MATURE EXPERIENCED ENGINEERS PATHWAY TO CHARTERED STATUS (MEEP)

GUIDELINES

To be eligible for the Mature Experience Engineers Pathway to Chartered Status you MUST:

- Be a member of Engineers Australia - which confirms that Stage 1 academic competency standards have been met;
- Have 15 + years of engineering experience that includes 5 years employment in position(s) of major responsibility in the design or execution of important engineering work; and
- Be able to produce a record of 150 hours of Continuing Professional Development (CPD) during the past three year period - in accordance with Engineers Australia CPD Guidelines.

Applicants that do not meet the entry requirements for the mature experienced engineers pathway are encouraged to apply for Chartered Status as per the process outlined in the *Chartered Status Handbook.*

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Method of Application

Eligible mature experienced engineers must submit a written request to the National Assessor in order to be allowed to submit an application for Chartered Status through the Mature Experienced Engineers Pathway. This request must include the applicant's membership number, a current CV of not less than 3 pages providing satisfactory evidence of the eligibility of the applicant to undertake this pathway and evidence of not less than 150 hours of appropriate CPD in the last 3 years.

Upon receiving written approval from the National Assessor, the applicant shall prepare and submit a Statement of Experience instead of the full Engineering Practice Report normally required. The Statement of Experience is to be approximately 2500 words in length and shall clearly describe:

- the applicant's personal contribution and responsibilities;
- the problems the applicant faced;
- the solutions the applicant found;
- the engineering judgments the applicant made; and
- the impact the applicant's solutions and judgments generated.

The Statement of Experience must demonstrate the applicant's achievements in respect of all of the Elements of the three compulsory Units and the required number of Elements of two elective Units of the Stage 2 Engineering Competencies. The Statement of Experience must show where competency elements are demonstrated by annotation in the right hand margin, as per the attached example.

Statements of Experience are to be verified by a senior experienced engineer (preferably a Chartered Engineer from at least the same occupational category as the applicant seeking Chartered Status). Verifiers must attest that they are familiar with the work the applicant has written about and the contributions they have made. In some instances this may not be possible and a Statutory Declaration is required in lieu of the attestation (refer to the Chartered Status page on the website www.engineersaustralia.org.au). In addition to the Statement of Experience, the applicant is to provide their current CV of not less than 3 pages, evidence of not less than 150 hours of appropriate CPD activity over the last three years as well as a completed Chartered Status Application Form together with assessment fee and registration fee as applicable.

Professional Interview

If the Assessor is satisfied that the applicant meets the entry requirements above, and has provided evidence of competency that meets the Engineers Australia Stage 2 Competency Standards, the applicant may proceed to a Professional Interview. This is a mandatory stage in the process. It is designed to ensure that the applicant's experience and responsibility has equipped the applicant to demonstrate the expected competency and commitment to ethical practice required for Chartered Status (CPEng, CEngT or CEngO).

EXAMPLE STATEMENT OF EXPERIENCE

Career Episode Title: Combat Systems Engineering Manager Dates of Career Episode: January 2002 to April 2004	Competency Element Claimed
Background: The FFG Upgrade Project (FFG UP) is a $1 billion contract being undertaken by ADI Limited to upgrade the Royal Australian Navy's (RAN's) Guided Missile Frigates (FFGs). In January 2002 ADI and its subcontractor, Lockheed Martin, agreed to transition the roles of Combat System Design Authority and Combat System Integrator to ADI Limited for the completion of the contract. I was assigned responsibility for these tasks in January 2002 and commenced the development of a new team with the capability to complete the Combat System design and integration. By May 2003, the Combat System Engineering Team (CSET) had been established with 25-30 direct professional engineering staff to undertake system level design and to complete the execution of Combat System integration and test activities. As leader of this team I exerted technical control and Design Authority responsibility over the work of five Integrated Product Teams that delivered hardware and software products for the Combat System. I led the re-architecture of the Command and Control component of the Combat System to overcome residual design issues with the inherited software design and achieved significant customer buy-in. This activity culminated in the successful completion of a Critical Design Review in April 2003 followed by the Preliminary Design Review for associated shore based combat system variants in July 2003.	E1B.1 Develops Project Integration
Episodes: In late 2001, the Combat System faced some technical challenges. I commenced addressing these issues by writing a white paper that investigated a change in the Combat System architecture that could overcome both the expected technical difficulties in integration and the programmatic difficulties being experienced. I proposed a re-architecture of the central element of the Combat System – the Command and Control System (C2) and the plan for its development. This re-architecture solved the following issues:	C1.3 Integrates Engineering with Other Professional Input
• Relieved interface bottlenecks where large volumes of track data would need to be exchanged • Removed the need for large numbers of CMS2 (an old computer programming language) programmers. Program to be done in Java and C++ with large productivity gains. • Moved a large amount of software development work from the US to ADI's own software development group where the work could be more effectively controlled and take advantage of Australian staffs lower cost.	C1.4 Develops Engineering Solutions
As the white paper developed, I used it as the basis to consult with the software development group to ensure that the most effective use was being made of existing and new software development technology.	C2.2 Prepares Concept Proposal and seeks advice on latest Technology
I distributed the white paper to a number of peers to confirm my conclusions of technical feasibility. Once it was agreed that the approach was technically feasible and indeed more desirable than the project's extant course of action, I began to flesh out the details of the implementation plan. As the plan matured, I worked with the program manager and we commenced activities to transfer the scope of work from the subcontracted design authority back to ADI and to brief the customer on our proposed change of architecture and the associated impacts and benefits resulting to the overall program.	E1B.2 Scopes the Project
Ultimately I won technical support and contributed to the winning of program support from the customer and we gained agreement from our subcontractor to transfer scope.	

Career Episode Title: Combat Systems Engineering Manager Dates of Career Episode: January 2002 to April 2004	Competency Element Claimed
One condition of the customer on the change in project plan was that ADI submit itself to a competence and process audit by DMO/DSTO. I lead the ADI side of the audit that dealt with the Combat System architecture and its method of integration. The conclusions of the audit team confirmed the feasibility of my technical proposal. I also supported other aspects of the audit including: • assessment of technical competencies of our team; and • a definition of the systems engineering processes that I planned to use. The latter were reviewed by means of a quick look process audit using the CMMI model. The outcome of the audit was positive for ADI to continue.	E3.3 Defines Processes to prepare Materials/ Components/ Systems for use in the Project/ Operation
At this point I was ready to commence my new role leading the re-architecture of the Combat System as Combat System Design Authority (CSDA). The first main task was to ensure that all the information and work products that our subcontractor had produced to date was identified, captured and reviewed. I sent a team of our staff to the USA for two weeks to work with our subcontractor to undertake a thorough cataloging and technical understanding of the legacy data set. This data was transferred back to Australia where we placed it under Configuration Management and made it available for myself and my staff to review and utilise.	C3.6 Manages Information
Hiring and development of the Combat Systems Engineering Team Forming the team to undertake the design work for the Combat System was my next major challenge. Within the existing project team we had several senior engineers with Combat System design experience. In general they were not working in a purely technical field but were working in project management roles. Given the relative scarcity of combat system engineers, I encouraged several of these experienced engineers to undertake a role in the design area. I convinced Program Management that it was easier to hire project managers to continue the work of managing our subcontractors, than it would be to find experienced combat systems engineers. By May 2003, the Combat System Engineering Team (CSET) had been established with 25-30 direct professional engineering staff to undertake system level design and integration and test activities. On the job and formal training was conducted to boost the effectiveness of this team.	E1B.3 Manages People
The re-architecture design progressed in earnest in 2003 under my leadership. Overall system architecture principles were set guide the design process: a) Simplify the C2 architecture - if it can be readily understood, it will be easier to develop, integrate, test and maintain. Latencies will be reduced and capacities and performance improved. b) Clearly separate fire control/weapon control functions from sensor control, picture compilation and command and decision functions - keep "like" with "like" and reduce unnecessary interactions for safety related functions. c) Create redundancy of basic data paths to enable independence of operation for subsystems/components. Provide a more fault tolerant system for the end user and simplified, independent paths for system integration. I introduced standard methods and tools for defining the Combat System architecture including functional flow block diagrams for functional analysis, system breakdown structures, interface identification and design and the development of requirements for new subsystems and components. I planned to complete the design and implement the final system in three distinct phases or “Baseline Builds”. The Builds were planned by first identifying the minimum set of deliverable functionality for the system and calling this Baseline Build 1. The subsequent builds were defined by prioritising the remaining contracted	C2.3 Implements Planning and Design Process

Career Episode Title: Combat Systems Engineering Manager Dates of Career Episode: January 2002 to April 2004	Competency Element Claimed
functionality balancing both customer priorities and technical risk. I planned the integration approach for each Baseline Build. The approach centred around providing a realistic Land Based Test Site on which software developers could execute their software (and in particular exercise its interfaces to other software components) as early as possible in the development cycle. This approach reveals system design and interface design errors and ambiguities early before more expensive formal testing is conducted. The integration schedule balanced the use of the physical resources in the laboratory between all the development contractors and also allowed use for the development of training material. I worked with project schedulers, Cost Account Managers and software development subcontractors to define implementation schedules for the above plans. These schedules formed the basis of a replan under the Cost Schedule Control System.	C3.4 Plans and manages work priorities and resources
The most critical early design task was to elicit the requirements for the legacy command system that would be replaced. This was necessary since ADI was contracted to provide no less functionality than the pre-upgraded FFGs. I established a process whereby I lead a series of 4 workshops that involved the customer (representing both operational and technical knowledge of the pre-upgrade command system), my team (as the system design authority) and the principal software development subcontractor (who would implement the requirements we were defining). The workshops established a baseline set of legacy requirements that were agreed with the customer and understood by the system designer and software developer.	C2.1 Interprets and scopes design requirements E3.1 Determines engineering requirements
With these requirements as a baseline and the contract specifications largely representing the additional upgrade requirements I lead my team in conducting functional analysis, definition of physical and interface design, and requirements development for the developmental subsystems. I introduced the system engineering tool, CORE, to support this process. The Combat System design was captured as a functional and physical model in CORE. All design issues and design decisions were also captured in this tool. CORE then provided as standard outputs the design documents required by the contract – in particular a System/Subsystem Design Description (a document of over 2000 pages for a system of this size and complexity).	C2.5 Prepares and maintains Documentation during the Design Process E3.2 Designs/ Develops Materials/ Components/ Systems
In addition to the design documents, the design process and tool also output the specifications for the Command and Control System and in particular the software requirements specification for its software. I convened a new series of workshops involving the customer and the software developer to review the draft version of these specifications before they were baseline for formal technical review. This built on the customer and software developer relationships established by previous set of workshops that elicited the customer baseline requirements. It maintained support for the developing design and reduced the risk of errors or ambiguities being propagated to the developer.	C3.5 Maintains customer focus and relationships with clients/stakeholders/suppliers/regulators
I led the design team in conducting a formal Critical Design Review (CDR) for the Combat System and the Command and Control System. The design and the plans for completing integration and verification were presented to the ADI Design Authority for the project and to the Commonwealth's Project Authority. Issues raised were dealt with during the conduct of the review meeting, actions taken where appropriate and a final report produced that presented the outcomes of the review including the closure of all action items. The culmination of this review signaled the acceptance of the systems detailed design.	C2.4 Reviews the design to Achieve Acceptance
Soon after the CDR, I also took on new responsibilities as the System Safety Manager	C1.5 Identifies

Career Episode Title: Combat Systems Engineering Manager Dates of Career Episode: January 2002 to April 2004	Competency Element Claimed
for the project. A lot of work had gone before, but this needed review and a restructuring of the plans to assure the safety analysis tasks were completed. I instituted a systematic review of the identified system hazards which encompassed hazards likely during construction (OH&S related issues), hazardous materials, test and trial hazards, and eventual hazards likely to occur during operation and maintenance of the upgraded FFG. New hazards were also identified and analysed under this process. Some of the hazards analysed provided new constraints to the upgrade design. An example was the need to provide positive controls (key locks) for all ordnance firing circuits. An item of off the shelf equipment for firing chaff decoys had a simple circlip arrangement to prevent inadvertent but not unauthorised firing. The associated hazard was used as the rationale to raise a Engineering Change Proposal that led to the redesign of the firing switch to use an appropriate keying arrangement. With my team, the requirements of each component of the Combat System were tightly managed. All components were subjected to Factory Acceptance Tests by the subcontractor to verify the requirements prior to our acceptance of these components and subsequent use in the overall system. My team witnessed these tests and raised problem reports and non-conformances to my attention. Problem reports were prioritised, rectification plans put in place and decisions made as to whether to continue to use the component for further system integration work or to wait until rectification of the problem had occurred.	constraints on Potential Engineering Solutions E1B.5 Manages quality, safety, environment and risk E3.4 Manages the Uses of Materials/Components/Systems within the Project/Operation
Signature of Candidate:	
Candidate's Verifier/s **Name:** Engineering Qualifications: (or Engineers Australia Membership Number): I verify that the above narrative is a true account of the candidates own work **Signature:**	

Career Episode Title: Professional Career Development Dates of Career Episode: December 1987 to Present	Competency Element Claimed
Background: This CER overviews my development as a professional engineer and the continuing professional development I have undertaken during my career. This CER addresses competency elements not readily claimed in other CERs.	
I have gained 17 years of experience as a professional engineer. I have represented my employers to their clients, partners and subcontractors both in Australia and extensively overseas. Both internal and external stakeholders have acknowledged me for my engineering professionalism and integrity. I have participated in the activities of professional bodies in particular Engineers Australia, IEEE and the Systems Engineering Society of Australia (SESA). I have presented papers at the annual conference of SESA in both 2003 and 2004 (refer to Publications on my CV).	C1.1 Presents and Develops a Professional Image
I have pursued both formal tertiary training and informal professional development training in order to improve both my engineering and non-engineering knowledge. I graduated with a BE in Electrical Engineering in 1987 after holding cadetship with Telecom Australia. I undertook postgraduate study part-time at the University of NSW culminating in the award of a MEngSci. in 1992 majoring in Communications. I undertook a distance education course with APESMA/Deakin University being awarded a Master of Business Administration (Technology Management) in 2001. Details of the professional memberships that I hold and the other professional development courses I have undertaken are included in my CV.	C1.2 Pursues Continuing Professional Development
I utilise my work time effectively by maintaining project and personal schedules, meeting calendars and prioritised action item lists. Any issues that prevent the completion of tasks to previously made commitments are communicated to affected stakeholders and changes are negotiated with them.	C3.1 Manages Self
I communicate regularly with customers using telephone and e-mail. Formal review and progress meetings are also an often used communication medium that I use for dialogue with customers. I communicate with my team by regular progress meetings and management by walking around. I also use workshops to facilitate team tasks and find these an effective means of coaching junior staff. Currently I train and mentor staff in the domain of systems engineering across the company.	C3.2 Works Effectively with people
In 2004, ADI initiated a culture change program titled Setting New Standards. I am a lead contributor to this program and have promoted initiatives in: • Professional development of our engineering and technical staff, • Safety in design, and • Process improvement for systems engineering and integration.	C3.3 Facilitates and capitalises on change and innovation
Signature of Candidate:	
Candidate's Verifier/s **Name:** Engineering Qualifications: (or Engineers Australia Membership Number): I verify that the above narrative is a true account of the candidates own work **Signature:**	

Career Episode Title: Hydrographic Ship Test and Trials Dates of Career Episode: January 1999 to June 2000	Competency Element Claimed
Background: As Senior System Design Engineer and later as Engineering Manager, I was primarily responsible for completion of the design, integration, test and evaluation of the Hydrographic Survey System for the RAN's Hydrographic Ships. This involved the integration of largely COTS hydro-acoustic sensors, navigation systems, survey acquisition and control systems, and data management and processing systems. Significant effort was involved in the integration and test of COTS and developmental software elements of the control, data management and data processing sub-systems. I undertook the lead engineering management role in the completion of the Hydrographic Ship Project, its validation and acceptance by the RAN Hydrographic Service.	
I lead the sea acceptance trials of the Hydrographic Survey System. The trials consisted of detailed technical performance verification trials over a series of months. During these trials the end users of the system were being trained in the operation of the system components. At the completion of these trials, I participated in a Hydrographic Survey Demonstration Cruise. This was a validation activity, led by the end user and supported by contractors. It validated the operational employment of the survey system over a 20 day at-sea period in realistic survey conditions. I led the subcontractor effort to support this. I maintained a log of system defects encountered on the cruise and a separate log of operator feedback that related to the usability and performance of the system. I later reviewed these logs with the procurement authority to agree repairs and design changes that would be conducted under warranty and those that were to be proposed as design enhancements outside the scope of the contract. The Cruise was deemed successful and the ship, HMAS Leeuwin, was commissioned by the RAN shortly afterwards. This marked the completion of the design and construction contract.	C2.6 Validates Design E1B.8 Finalises the Project
Signature of Candidate:	
Candidate's Verifier/s **Name:** Engineering Qualifications: (or Engineers Australia Membership Number): I verify that the above narrative is a true account of the candidates own work **Signature:**	

STAGE 2 COMPETENCY UNITS AND ELEMENTS
COMPULSORY UNITS AND THEIR RESPECTIVE ELEMENTS

When applying for Chartered Status and registration on the National Professional Engineers Register/National Engineering Technologists Register you need to address the following three Compulsory Units of Competency (UNIT C1, C2, C3). **Note that all seventeen [17] Elements within the Units must be addressed.**

UNIT C1 ENGINEERING PRACTICE Self-Assessment			
ELEMENTS:			
C1.1	Presents and Develops a Professional Image	YES	NO
C1.2	Pursues Continuing Professional Development	YES	NO
C1.3	Integrates Engineering with Other Professional Input	YES	NO
C1.4	Develops Engineering Solutions	YES	NO
C1.5	Identifies constraints on Potential Engineering Solutions	YES	NO

UNIT C2 ENGINEERING PLANNING AND DESIGN Self-Assessment			
ELEMENTS:			
C2.1	Interprets and scopes design requirements	YES	NO
C2.2	Prepares Concept Proposal and seeks advice on latest Technology	YES	NO
C2.3	Implements Planning and Design Process	YES	NO
C2.4	Reviews the design to Achieve Acceptance	YES	NO
C2.5	Prepares and maintains Documentation during the Design Process	YES	NO
C2.6	Validates Design	YES	NO

UNIT C3 SELF MANAGEMENT IN THE ENGINEERING WORKPLACE Self-Assessment			
ELEMENTS:			
C3.1	Manages Self	YES	NO
C3.2	Works Effectively with people	YES	NO
C3.3	Facilitates and capitalises on change and innovation	YES	NO
C3.4	Plans and manages work priorities and resources	YES	NO
C3.5	Maintains customer focus and relationships with clients/stakeholders/suppliers/regulators	YES	NO
C3.6	Manages Information	YES	NO

Plus **ELECTIVE UNITS AND THEIR RESPECTIVE ELEMENTS**
You need to address two of the ten Elective Units and the specified number of Elements stipulated within the Units.

UNIT E1B ENGINEERING PROJECT MANAGEMENT Self-Assessment			
ELEMENTS: AT LEAST FIVE ELEMENTS MUST BE ADDRESSED FROM THE FOLLOWING:			
E1B.1	Develops Project Integration	YES	NO
E1B.2	Scopes the Project	YES	NO
E1B.3	Manages People	YES	NO
E1B.4	Manages the Physical Resources within the Project	YES	NO
E1B.5	Manages quality, safety, environment and risk	YES	NO
E1B.6	Manages cost and procurement	YES	NO
E1B.7	Manages time and progress	YES	NO
E1B.8	Finalises the Project	YES	NO

UNIT E3 MATERIALS/COMPONENTS/SYSTEMS Self-Assessment			
ELEMENTS: ELEMENTS E3.1, E3.2 AND AT LEAST TWO OTHER ELEMENTS MUST BE ADDRESSED FROM THE FOLLOWING:			
E3.1	Determines engineering requirements	YES	NO
E3.2	Designs/Develops Materials/Components/Systems	YES	NO
E3.3	Defines Processes to prepare Materials/Components/Systems for use in the Project/Operation	YES	NO
E3.4	Manages the Uses of Materials/Components/Systems within the Project/Operation	YES	NO
E3.5	Manages the Recovery Reuse and Disposal of Materials/Components/Systems	YES	NO