



Ministry
of Defence



DE&S functional competence framework

Engineering

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EFCE 1 - Improve Engineering Capability

Explores innovative opportunities and exploit emerging technology to develop, sustain and enhance Defence capability

Level	Descriptors
Authority	<ul style="list-style-type: none"> • Applies world-class technical expertise to the sustainment and improvement of Defence capabilities through-life • Sets strategic direction for technology development, research and standards • Improves engineering performance across Defence by applying market intelligence, knowledge of technological developments and Defence priorities • Influences and facilitates the advancement of research both within Defence and from an industry perspective • Drives capability and skill improvements by leveraging networks within MoD, OGDs, industry, academia and allied nations
Expert	<ul style="list-style-type: none"> • Develops and delivers complex / novel technical approaches to improving and sustaining Defence capabilities through-life • Identifies constraints and exploits opportunities for the development and transfer of technology within a cross-disciplinary environment • Builds and utilises Defence knowledge base by setting, publishing and advising on technology management strategies / plans • Leads high profile technology demonstration programmes including market research, product / process development and experimentation / feasibility studies • Applies technical expertise to inform research and technology development objectives
Practitioner	<ul style="list-style-type: none"> • Independently applies technical knowledge to the sustainment and improvement of Defence capabilities through-life • Acts as a subject lead providing context advice and guidance throughout the technology development process • Independently drafts technical standards for equipment and services • Takes responsibility for technology development activity and is able to find appropriate solutions to technical challenges • Identifies and delivers significant technical improvements to Defence capabilities through-life
Supervised Practitioner	<ul style="list-style-type: none"> • Contributes to the technical aspects of sustaining and improving Defence capabilities through-life • Demonstrates creative and innovative thinking to find solutions to technical challenges • Contributes to the development of engineering standards and processes • Interprets and implements technology management strategies / plans • Takes responsibility for specific engineering activities as part of wider technology demonstration programmes, experiments and feasibility studies

Awareness

- Provides technical support to complex engineering activities across the system or engineering lifecycle
- Conducts routine tasks supporting engineering activities with guidance and supervision
- Recognises when to seek technical support and can readily identify the appropriate source of information or advice
- Engages with specialist leads to gain technical information / knowledge to develop their understanding
- Actively seeks professional development opportunities to understand new engineering standards, practices, techniques and methodologies

EFCF 2 - Application of Analytical Techniques

Applies systems thinking and analytical techniques to refine the approach, achieve intended outcomes and challenge assumptions

Level	Descriptors
Authority	<ul style="list-style-type: none"> • Provides leadership and guidance across Defence for the application of systems thinking and analytical techniques • Provides strategic direction to improve approaches taken to support technical arguments, conclusions and decision-making • Recognised and sought out across Defence for advice on analysis to underpin major technical decisions • Takes a holistic / strategic approach to deliver the best technical outcomes across multiple projects / programmes • Develops and applies novel / complex analytical and systems thinking techniques to major technical problems
Expert	<ul style="list-style-type: none"> • Acts as a system, sub-system or technical service lead and provides guidance and direction to stakeholder groups • Draws on extensive experience to identify effective analysis approaches and sources of information required to respond to requests for review and technical guidance • Applies a wide range of analytical engineering techniques and a systems approach to challenge assumptions and achieve optimum holistic outcomes • Develops improved applications of methods to engineering practices and shares these with peers • Develops others in the application of systems thinking and analytical techniques
Practitioner	<ul style="list-style-type: none"> • Applies appropriate engineering practices and technical methodologies based on the technical context and the level of risk and complexity • Confidently uses a wide range of technical data and analyses to inform decision-making • Secures the best holistic outcome with complete understanding of the technical context for the project / programme being delivered • Supports and guides others in using appropriate systems thinking and engineering analysis techniques to challenge and refine assumptions • Supports and guides others in identifying and managing technical dependencies
Supervised Practitioner	<ul style="list-style-type: none"> • Considers and ensures understanding of the technical assumptions and dependencies that affect their area of work • Applies suitable analytical methods, probability and statistics to conduct routine engineering activities • Recognises and communicates implications of technical decisions on other systems including interoperability with legacy assets • Seeks expert guidance for application of complex technical analysis techniques • Maintains knowledge of current systems thinking practices, analytical techniques and technical methodologies

Awareness

- Applies technical knowledge to describe the engineering context of their area of work
- Assists in the identification of dependencies and interfaces with other systems and legacy assets under supervision
- Applies routine technical analysis techniques to draw conclusions from various data sets
- Challenges technical assumptions to identify improvement opportunities
- Identifies information and data sources relevant to technical decision-making

EFCF 3 - Technical Requirements, Evaluation and Acceptance

Develops well-formed requirements and evaluates technical solutions against verified acceptance criteria whilst promoting best practice

Level	Descriptors
Authority	<ul style="list-style-type: none"> • Develops and delivers Defence policy and guidance for management of technical requirements, evaluation and acceptance\ • Identifies and communicates technical best practice across Defence to inform requirements development • Advises others in generating and managing complex technical requirements across Defence projects / programmes • Applies world-class technical expertise to derive requirements and conduct test and evaluation for Defence's most technically challenging projects / programmes • Uses national and international networks to future-proof requirements generation and evaluation techniques
Expert	<ul style="list-style-type: none"> • Develops the technical content of Defence and international standards for Defence capabilities to inform requirement setting, evaluation and acceptance criteria • Develops requirements that reflect a range of factors for engineering products, processes, systems and services • Defines and applies technical acceptance criteria to major decision-making for Defence's projects / programmes • Takes a responsible role during major technical tender assessments, high complexity technical scrutiny & approvals • Supports and guides others in shaping requirements and articulating acceptance criteria
Practitioner	<ul style="list-style-type: none"> • Determines stakeholder needs and translates them into comprehensive technical requirements • Explains technical requirements in a level of depth that is appropriate for the audience • Ensures that requirements are formally captured, structured and that configuration control is established • Develops clear acceptance criteria for equipment / services and can competently evaluate engineering and safety products against the criteria developed • Evaluates technical options in a way that considers the appropriate level of detail, wider impacts and available technology
Supervised Practitioner	<ul style="list-style-type: none"> • Interprets and applies appropriate Defence and international standards • Develops low complexity requirements, test plans and acceptance criteria • Contributes to the development of requirements as a specialist for part of a system • Provides test and evaluation recommendations to decision makers in their area of work • Can explain the derivation of the requirements and evaluation criteria in their area of work

Awareness

- Follows defined approaches to capture, structure and manage requirements
- Can explain the need for well-formed requirements and the principles of requirements management
- Contributes to the development and documentation of a requirement set
- Can explain the role of requirements in validating and verifying a solution
- Seeks expert advice in the derivation of requirements and application of Defence and international standards

EFCF 4 - Technical Decision Making

Applies technical expertise and uses available evidence to make informed technical decisions on complex issues, whilst demonstrating engineering integrity

Level	Descriptors
Authority	<ul style="list-style-type: none"> • Provides technical leadership for making strategic, complex and challenging decisions for Defence • Is recognised and sought out both internally and externally for professional judgement on major technical decisions • Leads the assessment, assurance and challenge of major technical decisions for Defence • Guides others on the inter-relationships between major technical decisions and in identifying and managing complex unintended outcomes • Researches and writes articles for publication in technical journals (both internal and external) as a recognised lead authority in their field of expertise
Expert	<ul style="list-style-type: none"> • Sets strategic priorities and provides oversight on technical decisions made in a range of projects / programmes • Applies technical judgement to make clear decisions regarding complex and / or sensitive issues or materials • Makes independent, critical technical decisions and assurances based on relevant evidence, a broad view of the strategic direction of Defence, ethics and technical knowledge • Demonstrates a comprehensive understanding of technology, system and integration readiness in technical decision-making • Advises others in planning and implementing responses to diagnosed technical issues
Practitioner	<ul style="list-style-type: none"> • Selects a justifiable decision-making approach that is appropriate to the nature of the decision being made • Demonstrates engineering integrity in technical decision-making and can effectively communicate concerns to all stakeholders • Ensures relevant evidence and experiences are used to make timely decisions regarding operational risks and possible technical solutions • Makes well-informed technical trade-off decisions and advises others whilst demonstrating a full understanding of the capability consequences • Uses relevant processes, knowledge of specific regulatory requirements, tools and techniques to make technical decisions
Supervised Practitioner	<ul style="list-style-type: none"> • Identifies appropriate sources of evidence to inform technical decision making • Makes technical judgement calls when appropriate but identifies personal limitations and appropriately defers • Keeps records of technical decisions made and the decision-making approach • Seeks input from a range of sources (including relevant technical LFE) before making technical decisions • Adheres to the Code of Conduct of the relevant Professional Body

Awareness

- Contributes to technical decision-making within their area of work
- Makes routine technical decisions and seeks appropriate supervision / guidance
- Clearly communicates technical decisions made in area of work
- Recognises when a technical decision needs to be escalated and when to seek guidance
- Demonstrates recognition of the Code of Conduct of the relevant Professional Body and uses this as a reference for personal assessment and development

EFCE 5 - Technical Risk Management

Assesses, communicates and manages technical risk associated with engineering activities to enable regulatory compliance and deliver operational effectiveness

Level	Descriptors
Authority	<ul style="list-style-type: none"> • Applies world-class technical expertise in the management of major technical risk across Defence • Provides authoritative technical risk information and advice across Defence • Develops and maintains Defence policy and guidance on technical risk management • Takes responsibility for identifying strategic technical risk associated with future changes in legislation, regulation or technology • Champions a positive safety and environmental risk management culture across Defence
Expert	<ul style="list-style-type: none"> • Leads in the application of professional technical risk management methodology • Leads in the development of improved risk management methods to embed safety and environmental priorities in design and ensure compliance • Identifies and analyses complex technical risk in major Defence projects / programmes • Offers well-evidenced challenge to technical risk in reviews of plans, equipment and operations • Empowers people to identify and raise concerns regarding technical risk
Practitioner	<ul style="list-style-type: none"> • Assesses risk of engineering activities and of systems of work to identify hazards and justify appropriate mitigation • Uses relevant processes, knowledge of specific regulatory requirements, tools and techniques to manage and mitigate the consequences of technical decisions • Communicates and raises awareness of technical risks and the need for well-judged mitigation plans • Ensures that safety and environmental risk is assessed and mitigated and opportunities identified • Captures and shares as LFE the risks encountered and outcomes experienced during the technical aspects of a project / programme
Supervised Practitioner	<ul style="list-style-type: none"> • Uses Defence-standard engineering and safety methodologies / toolsets • Applies the principles of risk escalation and risk transfer • Considers and acts upon identified safety and environmental risk • Seeks input from multiple sources to identify, assess and mitigate technical risk • Maintains knowledge of best practice in technical risk management methodology
Awareness	<ul style="list-style-type: none"> • Can explain the Defence engineering and safety methodologies / toolsets in their area of work • Contributes to technical risk management activities at project / programme level • Contributes to the preparation of safety and environmental products at project / programme level • Applies appropriate technical risk management toolsets in their area of work • Identifies technical risks in their area of work and proposes mitigation approaches



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