth letter titled "SEA1000 Future Submarine Program – Submarine Design Contract – Transfer of Technology – Way Forward Review – Mandated System Review – Delay", dated 13 September 2019, (Objective ID: BM9423690)

C. SEA1000 Future Submarine Program – Submarine Design Contract (Contract No. CASG/SD/Con9044/2), between the Commonwealth and Naval Group SA, dated 1 March 2019 (Objective ID: fAB5458026) (**Submarine Design Contract**)

D. Commonwealth Letter titled "SEA1000 Future Submarine Program – Submarine Design Contract – Deliverables Response – TOT-130 – TOT Way Forward Options Report – Final Version", dated 16 October 2019 (Objective ID: BM7751131)

E. Commonwealth Letter titled "SEA1000 Future Submarine Program – Submarine Design Contract – Contract Change Proposal Request for Core Work Scope 1 (CWS1) – Transfer of Technology Way forward Review CCP" dated 14 July 2019 (Objective ID: BM8539960)

1. Thank-you for your letter at Reference A which requests agreement to the Naval Group proposed way forward for Detailed Design and Design Authority for Sustainment. s47, s47C s47, s47C, s47G

2. As advised at Reference B and in accordance with Reference C, s47, s47C, s47G s47, s47C, s47G

3. The Commonwealth reiterates its decision at Reference D s47, s47C, s47G s47, s47C, s47G

4. At Reference A, Naval Group suggested that agreement to the Contract Change Proposal (CCP) for the ToT WFR is necessary to avoid a significant impact to the Australian engineers currently working in France. During the February SDC negotiations the Commonwealth agreed to fund the Australian engineers sent to France before 31 December 2019 for the period of CWS1 and this is included in the SDC Statement of Work. The Commonwealth remains committed to funding these costs.

S47, S47G

6. In relation to the ICT services, the Commonwealth understands Naval Group's position and is willing to work together to resolve the matter as a matter of priority should s47, s47C, s47G s47

7. s47, s47C, s47G

s47, s47C, s47G

s47, s47C, s47G

Accordingly, the Commonwealth remains willing to provide further clarification and assistance to Naval Group as may be required. Furthermore, it is understood that this issue will be considered by the relevant bilateral governance committee as agreed within in the Strategic Partnering Agreement (SPA) in the near future.

8. If you have any questions, the Commonwealth point of contact is S47F @

Yours sincerely,

S22

For **C.D. BOURKE**
Commodore, Royal Australian Navy
Director General Future Submarine Program
Capability Acquisition and Sustainment Group

Future Submarine Program Office
PO Box 169,
Kilburn North SA 5084

S47F

29 October 2019

For Information:

S47F
Naval Group SA
40-42 Rue du Docteur Finlay
75015 Paris, FRANCE

S47F
Naval Group SA
40-42 Rue du Docteur Finlay
75015 Paris, FRANCE
Mr Gerard Autret
Naval Group Australia
1 Richmond Road,
Keswick, Australia 5035

S47F
Naval Group Australia
1 Richmond Road,
Keswick, Australia 5035

Mr John Davis
Naval Group Australia
1 Richmond Road,
Keswick, Australia 5035

S47F

Document 22

From: S47F
Sent: Monday, 6 January 2020 1:59 PM
To: S47F
Subject: FW: Tr : RE: Tr : TOT WFOR - answer to CoA's comment sheet [SEC=UNCLASSIFIED]
Attachments: ToT-130 - Draft answer to comment sheet V2.docx

UNCLASSIFIED

Best regards,
S47F

S47F
Director – Australian Industry
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule'.

From: S47F
Sent: Saturday, 26 October 2019 3:46 AM
To: S47F
Subject: Tr : RE: Tr : TOT WFOR - answer to CoA's comment sheet [SEC=UNCLASSIFIED]

Hi S47F

A first draft of answer to CoA's comment sheet has been sent S47F

S47F and him have planned a conf call on Monday to have a first analysis so that at our VTC on next Tuesday we can only focus on the main points.

Best regards
S47F

----- S47F ----

De : S47F
A :
Cc :
S47F

Date : 25/10/2019 18:49
Objet : RE: Tr : TOT WFOR - answer to CoA's comment sheet [SEC=UNCLASSIFIED]

Hi S47F

Please find our draft comment sheet answer that has to be analysed during our meeting on Monday. I will join you at 17:00 (7:30 in France)

Regards

NAVAL GROUP

S47F
AFS - ToT Delivery Manager
—
Cherbourg
S47F
www.naval-group.com

De : S47F
A :
Cc :
S47F
Date : 24/10/2019 00:26
Objet : RE: Tr : TOT WFOR - answer to CoA's comment sheet [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F this sounds like a good idea so I will work with s47F today and sort out.

Regards

S47F
Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future

Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

From: S47F
Sent: Thursday, 24 October 2019 1:59 AM
To: S47F
Cc:
S47F
Subject: Tr : TOT WFOR - answer to CoA's comment sheet

Hi S47F

Following this invitation (issued from a discussion between S47F), I asked S47F to be in touch with you to book a VTC either in Dudley or in Keswick, as you prefer.

S47F suggested also to have a preliminary VTC on Monday to identify between us on which topic we should agree on the basis of our proposal and those on which we will have to focuse on Monday. Are you OK ?

Regards

S47F
AFS - ToT Delivery Manager
—
Cherbourg
S47F

www.naval-group.com
----- S47F -----

TOT WFOR - answer to CoA's comment sheet

mar. 29/10/2019 8:00 - 9:00

La participation estpour S47F

Organisateur : S47F

Aucune information sur l'emplacement

Requis : S47F

S47F please book rooms and arrange a VTC between Cherbourg and Adelaide

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47F

Document 23

From: S47F
Sent: Monday, 6 January 2020 2:01 PM
To: S47F
Subject: FW: Tr : TOT WFOR - answer to CoA's comment sheet [SEC=UNCLASSIFIED]

UNCLASSIFIED

Best regards,

S47F

S47F

Director – Australian Industry
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule'.

From: S47F
Sent: Monday, 28 October 2019 3:17 PM
To: S47F
Cc:
S47F

Subject: RE: Tr : TOT WFOR - answer to CoA's comment sheet [SEC=UNCLASSIFIED]

UNCLASSIFIED

Thanks S47F I look forward to discussing this tonight.

I assume that given this response only covers the priority 1 comments that NG accepts the priority 2 comments?

If you have any sticking points with the priority 2 comments I recommend they be addressed prior to delivery of the document otherwise they could become blocking points later.

Regards

S47F
Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

From: S47F
Sent: Saturday, 26 October 2019 3:19 AM
To: S47F
Cc:
S47F
Subject: RE: Tr : TOT WFOR - answer to CoA's comment sheet [SEC=UNCLASSIFIED]

Hi S47F

Please find our draft comment sheet answer that has to be analysed during our meeting on Monday. I will join you at 17:00 (7:30 in France)

Regards

S47F
AFS - ToT Delivery Manager

Cherbourg
S47F

www.naval-group.com

De : S47F
A :
Cc :
S47F
Date : 24/10/2019 00:26
Objet : RE: Tr : TOT WFOR - answer to CoA's comment sheet [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F this sounds like a good idea so I will work with S47F today and sort out.

Regards

S47F
Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

From: S47F
Sent: Thursday, 24 October 2019 1:59 AM
To: S47F
Cc:
S47F
Subject: Tr : TOT WFOR - answer to CoA's comment sheet

Hi S47F

Following this invitation (issued from a discussion between S47F , I asked S47F to be in touch with you to book a VTC either in Dudley or in Keswick, as you prefer.

S47F suggested also to have a preliminary VTC on Monday to identify between us on which topic we should agree on the basis of our proposal and those on which we will have to focuse on Monday. Are you OK ?

Regards

NAVAL GROUP

S47F

AFS - ToT Delivery Manager

—

Cherbourg

S47F

www.naval-group.com

----- S47F -----

TOT WFOR - answer to CoA's comment sheet

mar. 29/10/2019 8:00 - 9:00

La participation estpour S47F

Organisateur : S47F

Aucune information sur l'emplacement

S47F

Requis :

S47F please book rooms and arrange a VTC between Cherbourg and Adelaide

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S47F

Document 24

From: S47F
Sent: Monday, 6 January 2020 2:01 PM
To: S47F
Subject: FW: Tr : TOT WFOR [~~DLM=SENSITIVE~~]
Attachments: ToT-130 - Draft answer to comment sheet V2.docx

~~Sensitive~~

S47F

Director – Australian Industry
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule'.

S47F

Sent: Monday, 28 October 2019 8:02 PM
S47F

Subject: Tr : TOT WFOR

S47F

I confirm our meeting through VTC which will take place tomorrow from 5:30 pm to 6:30 pm Adelaide time (8:00 to 9:00 French time)
Room DP 1L- Conf Rm 3 in Dudley Park
Room Melbourne in Cherbourg HH

As support for item 1 of the meeting, please find attached the draft answer to CoA's Comment Sheet

Further to the preliminary meeting which took place today with S47F appears that we will have to treat in

priority during the meeting our answers to the items 1, 5, 9, 10 and 11 of the Comment Sheet.

Best regards
S47F

S47F

S47F

Date : 23/10/2019 16:18
Objet : TOT WFOR

S47F

Further to our call today, and further to the discussion which took place also today between S47F I can confirm you the VTC on Tuesday Oct 29th from 8:00 to 9:00 French time (5:30 pm to 6:30 pm Adelaide time) between Cherbourg and Adelaide on the topic of TOT WFOR.

As we discussed, the objective of this meeting will be

1 - To agree on the answer that Naval Group will send responding to CoA's comment sheet on TOT 130.
The objective is to be able to send you an official letter which will be acceptable by the CoA so that the CoA agrees to hold formally the TOT Way Forward Review.
I plan to send through GovTeam by end of this week a draft of comment sheet with our comments on the items noted 1
During the VTC we would have to focus only on the most critical items.

2 - To agree on the principle S47, S47C, S47G which could be shared at the TOT Way Forward Review

3 - To agree on sequencing and scheduling of TOT WFOR review and associated CCP

I send an invitation for this VTC meeting

S47F

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S47, S47C, S47G

S22 Document 26

S22

S47F

Sent: Wednesday, 30 October 2019 1:28 PM
S47F

Subject: ToT Way Forward Review [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

During last night's ToT Way forward VTC discussion, it was indicated by NG that the contract requires the updated version of ToT-130 by the 15 Nov 19. This means NG is required to address the CoA comments and release the document for s47, s47C, s47G by the 9 Nov 19 (7 working days from now).

It was agreed during this discussion that there also needs to be a follow-on workshop to review the NG response prior to delivery to the CoA.

Given the remaining work days left to hold this workshop the CoA is open to a request from NG for an extension of time for delivery of ToT-130.

If this is the case NG is requested to formalise this request via a letter.

Regards

S47F

Deputy Mission System Director
Future Submarine Program | SEA 1000

Department of Defence | Capability Acquisition and Sustainment Group
Russell Offices, R2-1-A074 | CANBERRA ACT 2610
S47F

NAVAL GROUP

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PRIORITY	
For information	X
Answer awaited	

Document 27

Naval Group
AFS Program
40-42, rue du Docteur Finlay
75732 PARIS Cedex 15
FRANCE

S47F

Commodore Craig Bourke
Director General Future Submarine Program
Future Submarine Technical Office
PO Box 169
Kilburn North SA 5084
Australia

Cherbourg, 30h of October 2019

O/Ref. : **COR-2019-704677**

Y/Ref. : **[Ref1] CoA Objective ID BM77511131/BM7751132 dated 16/10/2019 -** s47, s47C, s47G **Letter/Comments sheet - TOT-130 - ToT Way Forward Options Report Final version -** s47, s47C, s47G

Subject : **Australian Future Submarine Program**
ToT Way Forward Option Report (ToT-130)

C. A. : **03**

Dear Commodore Bourke,

Following the meeting in relation to the preparation of answer to the Comment Sheet in [Ref1] held between the Parties in Cherbourg on the 29th of October 2019, Contractor has attached in Annex A its answers to the Priority 1 comments.

During the meeting mentioned above, it was decided to organize an intermediate workshop to present a “storyboard” giving more detailed information on how Contractor would respond to the points of [Ref1].

Contractor proposes to organize these workshops in week 45, with one session in Australia and one session in France.

Depending on the outcomes of theses workshops, Contractor may ask for an extension of the date of delivery of updated ToT-130. In such a case, Contractor would send a dedicated letter.

Contractor remains available for any clarifications.

Dispatch note: COR-2019-704677

~~FOR OFFICIAL USE ONLY~~

Yours sincerely,

S47F
AFSP Sovereignty Director
S22

S47F

Enclosures : Answers to the Priority 1 comments

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Dispatch note: COR-2019-704677

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S47, S47C, S47G

~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

S47, S47C, S47G

~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

S47, S47C, S47G

~~FOR OFFICIAL USE ONLY~~

Dispatch note: COR-2019-704677

~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

~~FOR OFFICIAL USE ONLY~~

Dispatch note: COR-2019-704677

~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

S47F

Document 30

From: S47F
Sent: Tuesday, 5 November 2019 3:58 AM
To: S47F
Cc:
Subject: RE: NG DDA Course [SEC=UNCLASSIFIED]

Hi S47F

Thank you for your email. I confirm that the current training program in France is s47C, s47G Within these s47C, s47G there are 3 months of training on general disciplines s47C, s47G
s47C, s47G That's why we consider s47C, s47G training in the TWFOR.

The s47C, s47G will be decomposed as follows:
1°) s47C, s47G
2°)
3°)

The detailed program is s47C, s47G
Plan (further step to TNA according to the process described in the MTP). s47C, s47G
s47C, s47G

s47C, s47G

I hope this explanation allow to clarify

Regards

S47F
AFS - ToT Delivery Manager
—
Cherbourg
S47F
www.naval-group.com

S47F

Date : 01/11/2019 02:15
Objet : NG DDA Course [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hi S47F

I'm just starting to go through the TAFE SA TNA report which was delivered to the CoA today.

Reading through this report I thought it was interesting to note that the TAFE SA analysis of the DDA course in France is that this course could be completed s47C, s47G
s47C, s47G

I think this reinforces my point that the CoA will need proper analysis of the DDA course so we can understand why it exist, s47C, s47G

If we can action many of the recommendations it seems like the training will get students to a very high standard and include submarine specific training. What are your thoughts on this?

2.1.4 Naval Group Arranger Training School

s47C, s47G

Regards

S47F
Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which

will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

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S47F

Document 31

From: S47F
Sent: Monday, 6 January 2020 1:55 PM
To: S47F
Subject: FW: Follow up regarding Detailed Design workshop this week [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

Director – Australian Industry
Future Submarine Program
S47F

S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule'.

S47F

Sent: Wednesday, 6 November 2019 12:39 AM
S47F

I-

wood,

Subject: RE: Follow up regarding Detailed Design workshop this week [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

I would like the synthesis and I need to be involved in what's happening.

S47F

S47F

Sent: Tuesday, November 5, 2019 3:04 PM

S47F

Subject: RE: Follow up regarding Detailed Design workshop this week [SEC=UNCLASSIFIED]

S47F

Thank you for your email.

Further to the meeting we had on Oct 29th, we immediately engaged some discussions with S47F to prepare this elements.

Due to the difficulties with the time difference, we have organized several workshops directly in Adelaide, involving TOT and engineering teams.
A first workshop took place today and a second one is planned on Thursday, with the attendance S47F

My understanding is that the work is progressing well in the direction you recall in your email; a holistic approach of the situation including
- the workload diagrams for E and M level experts
- the global raodmap for building Design Authority in Naval Group Australia
- the global raodmap for involving Australian Industry

I would be pleased to have the opportunity to share with you the synthesis of this work, including the storyboard of the global approach, before end of this week.
I can travel to Cherbourg and propose you a meeting on this topic on Friday morning (for instance from 10h00 to 12h00)
Dos this suit you ?

I also had exchanges S47F and I fully support the ideas they are exploring for solving the issues on CCP, which is the needed contractual complement to what we are working on the operational side

Looking forward to your feedback
S47F

S47F

Date : 05/11/2019 11:13
Objet : Follow up regarding Detailed Design workshop this week [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

I wanted to drop you a note asking status for scheduling the workshop regarding way forward activities on ToT (Detailed Design (DD)). S22

Recall last week on 29th October a group of us met to discuss a Naval Group proposed path forward regarding a constructive approach to DD.

An essential building block of the way forward was amongst other things the workload diagrams that were presented for M and E level experts as it related to DD design and location. I've attached what I have to refresh all on the subject.

We spoke at length regarding not only how to further develop the attached reference, but other material that should be developed and packaged to support a holistic view on the situation.

It was agreed last week that NG would work up a storyboard of the proposed approach taking in the broader view and discuss at a workshop this week. The idea being a holistic view of the path ahead, so, if we put the full measure of effort against the proposal and develop it further, we believe we could reach a satisfying outcome for us.

S22

I look forward to hearing from you and when the earliest opportunity for conducting the workshop is.

Best Regards,

S47F

Mission System Director
Future Submarine Program | SEA 1000

Department of Defence | Capability Acquisition and Sustainment Group
Hughes House | CHERBOURG-EN-COTENTIN
S47F

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S47F

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S47F

Document 32

From: S47F
Sent: Monday, 6 January 2020 1:53 PM
To: S47F
Subject: FW: Next steps from last Friday's discussion on ToT Detailed Design (DD) and Design Authority (DA) [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

Director – Australian Industry
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule'.

S47F

Sent: Wednesday, 13 November 2019 1:18 AM
S47F

Subject: RE: Next steps from last Friday's discussion on ToT Detailed Design (DD) and Design Authority (DA) [SEC=UNCLASSIFIED]

S47F

I totally share your objective to define as soon as possible a mutually agreed path to both an approved TOT130 (enabling to held the TOT WFOR) as well as to a CCP S47C, s47G activities on TOT
S47C, s47G

S22

S47F

S47F

Date : 11/11/2019 11:46
Objet : Next steps from last Friday's discussion on ToT Detailed Design (DD), Design Authority (DA) plus the sound plan for procurement and entrance criteria for SRR [SEC=UNCLASSIFIED]

UNCLASSIFIED

S22

S47F

Thanks for your time and that of S47F Friday. I believe we settled on a follow up mid this week where S47F to develop our discussion points more fully on the storyboard side (bringing whole picture together for ToT, DD and DA). This is an important element of the foundation for a good transition plan like we discussed. There are some additional items which demand our attention as well and I'd like to factor in to our time together this week.

So we are aligned:

- Please develop more thoroughly the total workload discussion we had for Detailed Design – this connects S47, S47C I have already circulated inside the Commonwealth the output of our meeting Friday. I'm also interested for more detail on a transition plan like we discussed. I believe you were motivated, as are we, to put something together as soon as possible and in particular in light of GMSubs discussions at the 23 October Senate Estimates hearing.
- This connects with your desires to request an extension for the re-submit for ToT 130. We should talk at our next meeting this week s47C, s47G s47C, s47G Please be prepared to discuss your intentions for a proposed new due date.
- The two previous points will contribute directly to our ongoing CCP conversation S47F are having in parallel. S47F at minimum to participate via telecom accordingly, S47F obviously at NG's discretion when we schedule our time.
- I'd like to be able to by the end of this week have a mutually agreed path to an approvable ToT 130, and how that path supports meeting the ToT WFR requirements which were meant for September this year. We do need to bring all of this together so we can have a proper transition plan for Detailed Design and Design Authority that can be instantiated by a CCP as previously agreed. It will be a foundation for the remaining execution period S47

S22

S22

S22

S22

S22

S22

S22

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Naval Group
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40-42, rue du Docteur Finlay
75732 PARIS Cedex 15
FRANCE
S47F

Commodore Craig Bourke
Director General Future Submarine Program
Future Submarine Technical Office
PO Box 169
Kilburn North SA 5084
Australia

Cherbourg, 14th of November 2019

O/Ref. : **COR-2019-704677**

Y/Ref. : **[Ref1] CoA Objective ID BM77511131/BM7751132 dated 16/10/2019 - Letter/Comments sheet - TOT-130 - ToT Way Forward Options Report Final version -** s47, s47C, s47G

[Ref2] COR-2019-704677 - Australian Future Submarine Program - ToT Way Forward Option Report (ToT-130)

Subject : **Australian Future Submarine Program**

ToT Way Forward Option Report (ToT-130) – Extension request for the delivery of the next revision

C. A. : **03**

Dear Commodore Bourke,

Following the s47, s47C, s47G
s47, s47C, s47G

Since reception of the comment sheet [Ref1], and in accordance with the Commonwealth's suggestion, Contractor has organized several meetings to present the draft answers to the priority 1 comments in order s47, s47C, s47G

Following the meetings which were held up until 13th November 2019, s47, s47C, s47G
s47, s47C, s47G As such, Contractor will need more time to address the overall picture of the Design Authority in the way it has been clarified by the CoA. All related back-up is detailed in the enclosure in the column "Extension justification" that has been added to the table already delivered with [Ref2]

As a result of the above, Contractor therefore requests that the date of delivery of the next revision of the ToT WFOR be modified from the 15th November to 20th of December 2019.

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Contractor looks forward to the Commonwealth's agreement to the above request and remains available for any clarifications.

Yours sincerely,

S47F
AFSP Sovereignty Director
S22

S47F

~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

~~FOR OFFICIAL USE ONLY~~

Dispatch note: COR-2019-704677

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S47, S47C, S47G

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~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

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Dispatch note: COR-2019-704677

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S47, S47C, S47G

~~FOR OFFICIAL USE ONLY~~

S47, S47C, S47G

S47, S47C, S47G

S47F

Document 34

From: S47F
Sent: Wednesday, 20 November 2019 7:05 PM
To: S47F

Subject: RE: FW: Detailed Design Training [SEC=UNCLASSIFIED]

S47F

Thank you for your email. I can confirm that all opportunities to organize part of DDA training in Australia are planned to be studied by NG.

S22

S47F

Date : 19/11/2019 07:02
Objet : FW: Detailed Design Training [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F

Just a thought for you to consider.

Given the Commonwealth has now committed to using the MIE (Maritime Information Environment) as the IT network for the program, s47C, s47G
s47C, s47G

s47C, s47G

S47, S47C

s47C, s47G

S47, S47C

Thoughts?

Regards

S47F
Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

From: S47F
Sent: Tuesday, 19 November 2019 8:25 PM
To: S47F
Cc:
Subject: Impact CCP on ToT activities

Hi S47F

As discussed today, please find the list of activities initially planned in 2020 (S47 S47 that will not start without CCP:

S47,

ToT Design Authority and Detailed Design

- Pursue the development of the DA and DD transfer of technology through the related ToT Design Plans (following the delivery of the next revision 20D after the WFR)

S47, S47G

Happy to discuss further

Regards

S47F
AFS - ToT Delivery Manager

Cherbourg
S47F

www.naval-group.com

Think about the environment : Do you need to print message ?

S47F

Document 36

From: S47F
Sent: Thursday, 21 November 2019 6:30 PM
To: S47F
Cc:
Subject: RE: Impact CCP on ToT activities [SEC=UNCLASSIFIED]

Hi S47F

Yes it was the very good news from Yesterday ! I'm preparing the CCP berfore leaving France. S22
S22

Regards

S47F
AFS - ToT Delivery Manager

Cherbourg
S47F

www.naval-group.com

De : S47F
A :
Cc :
S47F
Date : 21/11/2019 08:02
Objet : RE: Impact CCP on ToT activities [SEC=UNCLASSIFIED]

UNCLASSIFIED

S47F I believe this has been resolved and I am expecting the CCP next week.

Talk to you soon.

Regards

S47F

Manager – Transfer of Technology
Industry Group
Future Submarine Program
S47F

Australian Department of Defence | Capability Acquisition and Sustainment Group
S47F

'The Future Submarine Program aims to deliver Australia a regionally superior submarine capability, which will be built, operated and sustained with sovereignty. The program therefore seeks to ensure that the Australian industrial capability necessary to support the build, operations and sustainment of the Future Submarine is established. This will involve maximising the involvement of Australian industry in all phases of the Program without unduly compromising capability, cost or schedule.'

From: S47F
Sent: Tuesday, 19 November 2019 7:55 PM
To: S47F
Cc:
S47F

Subject: Impact CCP on ToT activities

Hi S47F

As discussed today, please find the list of activities initially planned in 2020 S47
S47 that will not start without CCP:

S47, S47G **ToT Design Authority and Detailed Design**
- Pursue the development of the DA and DD transfer of technology through the related ToT Design Plans (following the delivery of the next revision 20D after the WFR)
S47, S47G

S47, S47G

Happy to discuss further

Regards

S47F
AFS - ToT Delivery Manager
—
Cherbourg
S47F

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PRIORITY	
For information	X
Answer awaited	

Document 39

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AFS Program
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75732 PARIS Cedex 15
FRANCE

S47F

Commodore Craig Bourke
Director General Future Submarine Program
Future Submarine Technical Office
PO Box 169
Kilburn North SA 5084
Australia

Cherbourg, 19th of December 2019

O/Ref. : **COR-2019-705583**

Y/Ref. : **[Ref 1] DOC-2019-703295 - ToT Workshop of September / October 2019 – Minutes of meeting with CoA in Adelaide**

[Ref 2] DOC-2019-704002 - ToT Workshop of December 2019 – Minutes of meeting with CoA in Adelaide

Subject : **Australian Future Submarine Program**
Content of the next version of Transfer of Technology Plan (ToTP – TOT-120)

C. A. : **08**

Dear Commodore Bourke,

During the ToT meeting held on 30th of September 2019 ([Ref 1] – minutes of the meeting), the contractor presented to CoA the content of the next delivery of the Transfer of Technology Plan (ToT-120). The next version will include the latest version approved of the following ToT capability plans:

S22

As stated during the ToT meeting held on 3rd of December 2019 ([Ref 2] - ToT Workshop of December 2019 – Minutes of meeting with CoA in Adelaide), the ToT Design Plan will be delivered in two parts in the next revision of the Transfer of Technology Plan (ToT-120):

S22

- ToT Detailed Design Plan.

S22

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Originator: Australia

In the next revision, the ToT Detailed Design Plan S22 will be updated accordingly with the outcomes of the ToT WFR.

As the CDRL of the SDC CWS1 specifies, the next revision of the Transfer of Technology Plan (ToT-120) is planned to be delivered 20 working days after the conclusion of the ToT Way Forward Review (not yet scheduled).

Contractor remains available for any further questions.

Yours sincerely,

S47F

AFSP Sovereignty & Procurement Program Director

S22

S47F

Originator: Australia