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| MOD_BLACK_AW |  | **SHIPS** |

Type 23 - Power Generation and MCAS Update (PGMU) – Machinery Control and Surveillance System (MCAS)

**CONTRACT SSA/004/04**

**SCHEDULE A**

**STATEMENT OF WORK**

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1. **INTRODUCTION**
   1. Overview
      1. The aim of the Type 23 Power Generation and Machinery Control and Surveillance (MCAS) System Update (PGMU) Project is to restore shortfalls in power margins and MCAS functionality to Type 23 warships in the Royal Navy to meet extended Out of Service Dates (OSD).

* + 1. The Authority shall be the Project Manager for the PGMU Project.
    2. The Authority PGMU Project Team is made up of MOD employees who will manage the project and undertake the procurement activity.
    3. The Naval Design Partnering team (NDP) will be the technical authority and system designer.
    4. Dockyard Contractors BAE Systems and Babcock Marine will, under the Surface Ship Support Alliance (SSSA), undertake the detailed installation design and installation of equipment on to the Type 23 Ships.
    5. It is therefore essential that until PGMU has been successfully delivered into service the Suppliers of the key equipments must develop and maintain effective working relationships with the Authority PGMU Project Team, the suppliers of the other key equipment and wider stakeholders as appropriate to ensure a successful integrated PGMU solution is installed.
    6. The PGMU solution will be made up of four key equipment areas as shown in the boundary diagram at Figure 1 below, and the PGMU System Integrator (SI). The supplier for each key equipment area will be selected via a competitive tendering exercise. The four ‘Lots’ are as follows:

Lot 1 - Diesel Generators;

Lot 2 - Motor Generators;

Lot 3 - Electrical Distribution System;

Lot 4 - Machinery Control and Surveillance (MCAS) System.

Figure 1 - PGMU Boundary Diagram

* 1. Structure of the Statement of Work (SOW)
     1. This Statement of Work (SOW) refers to Lot 4 (MCAS) and is structured as follows:

1. INTRODUCTION – This section;
2. PROJECT MANAGEMENT which covers programme and planning, risk management, information management, etc.;
3. SUPPLY AND ENGINEERING which covers detailed equipment specification, supply requirements and general engineering and safety aspects;
4. INTEGRATED LOGISTIC SUPPORT which covers requirements for support, maintenance, spares provision, etc.;
5. TRAINING which covers provision of training requirements and interim training delivery.
   1. Definitions
      1. Specific definitions used in this SOW:

| TERM | DEFINITION |
| --- | --- |
| Acquisition Operating Framework (AOF) | The Acquisition Operating Framework (AOF) is the authoritative source of policy and good practice on acquisition for MOD and its’ industry partners. It defines how we conduct, govern and control our Defence acquisition processes, to enable delivery to the Armed Forces and value for money for the taxpayer. |
| Authority’s Agent | This term is used in the context of the role of the PGMU SI. As the Authority’s Agent, the Contractor proactively ensures that the obligations on the Suppliers of all PGMU Lots (including the MCAS equipment in Lot 4) to share interface parameters and other data that enables functional integration to take place in a timely manner, are met. |
| Authority Safety Officer | The nominated person within the Authority organisation who has the lead responsibility for Safety Management. |
| Base Spares | The package of spares held ashore, either in Naval Stores or by the Contractor, to support routine maintenance and defect rectification. |
| COM Team | Means the team of individuals formed through the SSSA who provide management of all Ship-facing activities at the waterfront to maximise operational availability. |
| Commercial Off The Shelf (COTS) | Equipment that is currently available in the commercial marketplace and for which there are little or no development requirements for use in the Naval marine environment. |
| Comprehensive Royal Naval Inventory Systems Project (CRISP) | CRISP is the RN Inventory Management System that provides support to the Maritime Environment. The functions provided by CRISP are item introduction and initial provisioning, demand management (issues, returns, receipts), provisioning, procurement, repair & returns management, stock review, liabilities and On-Board Documentation (OBD). |
| Consumable | An item of materiel that is consumed or used to destruction, or which is otherwise regarded as consumed on issue. For example:  a. No repair policy is required;  b. There is no requirement for the item to be assessed by an authorised conditioner when unserviceable;  c. When the item is issued for use, no further accounting action is necessary, other than that required locally for management control. |
| Contingency Support Spares | An individual part, sub-assembly or assembly held in reserve for the unplanned maintenance or repair of systems or equipment. |
| Contractor’s  Obsolescence  Management Plan | Means the controlled set of activities which monitor, propose, and or implement the route to obsolescence of any of the identified components. |
| Contractors Safety Manager | The nominated person within the Contractors organisation who has the lead responsibility for Safety Management. |
| Critical Design Review  (CDR) | Means the assessment of whether the original Design has met the intended requirements. |
| Data Item Definition (DID) | Definition of an item listed in the Data Requirements List |
| Data Requirements List  (DRL) | Means the information to be provided as set out in Annex A, Schedule  B. |
| Defence Lines of  Development (DLOD’s) | Means Defence Lines of Development; other projects which Naval  Command Headquarters is currently overseeing or has ownership of. |
| Design Acceptance  Programme | Means the plans which together form or lead to the acceptance of the design solution. |
| Design Authority Maintenance Schedules (DAMS) | The design authority’s recommended preventive and corrective maintenance schedule for the system and/or equipment supplied, by level of maintenance. |
| Design Management  Services (DMS) | Means the body tasked with providing the Installation Solution, Safety and Environmental Assessments, updates to the T23 platform datum pack of drawings and Ship fit definition. |
| Design Reviews | Means any meeting in which the Design is open to reassessment following PGMU Project progress updates and reports. |
| Diagnostic Test Spares | An individual part, sub-assembly or assembly supplied for the diagnostic test of systems or equipment. |
| MCAS Project  Management Plan  (MCASPMP) | Means Lot 4 in the overarching PGMU Plan |
| DII(F) | Means the Defence Information Infrastructure (Future). |
| Dockyard Authority | Any Dockyard Organisation that is tasked with the management of maintenance or defect rectification on Type 23 Frigates. This could include the T23 COM and SSSA Contractors. |
| Dockyard Contractors | Means those Contractors engaged to perform upkeep services, maintenance, repairs, refits, fulfil guarantee or warranty obligations or other activities as specified by the Authority. |
| Equipment Performance Analysis (EPA) | A detailed causal monitoring based investigation undertaken to identify and analyse the root causes for sub-optimal equipment performance. Normally instigated when equipment availability levels consistently fall below the required thresholds for the particular equipment or platform. |
| Factory Acceptance Test  (FAT) Installation  Inspection | Means those tests and acceptance activities carried out at the  Contractors’ premises, and subsequently in situ onboard the Ship. |
| Failure Modes Effects and  Criticality Analysis  (FMECA) | A study specifically related to the longevity, mean time between failures and methods of failure of equipment and components. These all relate to the provisioning and construction of an adequate maintenance system. |
| Fuels, lubricants and associated products | Fuels, lubricants and associated products supplied for the operation and support of PGMU systems as defined in Def Stan 01-5. |
| Functional Integration | Demonstration that the equipment procured in the four separate equipment Lots of the project work together to deliver the requirements in the SRD. |
| General Purpose Hand Tools | Hand tools required for the maintenance and repair of systems and equipment which are generally applicable to a wide range of applications. |
| General Purpose Test and Measurement Equipment (GPTME) | Those items of Test and Measuring Equipment (TME) that are common to more than one main equipment or system, or have been introduced into service to support a single equipment but are capable of supporting other equipment. GPTME includes Electrical, Electronic, Mechanical, Optical, Physical and Safety equipments, Commercial Off The Shelf (COTS), Military Off The Shelf (MOTS). |
| GTR | General Technical Requirements for the equipment listed in this SOW. |
| Guarantee Defect | Any defect in equipment once installed as further defined at clause 13. |
| Harbour Acceptance Trials  (HAT(ME)) | Means those tests and acceptance criteria carried out onboard Ship in harbour as part of acceptance trials to demonstrate the systems and or components are fit for purpose. |
| Hazard Area Certification | The set of Certificates of Safety that are issued by the Naval Authority Group, to and following submission by the Platform Duty Holder, for Hazard Areas such as Stability, Structure, Fire, Escape & Evacuation, Propulsion & Manoeuvring. |
| HAZOP | Hazard Operability Study. |
| ILS Manager | The nominated person within the Authority or Contractors organisation who has the lead responsibility for Integrated Logistic Support. |
| In-Service Reliability Demonstration (ISRD) | A procedure to demonstrate the reliability achieved by equipment against the requirements specified in the Contract using production standard equipment under agreed in-service conditions. |
| Initial Provisioning List  (IPL) | First outfit of spares required for the adequate support of the equipment listed in this tender. |
| In-Service Date (ISD) | The date at which an agreed level of acceptance criteria has been met to declare that PGMU capability has reached initial operating capability on each Ship. |
| Installation Solution (IS) | Means the solution which is required to perform successful integration of the 4 (four) Lots which together form the PGMU Project, including the package of information and drawings, used to undertake the installation and commissioning of the PGMU equipments into the Ship. |
| Installation Solution,  Safety and Environmental  Assessments | Means individual detailed assessments for Installation of equipment, safety, and Environmental impacts. |
| Integrated Test,  Evaluation and  Acceptance Plan (ITEAP) | The specific requirements for evaluating, testing and accepting equipments into service. |
| Integrated Test,  Evaluation and  Acceptance Working  Group (ITEA WG) | Means the group of personnel required to test, evaluation and  complete any acceptance criteria for the deliverables under the  PGMU Project |
| Interface Data  Requirements List (IDRL) | Means the list of criteria which form the criteria to enable IS  Production. |
| JSC Purple Gate | The entry point to the Authority Joint Support Chain (JSC) as defined in JSP886, Volume 3, Part 3. |
| Lead-Free Solder  Verification Report | Means the report which lists those items or occasions where the use of lead-free solders in equipment is unavoidable for equipment supplied under the Contract. |
| Line Replaceable Units (LRU) | An LRU is a modular component of a system that is designed to be replaced quickly at an operating location. An LRU is usually a sealed unit and LRUs are typically assigned logistics control numbers (LCNs) during Supportability Analysis. |
| Logistic Support Date (LSD) | The date when support is available in range, but not necessarily in scale (all products that are needed by type, but not in quantity) to support the First of Class PGMU Ship. For PGMU, the LSD is 3 months prior to SAT(ME) for the First of Class (FOC) Ship updated with PGMU. |
| Logistically Significant Items | Every item in the product that requires support activity, or is involved with the operation of the product. Piece parts and materials used to manufacture items are not normally included.  LSI candidates shall not be limited to just those that require maintenance, but shall include support, test and training equipment; consideration will also be given to transportation, storage, packaging and handling, supply support and facilities. It is important when selecting candidate items that all ILS elements are given consideration, not just maintenance. For example items such as radioactive sources which require no maintenance are logistically significant as they are subject to stringent packaging, handling and storage regulations. They may also require control as individually managed items which will impact on supply support considerations. |
| Logistics Demonstration (Log Demo) | A demonstration or Supportability Assessment, consisting of a physical demonstration and review of documentation and data, to ensure that all support elements are available, to the required specification and in sufficient quantity, to enable PGMU to be supported. |
| Machinery Control and Surveillance System (MCAS) | For the purposes of the PGMU Project, the term “MCAS” may be taken to include both MCAS and MEPS controls and surveillance facilities of the Type 23 Frigate Machinery Installation together with the Secondary Surveillance System. |
| Maintenance Information Management In Computers (MIMIC) 3 | MIMIC3 is a Configuration Management (CM) system used to record routine Engineering data and to support CM applications including Reliability Centred Maintenance (RCM) and UMMS. |
| Major Assembly | Used to define principle equipment grouping which can be considered in a modular sense for installation, significantly those which are of a greater weight or dimension than can be manually lifted into the Ship in accordance with GTR Section 7.9 (Annex B to Schedule A) but also extending to groups of system components that are installed in a given location.  With regards to PGMU, these are principally the Diesel-Generator and Motor-Generator sets, but also other grouped items including but not limited to Local Control Panels, Switchboards, MCAS cabinets and so forth. |
| Main Electrical Power System (MEPS) | For the purposes of the PGMU Project, the term “MEPS” may be taken to include the main electrical power generation equipment and the main electrical power distribution equipment of the Type 23 Frigate Machinery Installation. |
| Naval Design Partnering  team (NDP) | Means the team of personnel formed to design and or specify the requirements for the Project and from the Defence Industry who provide the technical authority, undertake the initial system design and oversee the integration aspects of this project. |
| New to RN Warship Service | Equipments or materials that have not previously been approved for use on RN Warships. In most cases those that have not undertaken testing for fire characteristics. |
| Non-Development Software | Any software that has not been developed specifically for the equipment or sub-system within which it is intended to be used. Examples of non-development software includes operating system, graphics libraries, user interfaces, system libraries, databases, networking and communication software, device drivers, and reused supplier developed code. When an existing equipment or sub-system, which is implemented in software, is used for a new purpose its software constitutes non-development software. Non-development software also includes development tools such as compilers, linkers, test tools and analysers. |
| On-board Spares | The package of spare issued to each Ship and carried on board as part of the Consolidated Allowance List (CAL). |
| OPDEF | Operational Defect. The mechanism used by the RN and the Purchaser to notify the Contractor of a Defect. |
| Out of Service Dates  (OSD) | The end of life date for a Ship, effectively the point at which the Ship is sold on or otherwise disposed of. |
| Programmable Element (PE) | PE is defined as Products, Services and Systems (PSS) that are implemented in software or programmable hardware, which includes any device that can be customised, e.g. ASICs, PLDs and FPGAs”, as defined in Def Stan 00-56 Part 1. |
| PGMU Project | The programme of work to undertake the Power Generation and MCAS Update in Type 23 Frigates. |
| PGMU Solution | The overall package of equipment that is installed to meet the PGMU requirements. |
| PGMU System Integrator (PGMU SI) | The role to be undertaken on behalf of the Authority to deliver PGMU functionality and to detail and manage the interfaces between the integrated PGMU equipments with the platform services and systems. The Integrator’s task will also include the integration of the MEPS Distribution System and the Dynamic Modelling of the MEPS Generation and Distribution Systems. |
| PGMU Training Steering Group (TSG) | The PGMU Training Steering Group has been established to direct and assure the training solution on behalf of the Training Line of Development. The team is led by the PGMU team/T23 Requirements Manager, with members from Navy Personnel and Training Groups and HMS Sultan. |
| PQQ | Means the Pre-Qualification Questionnaire for this Lot. |
| Project Director | Means the individual acting as owner and or Agent on behalf of Navy  Command Headquarters. |
| Project Management Plan  (PGMU PMP) | Means the Plan to complete the PGMU Project. |
| Project Review Meeting(s) | Means the highest level review meeting to which all other reviews  (Risk Review, Safety Review, etc.) shall report. |
| Project Review Report | Means the document which will evidence progress on the PGMU  Project as defined in para 2.5.6. |
| Ready for Sea Date (RFSD) | The date during an upkeep period, post Harbour Acceptance Tests and appropriate Safety and Readiness Checks where the Ship is declared materially fit to proceed to see to commence sea trials. |
| Ready For Training Date (RFTD) | The RFTD is defined as the date by which the following will be available:  a. Training facilities;  b. Training content;  c. Training Equipment;  d. Training Equipment Support;  e. Trained trainers. |
| RN | Means Royal Navy |
| Safety and Environmental  assurance | Means the impact of any safety or environmental concerns or issues. |
| Sea Acceptance Trials  (Marine Engineering)  (SAT(ME)) | Means those tests and acceptance criteria carried out onboard Ship and performed at sea as part of acceptance trials to demonstrate the systems and or components are fit for purpose. |
| Senior Responsible  Owner (SRO) | Means the individual with ownership of the PGMU Project on behalf of  Navy Command Headquarters. |
| Setting to Work (STW) | Means the activities described in this Schedule A relating to the setting to work. |
| Software Integration Plan | Means the Plan for the installation of software. |
| Software Issuing Office | The SIO is the DE&S preferred distribution facility for all software issued to the Fleet and shore establishments. The SIO is located at:  The Fleet Information Management Unit (FIMU),Navy Command Headquarters (Portsdown Hill), QinetiQ, Portsdown Technology Park, Southwick Road, Cosham, Portsmouth, Hampshire PO6 3RU  Tel: 023 9221 2104 |
| Special Purpose Test and Measurement Equipment (SPTME) | Those items of Test and Measuring Equipment (TME) that are specific to PGMU equipment or systems, and are not capable of supporting other equipment. SPTME includes Electrical, Electronic, Mechanical, Optical, Physical and Safety equipments, Commercial Off The Shelf (COTS), Military Off The Shelf (MOTS). |
| Special to Type Hand Tools | Hand tools required for the maintenance and repair of systems and equipment which are specific to PGMU systems and equipment and not generally applicable to a wide range of applications. |
| Support and Test Equipment (S&TE) | S&TE includes all tools and equipment required to support the Equipment, and includes, but is not limited to Common User Hand Tools (CUHT), General Purpose Test and Measurement Equipment (GPTME), Special to Type Hand Tools (STHT), Ancillary Support Equipment (ASE), Special To Type Test Equipment (STTE), Automatic Test Systems (ATS), Automatic Test Equipment (ATE), Diagnostic tools and equipment, including laptops or other devices and the associated ancillaries, Identified items of GFE required to support the Items procured as the Contractor’s scope of supply. |
| Support Solutions Envelope (SSE) | The SSE consists of signposts to MOD acquisition policy and a tool providing advice and guidance on how to develop a support solution. The SSE is used to articulate those key areas of Defence Equipment and Support (DE&S) policy which are central to a good support solution and which drive coherence and avoid the known operational problems that arise when equipment is fielded with insufficient and / or incoherent support. |
| Support Spares | An individual part, sub-assembly or assembly supplied for the maintenance or repair of systems or equipment. |
| Support Tasks | Those tasks relating to the maintenance , husbandry and upkeep of equipment in service. |
| Surface Ship Support Alliance (SSSA) | The current commercial arrangements between MoD, BAE Systems and Babcock Marine to provide fleet time and upkeep support to in scope Ships including Type 23 Frigates. |
| System Readiness Review | A review to determine whether or not functional integration of PGMU has been achieved, and to recommend whether to proceed with the installation of PGMU into the First of Class. In terms of the Authority’s CADMID cycle, the SRR is the gate between the Demonstration and Manufacture phases. |
| Technical Shared Data Environment | A web based package to enable access of information by all relevant parties including Contractors, The Authority and Upkeep Contractors. |
| Tele-Engineering | Use of a Remote Engineering Support (RES) system for secure collaborative communication between the OEM and on-board maintainers, to enable defect diagnosis and repair, thus reducing the amount of time the Contractor is deployed overseas. For PGMU, it is envisaged that 3 UK shore locations will be available to facilitate communication with T23 Ships: Portsmouth COM Building, Devonport COM Building, MOD Abbey Wood Ops Cell. |
| TES | Means the Technical Equipment Specification(s). |
| Test, Trials and  Inspections Programme | Means those detailed Contract activities which form or define activities which form the Test, or Trials and Inspection Programme. |
| Testing and Tuning Spares | An individual part, sub-assembly or assembly supplied for the testing and/or tuning of systems or equipment. |
| Training Equipment Spares | An individual part, sub-assembly or assembly supplied for the maintenance or repair of training systems or equipment. |
| Trusted Agent | An embarked uniformed technician who has received relevant training and is authorised and empowered to undertake update, maintenance, testing, evaluation, diagnostic and defect repair activities for, or in place of, the Contractor where appropriate in order to organically maximise the availability and sustainability of Ships deployed worldwide and reduce the need for Contractor attendance on-board. |
| Type 23 Class Output  Management (T23 COM) | Means the COM team for the Type 23 Class of Ships. |
| Unit Maintenance Management System (UMMS) | UMMS is the Information System enabler for the application of RCM in the maritime environment. It can replace time expired, and interface with, disparate maintenance systems. It allows visibility of the platforms maintenance and stores state, along with the ability to plan work packages. |
| Upkeep | Means maintenance or those activities which would or could be considered as maintenance. |
| Upkeep Contractor. | Means the Contractor engaged by the Authority to undertake Upkeep  Periods. |
| Upkeep Periods | Means those times when a Ship is undergoing maintenance or refits and is not at sea performing normal duties. |
| Verification and Validation  Requirements Matrix  (VVRM) | Mean the matrix which lists all the tests necessary to verify and validate that the PGMU Project deliverables are fit for purpose. |
| Whole Life Cost (WLC) | The combined cost of procurement, installation, commissioning, operation, support and disposal of equipment throughout its full service life. |
| Whole Ship Shock Trial | A trial undertaken simulating a non-contact underwater explosion to measure the shock resilience of the Ship as a whole and equipments installed. Likely to be undertaken on the PGMU First of Class. |

* 1. References
     1. Documents referenced in this SOW:

ISO 9001-2008 - International Organisation for Standardisation 9001 (BS EN ISO 9001-2008)

AQAP 2105 – NATO Requirements for deliverable Quality Plans

AQAP 2110 – NATO Quality Assurance Requirements for design, development and production

AQAP 2210 – NATO Supplementary Software QA requirements to AQAP-2110

Def Stan 05-61 Part 1 Issue 5 (2005) – Quality Assurance Procedural Requirements

Def Stan 05-57 Issue 6 (2014) – Configuration Management of Defence Materiel

MAP 01-470 - Shock Manual

Def Stan 59-411 Pt 3 Issue 1 Amd 1 (2008) – Electromagnetic Compatibility

ICNIRP Guidelines – Guidelines for limiting exposure to time varying electric, magnetic and electromagnetic fields 0 to 300GHz

NFPA-70E - Electrical safety in the workplace

JSP 440 – Defence Manual of Security

AOF – MoD Acquisition Operating Framework

PGMU Safety Strategy Paper – Issue 01 June 2013

Frigates Ship Safety and Environmental Management Plan (SEMP) Issue 4 Aug 2011

JSP 430 – Management of Ship Safety and Environmental Protection

Def Stan 00-56 Issue 4 (2007) – Safety Management Requirements for Defence systems

NAN 07/2014 – Naval Authority Notice – Software Integrity

JSP 375 – MoD Health and Safety Handbook

British Geological Survey Risk List - Current Supply Risk Index for Chemical Elements or Element Groups 2011

Def Stan 00-600 – ILS Requirements for MoD Projects

JSP 886 Volume 7 – The Defence Logistics Support Chain Manual

BRd 1313 – Maintenance Management in Surface Ships

DEFCON 117 – Supply of documentation for Naval Codification

International Trade in Arms Regulations (ITAR)

International Trade Cooperation Treaty (ITCT)

Def Stan 81-41 Issue 7 (2013) – Packaging of Defence Materiel

DEFCON 129 – Use of Purchase to Payment (P2P) delivery label form

STANAG 4329 – NATO Standard Barcode Symbologies – AP-44(A)

DEFCON 16 – Repair and Maintenance Documentation

DEFCON 21 – Retention of Records

MoD Defence System Approach to Training (DSAT) Quality Standard 001:2008

JSP 882, Part 4 – The Defence Manual of Training Management

Def Stan 00-45 - Using Reliability Centred Maintenance to Manage Engineering Failures

Def Stan 00-55 Part 1 - Requirements for Safety of Programmable Elements (PE) in Defence Systems: Requirements and Guidance

IEC61508:2010 - Functional safety of electrical/electronic/programmable electronic safety-related systems

1. PROJECT MANAGEMENT
   1. General
      1. The Contractor shall demonstrate good Project Management practice in undertaking all activities required under the Contract. The Authority and Contractor shall adopt an open and honest approach at all times and ensure that potential risks to performance, cost and time are exposed at the earliest opportunity to enable them to be addressed to minimise any detrimental impact and maximise the benefit of any potential opportunity.
      2. The Authority shall be provided with full access to all plans, programmes and associated documentation at all levels throughout the duration of the Contract.
      3. Any proposed changes to all plans are to be agreed with and subsequently provided to the Authority.
   2. Deliverable Information
      1. The Contractor shall prepare, deliver and maintain (as required) the Deliverable Information listed in the relevant Data Requirements List (DRL) set out in Annex A to Schedule B of the Contract.
      2. Where a deliverable in the DRL has a Data Item Definition (DID) number referenced against it, the deliverable shall be provided in accordance with the requirements of the relevant DID.
      3. The Contractor is to supply equipment detailed in paragraph 3.1.1 in accordance with the delivery schedule contained in Part 2 of Schedule B of the Contract.
   3. Project Management Plan
      1. The Authority will maintain the master Project Management Plan (PGMU PMP) for PGMU as a whole. The PMP specific to each lot will feed into this master.
      2. The MCAS Project Management Plan (MCASPMP) shall be supplied by the Contractor, agreed and approved by the Authority at award of Contract, and maintained thereafter by the Contractor. **[DRL P1]**
      3. The MCASPMP shall define how the Contract activities shall be managed for all equipment, outlining the processes, procedures and techniques to be used with details of how all activities, plans and programmes will be established, monitored, changed, controlled, integrated and communicated with the Authority.
      4. The MCASPMP shall adopt a consistent and coherent approach to project management and establish procedures and reporting mechanisms. Implementation of the MGPMP will provide the Authority with confidence in the Contractor’s ability to deliver to time, cost and performance in accordance with the Contract and provide early visibility of potential issues so that mitigating action can be taken.
      5. The MCASPMP shall include but not be limited to the following:
         1. Organisation, Communication and Relationship Management;
         2. Project Control including:
            1. Project Reviews;
            2. Cardinal Date Programme;
            3. Contract Performance Measurement;
            4. Risk Management;
            5. Information Management;
            6. Supply and Engineering;
            7. Safety and Environmental Management;
            8. Quality Management;
            9. Integrated Logistics Support;
            10. Interface Management;
            11. Obsolescence Management;
            12. Tests, Trials and Acceptance;
            13. Configuration Management;
            14. Security;
            15. Design Support;
            16. Government Furnished Assets (GFA).
         3. Procedures for the management of the guarantee defect (warranty) process, detailed in Section 4.3, for all equipment that ensure replacement of equipment is provided and/or repairs undertaken in an efficient manner to minimise disruption to Ship operations.
      6. The MCASPMP shall include the definition of a Project Review Report structure used to demonstrate the status of the Contract. The Project Review Report shall include key performance indicators and/or critical success factors. The Contractor shall provide a completed Project Review Report at the Project Reviews or when requested.
   4. Organisation, Communication and Relationship Management
      1. Authority Organisation:
2. Defence Equipment And Support Project Team (PT). The DE&S PT is responsible for overall project management and delivery of the PGMU capability including the development of the requirement, assurance and approvals. The commercial staff within the PT are responsible for award and on-going management of the Contract. The PT is to be considered as the Authority within this Contract and will provide, in conjunction with NDP, the project overarching project oversight;
3. Navy Command Headquarters (NCHQ). NCHQ fulfil the role of Senior Responsible Owner (SRO) for the project and act as Project Director, including funding line holder, and User community representative. They are also the owner of several Defence Lines of Development (DLODs);
4. Naval Design Partnering team (NDP). The PGMU NDP team is an extension of the DE&S PT and consists of engineers from the Defence Industry who provide the technical authority, undertake the initial system design and oversee the integration aspects of the project. The PGMU NDP team will also set the strategy to enable the functional integration of the PGMU elements;
5. Design Management Services (DMS). The DE&S has Contracts under the Surface Ship Support Alliance (SSSA) with BAE Systems and Babcock for the provision of DMS. The PT will task the DMS to provide the Installation Solution, Safety and Environmental Assessments, updates to the T23 platform datum pack of drawings and Ship fit definition;
6. Type 23 Class Output Management (T23 COM). Under the SSSA each class of warship has its own COM team. The T23 COM is made up of BAES, Babcock and MOD personnel. For the PGMU project the T23 COM shall provide management of all Ship-facing activities at the waterfront to maximise operational availability. This includes management of the Upkeep Periods covering PGMU installation. They also provide waterfront Safety and Environmental assurance during installation;
7. Upkeep Contractor. The Upkeep of T23 warships are undertaken via the SSSA Services Contracts and managed at the waterfront by the T23 COM. PGMU will be installed and commissioned during Upkeep;
8. PGMU System Integrator (PGMU SI). The role to be undertaken on behalf of the Authority to deliver PGMU functionality and to detail and manage the interfaces between the integrated PGMU equipments with the platform services and systems.
   * 1. Contractor Organisation:
9. To enable the Authority to maintain a full understanding of the management arrangements and resources that will be employed on the Contract, the MCASPMP shall contain the Contractors relationship management plan to include:
   1. The company structure and organisation of the Contractor applicable to the Contract;
   2. The organisation, roles, responsibilities and resources of the Contractor’s team engaged on the Contract;
   3. Key Sub-Contractors including company overview, contribution to the Contract, management arrangements and resources;
   4. All other stakeholders that contribute to or influence the Contract including a stakeholder identification and analysis that sets out who will be engaged during the programme, when they will be engaged and the influence/contribution they have to the Contract.
10. The Contractor shall report information at Project Review meetings on, but not limited to the following:
    1. Key personnel changes;
    2. Manpower resources;
    3. Sub-Contractor utilisation and performance;
    4. Stakeholder engagement activities, issues and recommended corrective action.
11. Changes to the organisation and resources that affect performance under the Contact shall be agreed with the Authority.
    * 1. Communication & Relationships:
12. The MCASPMP shall include a communication and relationship management plan that describes how the interactions between the Authority, Contractor, key Sub-Contractors and other stakeholders are going to be established and managed throughout the Contract. The aim is to provide an effective team, working in an open and professional relationship, communicating in a timely and appropriate manner to deliver the programme to time, cost and performance requirements.
    1. Project Control
       1. Project Control Meetings. During the Contract, project control shall be exercised through a series of reviews, either at meetings or in correspondence. The highest level review meeting is the Project Review meeting (see paragraph 2.5.4) to which all other reviews (Risk Review, Safety Review, etc.) shall report.
       2. Unless agreed otherwise, all Project Review meetings shall be:
          1. Held alternately at the Authority’s and Contractors premises;
          2. Chaired by the Authority;
          3. Arranged/coordinated by the Contractor;
          4. Secretariat support provided by the Contractor including the recording of actions in the form of minutes **[DRL P2]**.
       3. The Authority shall retain the right to call a meeting with the Contractor on any matter of concern, subject to notice being given to the Contractor.
       4. The Authority requires its representative to be invited to attend Contractor’s internal meetings, or meetings with Sub-Contractors, relating to any aspect that has potential to affect performance under the Contact (for example, weekly progress meetings).
       5. The Authority will hold a combined PGMU Project Review meeting, at least quarterly, to review progress and issues across the PGMU Lots. This will encompass the Project Review activities across all Lots and monitor issues and progress of the PGMU project as a whole. The Contractor shall provide all required information to the Authority in a timely manner and also provide suitably qualified representatives to attend the review at the Authority’s premises.
       6. Project Review meetings shall be held monthly. For each Project Review meeting, the Contractor shall provide the Authority with a Project Review Report **[DRL P3]** no later than 5 working days prior to the Project Review meeting. The Project Review Report shall include but not be limited to the following areas that will form the basis of the Project Review meeting:
          1. Organisation, Communication and Relationship Management;
          2. Cardinal Date Programme;
          3. Contract Performance Measurement;
          4. Risk Management;
          5. Information Management;
          6. Supply and Engineering;
          7. Safety and Environmental Management;
          8. Quality Management;
          9. Integrated Logistics Support;
          10. Interface Management;
          11. Obsolescence Management;
          12. Tests, Trials and Acceptance;
          13. Configuration Management;
          14. Security;
          15. Design Support;
          16. PGMU System Integration.
       7. Cardinal Date Programme:
          1. The MCASPMP shall include the process for the management of the Cardinal Date Programme (CDP) to allow the Authority to gain an understanding of the derivation of the CDP, including any supporting programmes for each equipment set, and how they will be monitored, changed, controlled, integrated and communicated;
          2. The MCASPMP shall include a baseline CDP;
          3. The CDP **[DRL P4]** shall include, but not be limited to all principal activities milestones, reviews and dependencies, embracing design, development, production (including long lead items), tests, trials, inspections, acceptance, safety and environmental management and Integrated Logistic Support;
          4. The CDP shall be logical and be of sufficient detail to monitor progress of, and enable management of, the Contract, provide early visibility of potential issues and be used to analyse the impact of decisions and proposed changes on the CDP;
          5. The CDP shall be supported by detailed programmes for Contract activities, these shall include, but not be limited to:
             1. Material Delivery (including GFA);
             2. Project Management (including risk, programme, quality and cost activities);
             3. Design Acceptance Programme;
             4. Test, Trials and Inspections Programme;
             5. Safety and Environmental Management;
             6. Integrated Logistic Support;
             7. The Contractor shall include three point estimates and identify the critical path on the CDP, and all supporting programmes.
          6. The Contractor shall report information at Project Review meetings on, but not limited to the following:
             1. Progress against CDP;
             2. Key achievements;
             3. Key forthcoming activities;
             4. Potential programme issues and recommended corrective action.
       8. Contract Performance Management:
          1. The MCASPMP shall include the process for the measurement of Contractor performance against the Key Performance Indicators (KPI) detailed in Schedule C (Contract Performance Management) of the Contract;
          2. The Contractor shall report information at Project Review meetings on, but not limited to the following:
             1. Performance against KPI;
             2. Equipment Performance Analysis (EPA) recommendations to investigate areas where equipment availability drops below the indicator point as detailed in the KPI processes within the Contract;
             3. Activities undertaken to improve performance against KPI where required.
       9. Risk Management:
          1. Risk management includes the management of both threats and opportunities, excluding specific safety and environmental risks which will be covered by the Safety and Environmental Management process (see Section 2.5.12: Safety and Environmental Management);
          2. The MCASPMP shall include processes, procedures and techniques in the form of a Risk Management Plan **[DRL P5]** for the management of risk and the recording of risk assessments with descriptions, probability and quantifiable impact (time, cost, performance);
          3. The Risk Management Plan shall include, but not be limited to:
             1. Strategy;
             2. Roles and responsibilities;
             3. Risk management processes and procedures for:

Risk and opportunity identification and allocation of ownership to the Authority, Contractor, Sub-Contractors or other stakeholders;

Risk analysis, mitigation, planning and control;

Risk reviews;

Configuration management;

Reporting.

* + - * 1. The structure and management of the Risk Register covering:

Analytical tools and computer simulations to be used;

Definition of scoring scheme/impact criteria.

* + - 1. The Contractor shall provide information on all risks to the Authority throughout the duration of the Contract in the form of a shared Risk Register. The Contractor shall include Integration risks from the perspective of the PGMU SI in the Risk Register;
      2. The Contractor shall hold a bi-monthly (every two months) Risk Review meeting with the Authority. The Contractor shall provide information on, but not limited to:
         1. Risk management activities undertaken;
         2. Status of the risk register;
         3. Key programme risks;
         4. New risks identified;
         5. Mitigation activities undertaken.
      3. Unless agreed otherwise, Risk Review meetings shall be:
         1. Held alternately at the Authority’s and Contractor’s premises in conjunction with the Project Review Meetings;
         2. Chaired by the Authority;
         3. Arranged/coordinated by the Contractor;
         4. Secretariat support provided by the Contractor including the recording of actions in the form of minutes.
      4. The Contractor shall construct and maintain a shared Risk Register with the Authority, to include all threats and opportunities relating to, but not limited to:
         1. Authority activities;
         2. Contractor activities;
         3. Sub-Contractor activities;
         4. Stakeholder activities;
         5. Successful delivery of the programme.
      5. The shared Risk Register shall include but not be limited to:
         1. Description of risk and cause;
         2. Owner;
         3. Expected time of risk occurrence;
         4. Probability and impact analysis (time, cost and performance);
         5. Mitigation action;
         6. Contingency action.
      6. The Risk Register shall be capable of generating statistical and summary reports of risks for the Risk Review and Project Reviews;
      7. The Contractor shall provide the Authority with a bi-monthly export of the Risk Register, in MS Excel format, **[DRL P6]** and deliver a copy of the final Risk Register on completion of the Contract period;
      8. The statements contained in the Risk Register shall not alter the Contractual responsibilities held by either the Contractor or the Authority. Neither should these statements attempt to transfer responsibility or ownership of a risk from one party to another;
      9. The Contractor shall report information at the Project Review meetings on, but not limited to the following:
         1. Key risks (top 5);
         2. An assessment of the overall risk exposure in relation to performance, cost and time.
    1. Information Management:
       1. Information Management relates to any information on the programme, whether transmitted electronically, hard copy or verbally. The MCASPMP shall include processes and mechanisms for sharing information relating to the programme in the form of an Information Management Plan **[DRL P7];**
       2. The Information Management Plan shall include but not be limited to:
          1. The proposed use of a Technical Shared Data Environment accessible by the Contractor for each PGMU Lot and the Authority;
          2. System and data integrity management to ensure that all electronic systems and information are protected from viruses and malware.
       3. The Contractor shall report information at the Project Review meetings on, but not limited to the status of Information Management, issues and recommended corrective action.
    2. Supply and Engineering:
       1. The requirements for the management of Supply & Engineering are detailed in Section 3 : Supply and Engineering;
       2. The Contractor shall report information at the Project Review meetings on, but not limited to, Supply, Engineering and Acceptance activities and progress, issues and recommended corrective action.
    3. Safety and Environmental Management:
       1. The requirements for Safety and Environmental Management are detailed in Section 3.8: Safety and Environmental Management;
       2. The Contractor shall report information at the Project Review meetings on, but not limited to, Safety and Environmental Management, issues and recommended corrective action.
    4. Quality Management:
       1. The Contractor shall report information at the Project Review meetings on, but not limited to Quality Management (including audits and deficiency reports), issues and recommended corrective action;
       2. The Contractor is responsible for ensuring that the quality of the work performed and of the articles and materials supplied by him and all his Sub-Contractors conform to the requirements of the Contract;
       3. The Contractor shall maintain a quality management system and continually improve its effectiveness in accordance with the terms and conditions of the Contract, ISO 9001-2008 and the AQAP 2000 series, notably AQAP 2105, AQAP 2110 and AQAP 2210 and all amendments;
       4. In meeting the above, the Contractor shall provide the Authority with a Quality Plan within three months of the Commencement Date **[DRL P8]**;
       5. For the AQAP series, the following interpretations apply:
          1. Where the Contract refers to the “Authority”, the AQAP series refers to the “Acquirer”;
          2. Where the Contract refers to the “Contractor”, the AQAP series refers to the “Supplier”;
          3. Where the Contract refers to the “Sub-Contractor”, the AQAP series refers to the “Sub-supplier”;
          4. Where the Contract refers to the “Quality Management Plan”, the AQAP series refers to the “Quality Plan”.
       6. The Contractor shall maintain the Contractor’s Quality Plan throughout the duration of the Contract; changes shall be agreed with the Authority;
       7. The Quality Plan shall set out the quality strategy, practices, resources and sequence of activities relevant to the Contract and shall provide assurance to the Authority that:
          1. The Contract requirements and conditions have been reviewed;
          2. Effective quality planning has taken place;
          3. Identified risk areas are being addressed;
          4. The Contractor has indicated how the quality of products and/or processes, including critical ones (as stated in the Contract) shall be assured; and
          5. Those specific elements of the Contractor's quality system that are to be applied to the Contract are appropriate.
       8. To satisfy the above requirements, the Quality Plan shall meet the requirements as detailed in AQAP 2105, and shall include:
          1. Strategy for Quality Assurance defining the Contractors commitment to complying with the quality system requirements as relating to this Contract;
          2. Procedures that detail how the Quality Management System shall be used to deliver the equipment and which supplement the requirements for acceptance;
          3. Arrangements for Quality Management review meetings to be held every 3 months;
          4. Procedures for achieving Certification and Classification;
          5. Company organisation, competencies and resources;
          6. Supply base codes of practice, interfaces and standards policy;
          7. Configuration control.
       9. The Contractor shall implement procedures for configuration control to ensure commonality of equipment and its integration on each Ship across the Ship class;
       10. The Contractor shall implement procedures for the custody and maintenance of the design and Ship fit configuration data for a period until the end of the guarantee period of the last Ship;
       11. The Contractor shall implement procedures for the management of concessions in accordance with Def Stan 05-61 Part 1 issue 5;
       12. The Quality Plan shall include procedures for ensuring configuration control requirements are clearly defined, achievable and compliant with the Contract;
       13. The Contractor shall ensure that its strategy for configuration control is adequately developed, implemented and documented and clearly understood by all members of the Contractor’s design and production team and including relevant areas of the supply chain;
       14. Configuration control shall be the means by which the Contractor administers control of the product for form, fit and function throughout the design and production phases of each equipment and shall include the following interrelated processes to achieve that objective:
           1. Management and planning;
           2. Identification and documentation;
           3. Change management;
           4. Status management;
           5. Audits.
       15. For configuration control, the Quality Plan shall include procedures and processes for, but not limited to:
           1. Standardisation;
           2. Quality;
           3. Reliability and Maintainability;
           4. Traceability;
           5. Testability;
           6. Interchangeability;
           7. Interoperability;
           8. Supportability.
    5. Integrated Logistics Support:
       1. The requirements for the management of Integrated Logistics Support are detailed in Section 4 : Integrated Logistics Support;
       2. The Contractor shall report information at the Project Review meetings on, but not limited to, the status of ILS, issues and recommended corrective action.
    6. Interface/Integration Management:
       1. The requirements for the management of Equipment to Equipment and Equipment to Ship interfaces are detailed in Section 3.7: Interface Control and Monitoring of this document;
       2. Integration of the separate elements of the capability into the wider platform and its systems is essential to the success of to the project. Due to the involvement of multiple suppliers this represents several of the key risks to PGMU functionality not being achieved. In order to achieve timely delivery of PGMU capability to all platforms, in accordance with the PGMU PMP, it is essential that multiple suppliers work together in an efficient manner;
       3. From prior knowledge of the Authority and supported by the PQQ responses, the Authority recognises that Industry has extensive experience of working closely with other companies to achieve integration of equipment to deliver a coherent capability and are therefore best placed to manage the Integration Management process on behalf of the Authority;
       4. The System Integrator shall undertake the PGMU System Integrator role by using its detailed processes to facilitate and expedite the exchange of data and manage any design change;
       5. Integration shall be achieved through the adoption of a formal interface definition, management and control process determined by the PGMU SI and by the progressive test schedule described further in Section 3.5;
       6. With respect to integration management the Lot 4 Contractor shall:
          1. Attend all monthly Interface Management meetings and provide equipment parameters and further interface information as required by the PGMU SI for the purposes of system modelling and to ensure that the elements of PGMU work together and that PGMU as a system integrates into the platform;
          2. Share all interface data with the Suppliers of the other Lots in a timely manner to ensure that functional integration is enabled in accordance with the timescales in the PGMU PMP;
          3. Attend meetings, as required, with the PGMU SI and suppliers of Lots 1, 2 and 3 in order to facilitate the development of the equipment and ensure that functional integration is enabled.
       7. Given its prominence, Integration will also be on the agenda of Design Reviews, routine Progress Meetings and Integrated Test, Evaluation and Acceptance Working Group (ITEA WG) meetings giving multiple occasions for open communication between Suppliers of the Lots that are combining to deliver the PGMU capability;
       8. There are two aspects of integration that the Interface Management process will address: Intra-PGMU Integration - concerns the interfaces between the 4 PGMU equipment elements, and PGMU/Platform Integration that involves the interfaces between PGMU equipment and the Ship and its auxiliary systems and support services as illustrated in Figure 2:
          1. Intra-PGMU Integration - for Intra-PGMU Integration the Contractor shall:

Request from and provide interface data to the Authority and to the Suppliers of Lots 1, 2 and 3 as required to ensure the functional performance of PGMU;

Be responsible for the compatibility of the physical, functional and data interfaces between the equipment in the Lots it is providing where two or more Lots are being supplied. In this event, details of the physical, functional and data interfaces in this SOW at paragraph 3.7.1 are still to be supplied to the Authority.

* + - * 1. PGMU/Platform Integration - The PGMU Installation Solution (IS) will be produced by DMS using initial design information from the NDP and interface data of the new equipment being purchased. The Contractor shall provide data regarding the interfaces between PGMU equipment and the auxiliary systems and support services of the Ship to DMS Contractors as required under paragraph 3.7.1 and specified in the Interface Data Requirements List (IDRL) to enable IS production.



**Figure 2 – PGMU Interface Boundary Diagram**

* + 1. Obsolescence Management:
       1. The requirements for the management of obsolescence are detailed in paragraph 4.5.21 : Integrated Logistic Support and is to be defined in the Contractor’s Obsolescence Management Plan;
       2. In general terms, this obsolescence management approach will comprise a controlled set of activities that:
          1. Actively monitors the Articles to identify obsolescence;
          2. Generates a proposed solution to an obsolescence issue;
          3. Implements the solution.
       3. The Contractor shall report information at the Project Review meetings on, but not limited to, the status of equipment obsolescence issues and recommended corrective action.
    2. Tests, Trials and Acceptance:
       1. Progressive Verification and Acceptance of PGMU capability will be undertaken. This commences during the design phase and continues through to the In-Service Date (ISD). In chronological order, the elements of the progressive acceptance process for PGMU, as a minimum, are: Critical Design Review (CDR), Factory Acceptance Test, System functional test, Installation Inspection and Harbour and Sea Acceptance trials (HAT(ME)/SAT(ME));
       2. The verification and acceptance process is further detailed in Section 3.5 : Commissioning, Tests, Trials and Acceptance and Section 4: Integrated Logistic Support. Further information is also provided in the draft Integrated Test, Evaluation and Acceptance Plan (ITEAP);
       3. The Contractor shall support this process through the undertaking of required acceptance events to include but not limited to:
          1. Critical Design Review;
          2. Software Functional and Integration Testing (SFIT);
          3. Factory Acceptance Test;
          4. PGMU System Integration Test;
          5. Control System Integrity Checks.
       4. The Contractor shall provide support required to the Installation Contractor at upkeep related events to include but not limited to:
          1. Installation Inspections;
          2. Commissioning and STW;
          3. Harbour Acceptance Trials (including HAT(Console));
          4. Sea Acceptance Trials.
       5. The Contractor shall provide the proposed methods of verification for each of the Technical Equipment Specification (TES) and applicable General Technical Requirements (GTR) requirements in the form of a spreadsheet **[DRL P9]**. The Contractor shall select acceptance methods that demonstrate compliance to the requirements in the most cost effective manner. The ITEA WG will integrate the proposed verification tests for Lot 4 into the PGMU Verification and Validation Requirements Matrix (VVRM) and formally accept the methods proposed by the Contractor. The Contractor shall note that the proposals are subject to changes deemed necessary to provide the body of evidence required by the Acceptance Authority. Changes shall be agreed between the Contractor and the ITEA WG during the development of the VVRM;
       6. The Contractor shall report information at the Project Review meetings on, but not limited to, equipment test and acceptance issues and recommended corrective action;
       7. The Contractor shall provide any test data that is required for the production of IS to DMS as required.
    3. Configuration Management:
       1. The Contractor is to maintain a detailed approach to Configuration Management, in accordance with Def Stan 05-57, which is to be defined in the Contractor’s Configuration Management Plan, which is to align with the MES PDS Contract Configuration Management plan **[DRL P10]**;
       2. The Contractor shall report information at the Project Review meetings on, but not limited to, the status of Configuration Management issues and recommended corrective action;
       3. The Contractor is to include requirements for the Configuration Management specific to ILS, detailed in Section 4: Integrated Logistic Support in the Configuration Management Plan.
    4. Design Support:
       1. Installation design information in the form of an Installation Solution (IS) will be produced by a combination of the NDP and DMS. This process will rely heavily on the timely flow of mature design and interface information from the Contractor. Therefore, the Contractor shall provide this information as required and in accordance with the Contract;
       2. Interface information requirements are discussed in paragraph 2.5.15 and Section 3 of the SOW and detailed in the Interface Data Requirements List;
       3. The Contractor shall provide all required information, as detailed in the Interface Data Requirements List, to NDP and DMS and also provide suitably qualified representatives to attended DMS led Installation Solution design reviews. This should include as a minimum for the First Of Class fit:
          1. Initial Design Review;
          2. A minimum of two Interim Design Reviews;
          3. Final Design Reviews.
       4. The requirement for attendance at DMS design reviews for follow on Ships will be driven by any change to equipment supply and/or interface information.
    5. Government Furnished Assets (GFA):
       1. The Contractor shall state his requirements for Government Furnished Assets (GFA) in the tender response. Namely, Government Furnished Equipment (GFE)/ Government Furnished Information (GFI)/ Government Furnished Staff (GFS)/Government Furnished Facilities (GFF);
       2. The Contractor shall provide and maintain a Government Furnished Assets (GFA) Log for the duration of the Contract period. **[DRL P11]**;
       3. The integration of the equipment, systems and Government Furnished Assets (GFA) into the equipment/platform shall be undertaken in accordance with the process detailed at paragraph 2.5.15;
       4. The Government Furnished Assets (GFA) should not be modified in any way without the permission of the Authority.

1. SUPPLY AND ENGINEERING
   1. Scope of Supply
      1. The Contractor shall supply:
         1. The equipments as specified in the MCAS Technical Equipment Specification (MCAS TES), at Annex A to this SOW, for each of the T23 Ships to receive the PGMU system;
         2. Training Equipment required to meet the training requirements specified in Section 5. The nature and extent of the supply of Training Equipment will be discussed and agreed between the Authority and the Contractor as details of the update to the MCAS equipment are clarified.
         3. Spares as detailed in Section 4 and summarised as follows:
            1. On-board spares (per Ship);
            2. Base Spares;
            3. Reprovisioning of On-board and Base Spares.
         4. Support and Test Equipment (S&TE) as detailed in Section 4.
      2. Equipment Delivery Schedule:
         1. The Contractor is to supply equipment, spares and S&TE detailed in paragraph 3.1.1 in accordance with the delivery schedule contained in Part 3 of Schedule B of the Contract.
   2. Technical Equipment Specification
      1. The TES for the MCAS system (Lot 4) element of the PGMU system is at Annex A to this SOW and defines the technical requirements and performance specification for Articles to be supplied under this Contract.
      2. All Articles delivered under this Contract shall comply with the requirements identified in the MCAS TES.
      3. The MCAS TES defines the requirements for the update of the existing T23 Machinery Control and Surveillance system.
      4. The existing MCAS system collects data from equipment and analyses it for presentation to the operator. The MCAS update is intended to enhance the organisation of the data to aid fault diagnosis:
         1. The MCAS system should be able to organise Out of Limits Operation information into system groups. A system group shall be presented in terms of major plant items and their ancillaries;
         2. The Contractor shall propose the system groups for agreement with the Authority **[DRL E33]**.
      5. Specific plant and system parameter settings are adjustable to aid the smooth running and setting-to-work of the systems controlled and monitored by the MCAS system. The adjustment allows the set point value to be adjusted between preset maximum and minimum values for parameters appertaining to time constants, delays, temperatures, pressures, flows etc.
         1. The Contractor shall provide a listing of the final values of the adjustable parameters settings used on-board each specific Ship at the end of the PGMU update period **[DRL E34]**.
      6. MCAS Software Safety:
         1. The Contractor shall undertake an analysis of the functions provided by MCAS, and the way these functions affect both the control and monitoring of machinery and the operation of the warship platform, to determine those functions that present, or could present, hazards to human safety or the environment as a consequence of their failure **[DRL E35]**;
         2. For each safety hazard identified during the analysis of MCAS functions and the consequences of their failure, the Contractor shall propose a strategy that will reduce the hazard to an acceptable level of risk **[DRL E36]**;
         3. Evidence shall be provided by the Contractor that the level of functional safety for the MCAS system achieves the standard required by the Naval Authority (Propulsion & Manoeuvring Systems) **[DRL E37]**.
      7. In addition to the shock requirements detailed in the GTR and paragraph 3.4.2 below, the Contractor shall conduct a review using a Finite Element Analysis (FEA) Shock model for new MCAS equipment to be located in the superstructure above 1 Deck **[DRL E38]**.
      8. The current MCAS Signal Schedule, provided at Appendix 1 to the MCAS TES, dates from 1993 and covers the T23 Frigates as a Class, annotated to show differences between batches or individual Ships. It may no longer accurately reflect the provision of signals on-board each Ship due to the differences between Ships at build and the subsequent completion of As&As. Similarly, the MCAS System Parameter List documents provided at Appendices 2 and 3 to the MCAS TES may no longer accurately reflect the provision of signals on-board each Ship.
      9. The current MCAS Supplier has undertaken a survey of HMS ARGYLL, provided at Appendix 9 to the MCAS TES in the form of an MCAS Signal List Spreadsheet, to gather the following data:
         1. MCAS hardware and software signal lists, specific to HMS ARGYLL;
         2. MCAS signal functionality, specific to HMS ARGYLL;
         3. MCAS signal source and destination details, specific to HMS ARGYLL.
      10. Using the original Signal Schedules and Parameter Lists and the HMS ARGYLL MCAS Signal List Spreadsheet as guidance, the Contractor shall undertake a survey of the MCAS System fitted to each individual Ship prior to the start of its PGMU update period to establish a definitive baseline Signal Schedule and Parameter List upon which to base the changes to the MCAS System described in the MCAS TES:
          1. The Contractor shall provide copies of the baseline Ship-specific Signal Schedules **[DRL E39]** and Parameter Lists **[DRL E40]** to the Authority;
          2. The Contractor shall update the baseline Ship-specific Signal Schedule and Parameter List as the Ship’s PGMU update period progresses such that the final versions, after completion of the update period, provide an accurate representation of the provision of MCAS signals **[DRL E41]** and **[DRL E42];**
          3. The Contractor shall use its electronic configuration control tool (ACAT) to record the baseline ship-specific Signal Schedule and Parameter List data resulting from the surveys;
          4. The Contractor shall provide a copy of the ACAT application and of the baseline ship-specific data **[DRL E43]**;
          5. The Contractor shall update the ACAT baseline ship-specific data to provide a final version after completion of each ship’s update period.
   3. General Technical Requirements.
      1. The General Technical Requirements (GTR) specifies requirements with widespread applicability to Type 23 PGMU Equipment and is at Annex B to this SOW.
      2. All Articles delivered under this Contract should comply with the requirements identified in the GTR.
      3. The GTR underpins the MCAS TES document; in the event of any inconsistency requirements specified in the relevant TES for the equipment shall take precedence over requirements in the GTR.
   4. Specialist Engineering
      1. Operating Conditions:
         1. All Equipment supplied under the Contract shall be capable of withstanding and/or operating in the range of environments stated in the GTR as defined with respect to climate and Ship motions;
         2. Where the performance of Equipment supplied under the Contract is affected by external temperature conditions the Contractor shall provide a detailed report that characterises the performance degradation of their equipment as stated in the GTR **[DRL E1].**
      2. Shock:
         1. Significant shock requirements are defined in the GTR. The Contractor shall provide appropriate documentary evidence that the Equipment supplied under the Contract meets these requirements. The Contractor shall prepare, deliver and maintain an Equipment Shock Qualification Plan to define processes for qualifying equipment **[DRL E2];**
         2. The Contractor shall supply documentary evidence in the form of the Equipment Shock Qualification List **[DRL E3]**,Equipment Shock Qualification Report **[DRL E4]** and supporting documents to confirm that all equipment is shock qualified and suitable for use on-board the Ship;
         3. For shock performance specification, the Contractor shall assume that all equipment within the scope of PGMU is Class 2 equipment (functions essential to support the primary functions of the Ship);
         4. The Contractor shall provide Equipment which shall function without degradation in performance when subjected to the shock motions at the foundation (i.e. Ship structure) described in MAP 01-470 and defined in the GTR document.
      3. Software:
         1. Software Management:
            1. The Contractor shall ensure that all software developed under the Contract for the T23 PGMU Project, whether this is a new development or a modification to existing software, is developed and documented in a controlled manner, and such control facilitates its effective long term support;
            2. The Contractor shall therefore prepare, deliver and maintain a Software Integration Plan for Non-Development Software for all software integrated and used for the conduct of any acceptance event or design proving event **[DRL E8];**
            3. Where minor modifications are required to Non-Development Software or where totally new software is required in order to meet the Requirements, the Contractor shall prepare, deliver and maintain a Software Management Plan for New and Modified Software Development **[DRL E9]**.
         2. Software Version Description:
            1. The Authority recognises that several versions of the software associated with the Articles may be required throughout the duration of the Contract. The Authority is reliant on an understanding of the material state of any software, whether it is the final or an interim release, that is delivered in connection with the Work;
            2. Notwithstanding the requirements identified in the Configuration Management section of this document, the Contractor shall prepare, deliver and maintain a Software Version Description for any software delivery **[DRL E10].**
         3. Detailed Software Documentation:
            1. The Contractor shall prepare, deliver and maintain a Software Design Specification for all software provided throughout the Contract. **[DRL E11]**.
         4. Program Assembly Information Document:
            1. The Contractor shall prepare, deliver and maintain a Program Assembly Information Document (PAID) for any Software delivery **[DRL E12];**
            2. For the avoidance of doubt, where the software delivery is not intended for distribution via the Software Issuing Office (for example, software delivered for use during the Authority’s integration or trials activities), the Contractor shall agree any changes to the content of the Program Assembly Information Document that may be necessary to support the activity in question.
      4. EMC:
         1. The Contractor shall prepare, deliver and maintain an Electromagnetic Compatibility Control Plan **[DRL E13]**. The document may be prepared in accordance with the Contractor’s own conventions and format but must include the following information:
            1. Title Page(s) to include Document Title, Document Number, Document Issue, Date of Issue, Contract Number, Revision date, Company Identifier, System Identifier, Security Classification, Author, Authoriser and Approver, Document History and Table of Contents;
            2. Introduction to include statements on Purpose, Scope, Requirement and Glossary of Terms;
            3. Overview to consist of a brief description of the objectives of the EMC Control Plan.
         2. The EMC Control Plan shall address management of the following:
            1. Organisation for EMC Control;
            2. Resources including support from other Contractor and/or specialist facilities;
            3. Responsibilities;
            4. EMC Process, schedule and test schedule;
            5. Summary of detailed EMC requirements and standards imposed on the design and production;
            6. Description of the equipment or subsystem;
            7. EMC defect resolution procedures.
         3. The EMC Control Plan shall include a functional description of the EMC design and implementation process using a flow diagram.
         4. The EMC Control Plan shall describe the specific design techniques and procedures used to meet the EMC requirement, including:
            1. EMC mechanical design, including the following:

Screened cabinet design guidelines;

Screening techniques to be used.

* + - * 1. Electrical wiring design, including cable types or characteristics, cable routing, cable separation, grounding philosophy, and cable shielding types and termination methods;
        2. Fibre optic installation for EMC including Waveguide Beyond Cut-Off (frequency) (WGBCO);
        3. Electrical and electronic circuit design, including the following:

Filtering techniques, technical reasons for selecting types of filters, and associated filter characteristics, including attenuation and line-to-ground capacitance values of AC and DC power line filters;

Part location and separation for reducing EMI;

Location, shielding, and isolation of critical circuits.

* + - * 1. Developmental Testing. Specification of testing to be performed during development (such as evaluations of breadboards, prototypes, and engineering models).
      1. The EMC Control Plan shall describe the EMC Qualification Methodology that shall include:
         1. A detailed list of the proposed qualification testing planned by the Contractor to demonstrate that the items, equipment, subsystems or systems under test/trial conform to the EMC mandated specifications and the UK/EU legal requirements including:

Legacy equipment in service before 20/07/09 – existing naval or commercial standards;

New military equipment – Def Stan 59-411 Pt 3 Issue 1, Amd 1 (2008) Sea Service Below Decks Limits;

All equipment brought into service after 20/09/2011 whether military or civilian – The essential requirements of directive 2004/108/EU or alternative directive (e.g. marine equipment directive).

* + - * 1. Details of proposed certification shall be listed.
      1. The Contractor shall supply an EMC Test Plan **[DRL E14]** to include:
         1. A detailed schedule of the proposed qualification tests planned by the Contractor up to Factory Acceptance Test (FAT);
         2. A definition of the qualification evidence;
         3. Sub-Contractor and notified body support.
      2. The Contractor shall supply an EMC Test Report **[DRL E15]** to be produced on completion of testing and including:
         1. Equipment under test serial numbers and software versions where applicable;
         2. Confirmation that test procedures complied with the EMC Test Plan or listed deviations with justifications;
         3. Test results indicating pass/fail and limits;
         4. Dates of start and completion of tests.
    1. Materials:
       1. The Contractor shall provide documentary evidence of compliance with the Material Selection criteria defined in the GTR;
       2. The Contractor shall prepare, deliver and maintain a Materials List **[DRL E17]** for review and confirmation by the Authority to include, where necessary, a justification statement for the use of materials that do not comply with the Material Selection criteria defined in the GTR;
       3. The Authority will review the Materials List and advise on which items are considered New to RN Warship Service. For such materials the Contractor shall liaise directly with the Authority to fulfil the necessary requirements defined in the GTR;
       4. The Contractor shall confirm that the equipment supplied under the Contract contains only lead-tin solder through the use of suitable and independently-auditable techniques. Where the use of lead-free solders is unavoidable the Contractor shall provide a Lead-Free Solder Verification Report **[DRL E18]** to verify the performance of the equipment to the expected equipment end of life.
    2. Security:
       1. The Contractor shall ensure that the MCAS system and its connections achieve Security Accreditation in accordance with JSP 440 as described in the GTR document;
       2. The Contractor shall supply a Risk Management Accreditation Document Set (RMADS) in support of the Equipment suitability in accordance with JSP 440 as described above **[DRL E20];**
       3. The Contractor shall ensure that security requirements in the TES and GTR are met concerning access controls, physical or electronic, including the override of control interlocks;
       4. The Contractor shall ensure that the frequency and format of accounting records are detailed in their submission (RMADS).
  1. Commissioning, Test, Trials and Acceptance
     1. Commissioning , Test and Trials:
        1. General. A series of tests and trials will be conducted to progressively build up confidence and evidence that the solution will deliver the capability required. There will be tests of the equipment being purchased in each Lot which equate to PGMU sub-system tests. The intention is that Lots/sub-systems will be combined for system-wide testing before installation, to be confirmed by the Integrated Test, Evaluation and Acceptance Working Group (ITEA WG). This may include a test of the MCAS software integration with the DG set procured in Lot 1 and with the MG set procured in Lot 2, prior to Ship installation;
        2. The T23 Requirements Manager (RM) chairs the ITEA WG which will develop a detailed Integrated Test, Evaluation and Acceptance Plan (ITEAP) during the Assessment Phase and Demonstration & Manufacture (D&M) Phase of the project. The extant draft ITEAP is at Annex E to this SOW. The Contractor shall attend ITEA WG meetings and be proactive in planning and conducting the ITEA process to ensure that evidence is gathered to show compliance with requirements in the most cost effective manner. The minimum list of tests follows, and the ITEA WG will add to or otherwise amend the list as required:
           1. Critical Design Review (CDR). The Contractor shall arrange a CDR at which the evidence that the MCAS system will meet the requirements in this SOW, TES and GTR will be presented to the Authority. The required outcomes of the CDR are to be agreed with the Authority at least 2 weeks before the date of the review;
           2. Software Functional and Integration Testing (SFIT). The Contractor shall arrange a period of Functional and Integration Testing for the MCAS software and propose the scope of the tests based on his understanding of the TES and other requirements documents provided in this SOW;
           3. Factory Acceptance Test (FAT). The Contractor shall arrange a FAT and propose the scope of the test based on his understanding of the TES and other requirements documents provided in this SOW;
           4. PGMU System Integration Test. The Contractor shall participate in the planning and conduct of a PGMU system integration test to demonstrate the combined functionality of the main elements of PGMU including the MCAS software. The details of this system-wide test will be developed by the Authority with the PGMU SI through the ITEA WG;
           5. Installation Inspections (II). The Contractor shall liaise with all relevant agencies to plan and conduct II. The securing of new or refurbished MCAS Data Collection Units (DCUs) and Control and Data Collection Units (CDCUs), and the installation of new, replacement and additional MCAS system cabling will be undertaken by the Upkeep Contractor as detailed in Section 3.9. The MCAS system Contractor shall certify that installation has been completed satisfactorily before Setting to Work commences. The ITEA WG will clarify roles and responsibilities;
           6. Setting to Work (STW). The Contractor shall liaise with all relevant agencies to plan and conduct STW. For the First of Class (FOC) installation in each dockyard the Contractor shall lead the STW activity with assistance from Ship Staff and the Upkeep Contractor Commissioning Engineers. For follow on installations the Upkeep Contractor Commissioning Engineers will lead the STW activity and the Contractor shall support and attend STW. The ITEA WG will clarify roles and responsibilities;
           7. Control System Integrity Check (CSIC). The Contractor shall liaise with all relevant agencies to plan and conduct a CSIC. The Maritime Capability Trials and Acceptance (MCTA) team will lead the CSIC and the Contractor shall support and attend CSIC trials. The ITEA WG will clarify roles and responsibilities;
           8. Harbour Acceptance Trials (HAT) (Console). The Contractor shall liaise with all relevant agencies to plan and conduct HAT(Console). MCTA will lead the HAT(Console) and the Contractor shall support and attend HAT(Console) trials. The ITEA WG will clarify roles and responsibilities;
           9. Harbour Acceptance Trials (HAT) Marine Engineering (ME). The Contractor shall liaise with all relevant agencies to plan and conduct HAT(ME). MCTA will lead the HAT(ME) and the Contractor shall support and attend HAT(ME) trials. The ITEA WG will clarify roles and responsibilities;
           10. Sea Acceptance Trials (SAT) Marine Engineering (ME). The Contractor shall liaise with all relevant agencies to plan and conduct SAT(ME). MCTA will lead the SAT(ME) and the Contractor shall support and attend SAT(ME) trials. The ITEA WG will clarify roles and responsibilities;
           11. Shock Trials:

The MCAS equipment is required to conform to the standards defined in the GTR document for Shock requirements. Continued operation following a shock event is key to all PGMU equipment thus the Contractor shall supply Shock Qualification evidence to support claims made in the ESQL;

It is expected that the Authority will undertake a whole Ship Shock Trial on the first Ship installed with PGMU as a minimum. The Contractor shall support the Authority in developing the scope of this trial and analysis of results with respect to their equipment.

* + - 1. ILS. The requirements for ILS testing are at detailed in Section 4: Integrated Logistic Support.
    1. Test Forms. For the tests that are Contractor-led (CDR, SFIT, FAT, PGMU System Integration Test, II and First of Class STW), the Contractor shall produce test forms **[DRL E21]** and obtain Authority approval, via the ITEA WG, a minimum of 2 weeks before the tests are conducted. Draft test forms will be developed by the ITEA WG specifically for each test undertaken in the acceptance process. The Contractor shall support the ITEA process and is to contribute to the development of all test forms where his equipment is involved. The draft test forms will then be developed by the Upkeep Contractor into platform specific forms applicable to the individual Ship receiving PGMU. The Contractor shall liaise with the Upkeep Contractor during this development.
    2. Acceptance:
       1. General. Acceptance will be carried out progressively and in accordance with the guidance in the MOD’s Acquisition Operating Framework. The list of acceptance events at paragraph 3.5.1 is the minimum required to gather acceptance evidence. With Contractor membership, the ITEA WG will plan and execute the detailed route to acceptance, which is a dynamic process, affected by risks and constrained by time and resources. The Contractor shall work closely with the suppliers of Lots 1, 2 and 3 and the PGMU SI, to ensure that the different elements of PGMU combine effectively to deliver the functionality described in the requirements documents;
       2. Verification and Validation Requirements Matrix (VVRM). The VVRM will be developed as an Annex of the ITEAP. It will contain the acceptance criteria for each requirement in the TES, GTR, SRD and URD. The Contractor shall propose acceptance test methods to demonstrate compliance with the requirements in the most cost effective manner, as previously directed at paragraph 2.5.17.e and through participation in the ITEA WG. The VVRM will be used to monitor acceptance progress and after each test event that he is responsible for, the Contractor shall provide evidence in test reports **[DRL E22]** in a format that clearly attributes evidence to TES and GTR requirements, SRs and URs as applicable;
       3. Schedule. The detailed ITEA schedule will be developed by the ITEA WG with input from the Contractor during the D&M phases of the PGMU project. An outline schedule for guidance is at Annex C of the draft ITEAP.
  1. Certification
     1. Classification Society Approval:
        1. The Type 23 is in class for structure and carries the following notations: 100A1, NS2, Frigate, SA1, Air. The Contractor shall identify any potential impact on the Ship’s key structure at the earliest opportunity to enable the Authority to address via the plan approval process;
        2. The Type 23 is not in class for machinery and hence equipment does not need to carry Lloyd’s Register of Shipping (LR) notation however, where proposed new equipment bears an existing notation or generally conforms to classification society regulations this should be indicated to the Authority;
        3. Throughout the Contract it is expected that third party design assurance will be undertaken by LR. The Contractor shall provide any required equipment information required by LR in pursuit of this assurance.
     2. Naval Authority Certification:
        1. Throughout the installation of PGMU into each Ship the Authority will, in accordance with the requirements of JSP 430 Part 3, prepare submissions to the Naval Authority Group for the issue of specific Hazard Area Certificates of Safety for Propulsion and Manoeuvring, Fire, Escape & Evacuation, Stability and Structural Strength;
        2. The Contractor is to provide any required specific equipment information to the Authority to enable the development of the submissions.
  2. Interface Control and Monitoring
     1. Interface with other Equipment and Systems:
        1. The Contractor shall participate in the Interface Management process as described at paragraph 2.5.15. The Contractor shall provide the interface data as detailed in the Interface Data Requirements List (IDRL) **[DRL E24]**. This data shall detail all interface connections;
        2. The IDRL shall include but is not limited to the following:
           1. Weight Constraints and Monitoring:

The Contractor shall submit data as part of the Interface Data Requirements List detailing each major assembly within the overall equipment solution.  Data for each assembly shall detail Weight and CoG figures.

* + - * 1. Space Constraints:

The Contractor’s equipment solution should conform to the space constraints as indicated in the TES and GTR;

The Contractor shall submit, as part of the IDRL, general arrangement drawings, in electronic CAD format, giving clear and complete indication of the space requirement for the equipment and component packages including maintenance envelopes;

The Contractor shall submit dimensional data for each major assembly within the overall equipment solution.  Data for each assembly shall include extreme dimensions.

* + - * 1. Wild Heat:

The Contractor shall inform the Authority of the wild heat output from their proposed equipment solution(s).

* 1. Safety and Environmental Management
     1. General Obligations:
        1. Where this section refers to “safety”, this shall be taken to read “safety and environmental protection” and “software safety”;
        2. The Authority has an obligation to ensure that the Type 23 Ships are demonstrably safe, and that the risks resulting from hazards have been reduced to As Low as Reasonably Practicable (ALARP). For PGMU this will be achieved via the construction of an explicit safety argument and a progressive system of safety assurance as detailed in the Authority’s Safety Strategy and documented though the Equipment and Platform Safety Cases;
        3. The Safety Case shall demonstrate that suitable measures have been taken to ensure that the risks to the safety of personnel, the Ship and its equipment and the environment are As Low As Reasonably Practicable (ALARP), and that the impacts upon the environment have been minimised wherever possible and practicable;
        4. The Contractor shall enter into dialogue with the Authority to ensure full understanding of the Authority’s requirement for both the Safety and Environmental Management, and that the Equipment Safety Case conforms to the Frigates Ship Safety and Environmental Management Plan (SEMP);
        5. The Contractor shall inform the Authority in writing where any new safety issue or hazard throughout the life cycle of their product (including disposal) is identified. This requirement is independent of the Contract and will continue beyond the life of the Contract.
     2. Safety and Environmental Management Plan:
        1. The Contractor shall prepare, deliver and maintain a Safety and Environmental Management Plan (SEMP) **[DRL E25]** which covers all activities within the Contract including Software Safety Management and is in accordance with Def Stan 00-56;
        2. The Contractor’s SEMP shall be presented at the initial Safety Review Meeting and then at subsequent reviews as the Contractor’s Safety Case matures;
        3. The Contractor’s SEMP shall describe the management organisation of the Contractor specific to the management of safety and environmental issues and development of the Contractor’s Equipment Safety Case. Personnel and interfaces to be highlighted in the safety management organisation should include :
           1. Nominated Contractor’s Safety Manager - responsible for compiling documentation, organisation, and managing the Safety and Environmental Management Programme;
           2. Key technical specialists;
           3. Description of Safety and Environmental organisation with terms of reference for members and SQEP credentials including responsibilities and resources;
           4. Link to Authority Safety Officer;
           5. Links to other organisations (Classification Society (LRS) and others as appropriate);
           6. Links to Sub-Contractors.
        4. The Contractor’s SEMP shall include the Ship and major equipment description with Safety and Environmental context;
        5. The Contractor’s SEMP shall define the Safety and Environmental Requirements, Objectives, Targets and Acceptance plan;
        6. The Contractor’s SEMP shall detail the methodology used to identify and classify hazards. Specifically all procedures, methodology and documentation must be described;
        7. The Contractor’s SEMP shall describe the scope of the HAZOP Study detailing the types of HAZOP Study and the areas of the design to which they are to be applied to the Ship;
        8. The Contractor’s SEMP shall include the SEMP programme;
        9. The Contractor’s SEMP shall include a register of all safety and environmentally related assumptions;
        10. The Contractor shall ensure that all Sub-Contractors develop, update and implement appropriate plans (commensurate with the scope of work for each Sub-Contractor) that results in the delivery of an integrated and cost-effective approach to the safety and environmental aspects of the Contract;
        11. The Contractor shall ensure that all Contractor and Sub-Contractor activities are in accordance with the Safety and Environmental Management Plan.
     3. Hazard Log:
        1. The Contractor shall develop, provide and maintain a Hazard Log **[DRL E26]** to capture all safety and environmental risks identified in the course of developing the Safety Case. The Hazard Log shall use the D Ships Risk Classification Matrix (Figure 3) and shall capture each hazard recording information required for the conduct of the HAZOP Study including but not limited to:
           1. Unique reference number;
           2. Ship System / Procedure / Zone;
           3. Title;
           4. Description;
           5. Mitigation;
           6. Frequency, Consequence / Severity and Risk Classification;
           7. Administrative details of how and when the hazard was raised;
           8. Administrative details of how and when the hazard was accepted;
           9. Contain features to enable hazards to be managed to be ALARP and accepted.
        2. The Hazard Log shall permit a user to interrogate the hazards to extract Statistics, including by Risk Classification.

| **Severity** | | | |
| --- | --- | --- | --- |
| Accident Severity | Personnel Safety | Damage to Ship or other material with an impact on safety | Environmental Safety |
| Catastrophic | More than 100 deaths | Loss of vessel | Significant prolonged or widespread damage to a habitat or species. Damage > 100 years. |
| Disastrous | 10 to 100 deaths. | Vessel out of action > 6 months, and / or loss of three or more aircraft. | Significant prolonged or widespread damage to a habitat or species. Damage 10 to 100 years. |
| Critical | 1 to 10 deaths. | Vessel out of action 2 – 6 months, and / or loss of one or two aircraft. OPDEF Cat A | Major damage to a habitat or species. Damage 1 to 10 years. |
| Major | Permanent RIDDOR.  Severe injury from which a full recovery is not possible and which must be reported under RIDDOR 95 | Major damage to Ship systems, requiring repair period alongside <2 months. OPDEF Cat B | Small-scale, short-term damage to a habitat or species. Damage 1 month to 1 year |
| Marginal | Recoverable RIDDOR.  Injury that can be recovered from with medical treatment and recovery time, but which must be reported under RIDDOR 95 | Operationally critical Ship system(s) out of action, restorable at sea 2 hours to 2 days. OPDEF Cat C | Minor local damage to a habitat or species. Damage up to one month. |
| Negligible | Non – RIDDOR.  Minor injury requiring basic first aid treatment and not reportable under RIDDOR 95 | Operationally critical Ship systems temporarily disabled, restorable at sea within 2 hours. | Minor local damage to a habitat or species. No sustained damage. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Frequency** | | | |
|  | Occurrence during the working lifetime of a Ship | Whole Ship Accident Frequency per Year | Frequency of an *accident* involving a *particular* *individual* resulting in the stated *severity* (per year) |
| Frequent | Likely to occur repeatedly on the Ship during its life. | >1 | >10-1 |
| Probable | Likely to occur from time to time on the Ship during its life. | >10-1 | 10-1 – 10-2 |
| Occasional | May occur once on the Ship during its life. | 10-1 – 10-2 | 10-2 – 10-3 |
| Remote | Unlikely to occur on the Ship during its life. | 10-2 – 10-3 | 10-3 – 10-4 |
| Improbable | Very unlikely to occur on the Ship during its life. | 10-3 – 10-4 | 10-4 – 10-5 |
| Highly Improbable | Extremely unlikely to occur on the Ship during its life. | 10-3 – 10-4 | 10-5 – 10-6 |
| Incredible | Extremely rare event. | 10-5 – 10-6 | <10-6 |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Classification** | | | | | | |
|  | Catastrophic | Disastrous | Critical | Major | Marginal | Negligible |
| Frequent | **A** | **A** | **A** | **A** | **A** | **C** |
| Probable | **A** | **A** | **A** | **A** | **B** | **C** |
| Occasional | **A** | **A** | **A** | **B** | **C** | **D** |
| Remote | **A** | **A** | **B** | **C** | **C** | **D** |
| Improbable | **A** | **B** | **C** | **C** | **D** | **D** |
| Highly Improbable | **B** | **C** | **C** | **D** | **D** | **D** |
| Incredible | **C** | **D** | **D** | **D** | **D** | **D** |
| **A Intolerable** – Can NOT be tolerated – unable to be signed off / endorsed unless there are exceptional reasons for the activity to take place. Must be authorised by higher authority (D Ships in agreement with DCNIC)  **B Undesirable.** Can be tolerated. A full safety justification and ALARP argument must be provided, including safety assessment, to justify the risk. Any residual Class B risks are to be approved on a case by case basis, by the Project Safety Committee and authorised by the Team Leader in agreement with NCHQ.  **C Tolerable**. Can be tolerated provided ALARP status is reached. The record of ALARP status is to be provided in the Hazard Log.  **D Broadly Acceptable**. Can be tolerated (can be signed off from an ALARP perspective). The record of ALARP status is to be provided in the Hazard Log. | | | | | | |

Figure 3 - D Ships Risk Classification Matrix

* + 1. Equipment Safety Case:
       1. The Contractor shall develop, maintain and refine an Equipment Safety Case through the full lifecycle of the Contract;
       2. Where appropriate, the Contractor shall ensure that any related Safety Cases already in existence are utilised and integrated into the Safety Case;
       3. The Contractor shall prepare, deliver and maintain Equipment Safety Case Reports (SCR) **[DRL E27]** in accordance with the Authority’s safety regulations, namely Def Stan 00-56 and JSP 430, which shall describe the equipment, the safety analysis completed and the significant hazards that have been identified and how these hazards have been dealt with. Software Integrity is also to be managed in accordance with the requirements of NAN 09-2012;
       4. The draft SCR shall be presented at the initial Safety Review Meeting and then at subsequent reviews as the Contractor’s Safety Case matures;
       5. The SCR shall be presented in a manner that clearly articulates the claims, arguments and evidence demonstrating the Safety Case. The depth of argument and evidence shall be proportionate to the risk posed by the hazard and its complexity. The SCR Format shall consist of the following two “core areas”:
          1. Design Disclosure. It shall include, as a minimum:

General Arrangement drawing and description of the Equipment;

An understanding of the margin between the safe operating envelope and the actual safety limits, including justifications that the equipment design philosophy is understood and the material state is consistent with the design solution;

References to all documentation relating to safety and environmental management that will form part of the overall Contractor’s Safety Case;

Scheme of Complement in order to safely operate the equipment, minimum skills required and associated Training Needs Analysis;

Copies of the certificates as required.

* + - * 1. Risk Management. It shall include as a minimum:

Reference to the Hazard Log and its current issue status;

A summary of all Cat A and B Hazards and the worst 20 Cat C Hazards and a summary of hazard statistics including number by hazard class and how many are awaiting classification or resolution;

Emergency and Contingency Arrangements, to consider all credible events where risk controls may fail.

* + 1. Control of Substances Hazardous to Health (COSHH):
       1. The Contractor shall carry out COSHH risk assessments, in accordance with JSP375 and the requirements of the GTR, of materials and substances used in the manufacture or operation of the equipment or that form part of the equipment itself;
       2. The assessments should be used as part of equipment development and for the Contractor’s use during any potential commissioning, trials, maintenance, repair and overhaul;
       3. The Contractor shall provide and maintain COSHH risk assessments in the form of a COSHH Register throughout the duration of the Contract **[DRL E28]**;
       4. Use of Batteries:
          1. The unmanaged use of Li-ion batteries presents a safety risk on-board Ship. Any use of batteries with a capacity of greater than 96Wh is to be avoided;
          2. Any requirement for the use of batteries with a power requirement in excess of 96Wh is to be agreed with the Authority;
          3. The Contractor shall supply a comprehensive list of installed batteries in the form of a Battery Register **[DRL E29]** detailing: capacity, type, voltage, location, charging arrangements, and vents.
    2. Environmental Management:
       1. The Contractor shall prepare, deliver and maintain a Contractor’s Environmental Statement **[DRL E30]** that considers the full lifecycle of the Equipment, in accordance with the Project Orientated Environmental Management System (POEMS) methodology. This shall cover, but not be limited to, the following:
          1. Any Environmental Impact Assessments (EIA) related to the equipment and supporting documentation and evidence of mitigation or impact reduction measures that have been taken;
          2. An Environmental Risks Log, taken as an output of those items in the Hazard Log which are identified as Environmental Risks;
          3. An Environmental Legislation Log together with acceptance or conformance criteria and evidence of compliance. This could be incorporated into a common matrix with safety related legislation;
          4. An actions and outstanding issues log, showing all actions remaining at hand over;
          5. Inventory of Hazardous Materials (IHM) for the equipment to be provided under the Contract.
       2. The Equipment should not use materials specified in the EU critical raw materials list or in the British Geological Survey Risk List as described in the GTR. Should these materials be required then the Contractor shall prepare, deliver and maintain a Use of Critical Raw Materials Report detailing its use and justification.
    3. Sustainable Procurement:
       1. The PGMU requirement set includes requirements and constraints that are consistent with the MOD’s mandated policy of sustainable procurement. Pertinent examples are energy efficiency targets and adherence to environmental legislation. By fulfilling the technical requirements and the obligations on the Contractor in Section 3.8, the Contractor will be participating in the MOD’s sustainable procurement processes;
       2. The Contractor shall show that sustainable development risks and opportunities have been considered. The Contractor shall provide evidence of this in their proposal and shall subsequently adhere to the principles of sustainable procurement described in the MOD’s Acquisition Operating Framework.
    4. Safety and Environmental Meetings and Audits:
       1. Meetings:
          1. The Contractor shall hold a bi-monthly (every two months) Safety Review meeting with the Authority. This meeting should generally be held in conjunction with Project Review meetings. The Safety Review meeting shall focus on the Hazard Log but also provide information on, but not limited to:

Equipment Safety Case development;

Control of Substances Hazardous to Health (COSHH) issues;

Environmental Management issues;

Sustainable Procurement;

Safety Certification impact.

* + - * 1. Unless agreed otherwise the Safety Review meetings shall be:

Held alternately at the Authority’s and Contractor’s premises in conjunction with the Project Review Meetings;

Chaired by the Authority;

Arranged/coordinated by the Contractor;

Secretariat support provided by the Contractor including the recording of actions in the form of minutes **[DRL E31]**.

* + - * 1. The Authority may require the Contractor’s attendance at its own safety and environmental meetings. These may cover both safety and environmental issues associated only with the Contractors Articles, or safety and environmental issues associated with PGMU as a whole;
        2. The Contractor shall invite the Authority to attend any internal safety meetings he intends to hold (for example, a hazard identification or safety committee meeting).
      1. Audits:
         1. The Authority may choose to conduct one or more safety and environmental audits of the Contractor’s safety and environmental material. These audits may be conducted by the Authority, or by an independent safety auditor that has been appointed by the Authority;
         2. The Authority will give the Contractor at least 10 working days’ notice of its intent to conduct an audit;
         3. The Contractor shall support the audits, and provide that information necessary to conduct the audit (such as, but not limited to, formal records of all hazard and risk assessment meetings);
         4. Unless agreed otherwise, safety and environmental audits shall be:

Conducted by the Authority (or the independent safety auditor);

Held at the Contractor’s premises;

Recorded by the Contractor in the form of Minutes **[DRL E32]**, and

All Action Items arising from a Meeting shall be recorded by the Contractor.

* + - * 1. The Contractor shall identify and implement at his cost timely remedial actions to address any Observations or Critical Deficiencies raised by the Authority during the audit.
    1. PGMU Safety Assessment:
       1. As part of the development and approval of the Installation Solution for PGMU, as a whole system, DMS will lead a safety assessment in order to ensure that:
          1. Individual Equipment Safety Cases, for each Lot, are understood and incorporated into a PGMU Safety Case;
          2. The impact of individual equipment failures in the context of operational scenarios and the Type 23 operating profile are understood;
          3. All hazards associated with the installation and operation of PGMU in Type 23 platforms have been identified, assessed and categorised;
          4. Mitigation actions are identified and implemented to ensure hazards are ALARP and that installation can proceed.
       2. The Contractor shall provide all required information, as detailed in the Interface Data Requirements List, to the Authority and DMS and also provide suitably qualified representatives to attended DMS led Safety Assessment meetings. This should include as a minimum for the First Of Class fit:
          1. Initial Safety Assessment;
          2. A minimum of two Interim Safety Reviews;
          3. Final Safety Reviews.
       3. The requirement for attendance at Safety Reviews for follow on Ships will be driven by any change to equipment supply and/or interface information.
    2. Software Safety
       1. The Contractor shall undertake the achievement, assurance and management of Software Safety as described in Def Stan 00-55 Part 1 (Requirements for Safety of Programmable Elements (PE) in Defence Systems). Note that PE is defined as Products, Services and Systems (PSS) that are implemented in software or programmable hardware, which includes any device that can be customised, e.g. ASICs, PLDs and FPGAs”, as defined in Def Stan 00-56 Part 1.
       2. The Contractor shall provide a Programmable Element Safety Summary (PESS) in accordance with Def Stan 00-55 section 6.1.4 (**DRL E44**).
       3. The aspects of PE management derived from Def Stan 00-55 may be contained within the Safety and Environmental Management Plan (SEMP) [DRL E25] rather than create a new PE Safety Management Plan.
       4. Def Stan 00-55 is based upon use of an International Standard (for this Contract IEC 61508 is to be used). If the Contractor intends to use its own internal processes for the achievement, assurance and management of Software Safety, the Contractor shall undertake an analysis of the differences between their internal processes and IEC 61508 and provide this analysis to the MOD for agreement (**DRL E45**).
  1. Installation
     1. The MCAS Contractor shall undertake the installation of new, additional and replacement MCAS components within the existing MCAS consoles (including MCAS SCC Consoles and Desks, Secondary Electrical Control Panels (SECPs) and the Primary Electrical Control Panel (PECP)), DCU racks and CDCU racks.
     2. Modification of the MCAS System DCU and CDCU racks should be undertaken in-situ. If necessary the Upkeep Contractor will remove MCAS System racks from the Ship for modification by the MCAS Contractor at the MCAS Contractors works, and will secure the modified MCAS System racks to the existing seatings upon their return.
     3. Modification of MCAS consoles shall be conducted in-situ or following removal by the MCAS Contractor of the affected components from the MCAS console for modification at the MCAS Contractors works. Removal of complete MCAS consoles from the Ship shall not be undertaken.
     4. The Upkeep Contractor will install new, additional or replacement MCAS cabling (including, where appropriate, fibre optic cabling), to the design specified by the MCAS Contractor during the detailed design phase of the Contract.
     5. The MCAS Contractor shall connect the modified MCAS System racks, and modified MCAS consoles, to the Ship’s installed cabling:
        1. The position of cable glands, plugs and sockets associated with each of the replacement or modified MCAS System racks and modified MCAS consoles shall align with the position of the equivalent cable glands, plugs and sockets associated with each of the current MCAS System racks and consoles so as to minimise the disruption to the Ship’s installed cabling during installation.

1. INTEGRATED LOGISTIC SUPPORT
   1. **Introduction**
      1. The principles of ILS, as defined in Def Stan 00-600 (Integrated Logistic Support Requirements for MOD Projects) shall be applied to all update aspects of the PGMU MCAS programme.
      2. PGMU is expected to consist of a high proportion of Commercial Off The Shelf (COTS) equipment which limits the opportunity for support considerations to influence design, however where design freedom exists, ILS shall be used to ensure support is considered during the design process. Where no design freedom exists, ILS will be used to evaluate the supportability of the systems proposed.
      3. The ILS Plan sets out the overall support strategy for PGMU. The key outcomes of the ILS requirement are:
         1. To achieve a cost effective ILS programme appropriate to existing systems and COTS based technology;
         2. To achieve and sustain availability of PGMU at minimum Whole Life Cost (WLC);
         3. To achieve the Logistic Support Date (LSD) for PGMU on time and to cost;
         4. To establish a robust framework for the long term in-service management of PGMU that is underpinned by the required Supportability Analysis.
   2. **Support Solution**
      1. The Lot 4 Support Solution, as developed for the renewal of the existing Post Design Support (PDS) contract, shall comply with the requirements of the Authority’s Acquisition Operating Framework (AOF) and Support Solutions Envelope (SSE).
      2. The Contractor shall:
         1. Provide a Guarantee Defect period for Lot 4 supplied Equipment for each T23 Ship installed with the PGMU solution in accordance with Figure 4 and as detailed in Clause 13 of the Terms and Conditions;
         2. Undertake Integrated Logistic Support (ILS) Activities as detailed in paragraph 4.5.



Figure 4 - Guarantee Defect Periods

* + 1. Please note that Contractor Logistics Support (CLS) is not applicable to this contract. On completion of the Guarantee Defects Period, continued support will be provided through renewal of the existing Post Design Support (PDS) arrangements. Note: The earliest date for availability of the new support Contract is Nov 2016. This should not create problems for PGMU unless delayed beyond the Warranty/Guarantee defect period for the FOC fit.
  1. **Guarantee Defects**
     1. This is detailed in Clause 13 (Guarantee Defects Period) of the Special Conditions of Contract.
  2. **Support Tasks**
     1. The Support Tasks which shall be undertaken during the Guarantee Defect period are fully detailed at Annex C to this SOW and are broken down as follows:

**Task 1** - Provision of facilities for repair/overhaul, test and storage of equipment and associated spares;

**Task 2** -Equipment commissioning;

**Task 3** -Supply of sub-assemblies, components and associated spares;

**Task 4** -Repair/overhaul of sub-assemblies, components and associated spares;

**Task 5** -Technical support.

* + 1. If the Contractor’s Supportability Analysis recommends a deviation from the tasks proposed then, following Authority agreement, the Contract Change Procedure at Clause 22 of the Contract shall be used to amend the requirement.
  1. **ILS Activities**
     1. **ILS Management:**
        1. General:
           1. The Contractor shall provide an Integrated Support Plan (ISP) for the management and execution of the ILS Programme which shall conform to JSP 886, Volume 7, Part 2, Annex B, PD0001-01. **[DRL S1]**;
           2. The Contractor shall state within the ISP the Company policy on ILS and describe how it proposes to implement the policy: a copy of the Company policy that is referenced within the ISP is to be provided to the MOD;
           3. The Contractor shall assign an ILS Manager for the PGMU programme;
           4. The Contractor shall include the Terms of Reference (TORs) for the Contractor’s ILS Manager within the ISP;
           5. The ILS Manager shall have full responsibility and accountability for performance of all ILS requirements for the PGMU system;
           6. The ILS Manager shall be provided with resources within the Contractor’s company necessary to manage the Contractor’s ILS programme;
           7. Where the Contractor proposes to use Sub-Contractors the ISP shall include management of the Sub-Contractors' ILS activities;
           8. The proposed method of management of equipment suppliers shall be stated.
        2. Organisation:
           1. The Company's ILS organisational structure shall be described covering each speciality within ILS;
           2. An organisational diagram shall be produced, identifying the relationship between ILS and other disciplines within the overall organisation;
           3. CVs of the Contractor’s ILS Manager, Supportability Analysis (SA) Manager and other key ILS personnel shall be included within the ISP provided.
        3. ILS Programme Management:
           1. The Contractor shall establish and provide an ILS project milestone plan within the ISP;
           2. The Contractor shall propose an ILS delivery schedule within the ISP, which details all ILS deliverables.
        4. Logistic Support Committee (LSC) Meetings:
           1. The Contractor shall support LSC meetings with the Authority in accordance with Def Stan 00-600 and JSP886. The Contractor shall produce the meeting agenda (to be agreed with the MILSM) and the meeting minutes within 10 working days of each meeting. The output of the activities shall meet the requirements of JSP 886, Volume 7, Part 2, Annex B, PD 0003-01. The first LSC meeting shall be held within 30 days of Contract award. Subsequent LSC meetings will be held at bi-monthly intervals up to the LSD, with the venue alternating between the Authority and Contractor’s premises. **[DRL S2]**.
        5. In-Service Logistic Support Committee (ISLSC):
           1. The Contractor shall support ISLSC meetings with the Authority in accordance with Def Stan 00-600 and JSP886. The Contractor shall produce the meeting agenda (to be agreed with the MILSM) and the meeting minutes within 10 working days of each meeting. The output of the activities shall meet the requirements of JSP 886, Volume 7, Part 2, Annex B, PD 0003-01. ISLSC meetings will be held at quarterly intervals after the LSD for the duration of the Contract, with the venue alternating between the Authority and Contractor’s premises. **[DRL S3]**.
        6. Supportability Case:
           1. The Contractor shall demonstrate the supportability status of the equipment and the adequacy of the support solution through the delivery of Supportability Case Reports (SCRs) 5 working days prior to each LSC meeting. **[DRL S4]**;
           2. The SCRs shall provide sufficiently detailed evidence to assure that the support requirements contained in this SOW are being addressed;
           3. The SCRs shall detail the mitigation or the management approach to all support risks and issues;
           4. The SCRs shall be constructed in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 4002-01;
           5. All relevant supportability disciplines in scope for this project, e.g. HFI, Training, R&M etc. shall be addressed in the SCRs.
        7. Risk:
           1. The Contractor shall identify and integrate ILS risk activities with the overall MCAS Project risk activities;
           2. The Contractor shall incorporate Support Solution risks into the MCAS Project Risk Register;
           3. The MOD’s intention is to implement a joint PGMU Project Risk Register with MOD and the PGMU Contractors: risks to delivery of the PGMU Project, including any support activity risks, should be included within this.
        8. Standardisation:
           1. The Contractor shall define the methodology whereby standardisation of supportability aspects are exploited, and risks identified.
     2. **Configuration Management**:
        1. The Contractor shall detail, within the ISP, how configuration management for ILS data shall be achieved as part of the project configuration management process: a copy of any Company configuration management policies or processes that are referenced within the ISP are to be provided to the MOD;
        2. All elements (Logistically Significant Items) that require configuration management to enable support of the capability shall be identified.
     3. **Supportability Analysis (SA)**:
        1. SA Management:
           1. The Contractor shall state the Company approach to SA giving a short description within the ISP;
           2. The Contractor shall outline the SA strategy within the ISP;
           3. The Contractor shall outline a Supportability Analysis Plan (SAP), in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 0002-01, within the ISP;
           4. The Contractor shall state how he will ensure that Sub-Contractors, if employed, practice the discipline of ILS/SA.
        2. SA Scheduling:
           1. A programme plan shall be outlined within the ISP;
           2. The plan shall also identify deliverable milestones.
        3. SA Tailoring:
           1. SA activities shall be tailored to meet the Contract requirements;
           2. The size, complexity and proposed acquisition strategy of the Project shall be taken into consideration in determining the SA tailoring to be applied and outlined within the ISP.
        4. SA activities:
           1. The Contractor shall undertake the following SA activities, defined in the ISP, within the SA programme:

A Task analysis shall be conducted;

Post Production Support Analysis shall be conducted;

Supportability, Test, Evaluation and Verification shall be carried out.

* + 1. **Maintenance**:
       1. Maintenance Management:
          1. A Maintenance Plan for the development of the system maintenance concept shall be outlined in the ISP;
          2. Using the results of the SA, the given maintenance concept shall be developed into a System Maintenance Plan and Maintenance period statements, which shall encompass the total system, training equipment and its Support and Test Equipment (S&TE). The required maintenance shall fit within the current RN norms for maintenance periods and the maintainability requirements specified in the System Requirements Document (SRD);
          3. The Plan shall identify all the preventive and corrective system maintenance tasks to be performed and their resource requirements;
          4. The manpower required to implement the plan at each level shall be quantified by grade and trade group;
          5. The plan shall identify the requirement for its periodic review.
       2. Maintenance Aims:
          1. The product shall be designed for an overall reduction of the maintenance task;
          2. Allow fault diagnosis and permit equipment exchange of faulty Line Replaceable Units (LRUs) by service personnel without Contractor support;
          3. Ensure the requirement for preventive maintenance during operational periods, if any, is compatible with the allowable equipment downtime.
       3. Maintenance:
          1. A product Maintenance Policy shall be prepared;
          2. A Maintenance Period Statement shall be produced that identifies:

Periods of non-operational time to which equipment will be subject;

Conditions in which equipment are to be maintained during each type of period;

The consequential requirements for power supplies and services.

* + - * 1. The Contractor shall identify the maintenance required for specific environments.
      1. Failure Modes, Effects and Criticality Analysis (FMECA):
         1. Where applicable, the Contractor shall complete a Failure Modes Effects and Criticality Analysis (FMECA), identify and record Failure Definitions and produce a Criticality Matrix. The Contractor may update an existing analysis if available.
      2. Reliability Centred Maintenance (RCM):
         1. Where applicable, the Contractor shall conduct and deliver a Reliability Centred Maintenance (RCM) analysis, in accordance with Def Stan 00-45 and using the Authority’s RCM Toolkit (to be issued after Contract award). The Contractor may update an existing analysis if available;
         2. The Contractor shall state how the RCM data obtained can be verified/validated;
         3. The Contractor shall state his point of contact for RCM;
         4. The Contractor shall work with the Authority UMMS Team to produce Maintenance Task Instructions as necessary during the course of the Contract.
      3. Level Of Repair Analysis (LORA):
         1. The Contractor shall conduct a LORA, taking into account the preferred maintenance concept provided in the Authority ILS Plan, including the requirement to maximise use of on-board RN maintenance personnel. A tailored level of LORA, Supportability Analysis & supporting information is needed for completely new elements of the MCAS solution. **[DRL S9]**.
      4. Use of Reliability And Maintainability Data:
         1. The Maintenance Policy shall take into account the system R&M data. If necessary the Maintenance Policy shall be reviewed in order to achieve the R&M targets.
      5. Maintenance Envelopes & System/Equipment Routes:
         1. The Contractor shall ensure that the equipment used for maintenance is usable in the space available;
         2. The Contractor shall specify which equipment needs to be removed in order to carry out surveys, refurbishment or replacement of lifed items or as a consequence of work in the wake of other activities;
         3. Lifting arrangements for replaceable items of equipment shall be identified.
      6. Maintenance Schedules:
         1. Design Authority Maintenance Schedules (DAMS) shall be prepared by the Contractor based on the outputs of the Contractor’s supportability analysis (including RCM, LORA and FMECA). The Contractor shall collate all Design Authority Maintenance Schedules, incorporate common maintenance items and present a system/equipment set of DAMS. **[DRL S10]**;
         2. MOD comments shall be incorporated into the Design Authority Maintenance Schedules.
      7. Information Package:
         1. The Contractor shall ensure that Maintenance plans are generated for all supplied equipment:
         2. The Contractor shall collate all Maintenance plans and ensure that the equipment being procured conforms to the Maintenance policy requirements;
         3. The Maintenance plan shall be a through life plan which identifies all planned and corrective maintenance.
      8. Unit Maintenance Management System (UMMS):
         1. The Unit Maintenance Management System (UMMS) shall be used by the Authority to hold information relating to the planned maintenance activities that need to be undertaken. The UMMS information shall consist of the maintenance schedules proposed by the equipment Contractor and the common maintenance schedules produced by the Authority. The scheduling of maintenance periods and the amalgamation of the maintainer and operator functions shall be taken into consideration by the Contractor;
         2. The Contractor shall produce the maintenance solution using the Authority’s WinUMMS software application, available at nil cost provided a Non-Disclosure Agreement (NDA) is agreed with the holder of the IPR for UMMS (IFS Defence).  Maintenance Tasks shall be written in accordance with BRd 1313 Maintenance Management in Surface Ships and supplied with the maintenance solution in MS Word format using the template supplied by the Authority.
      9. Navy Specific Maintenance Clauses:
         1. A product information package shall be developed for new items as detailed in the ILS Plan. **[DRL S11]**;
         2. A technical datum pack shall be developed for new items as detailed in the ILS Plan **[DRL S12]**;
         3. Configuration control of the datum pack shall be detailed in the ILS Plan.
    1. **Support Information Management Systems:**
       1. The Contractor shall develop and provide a Logistic Information Management Plan, as an appropriately tailored section of the ISP, in accordance with Def Stan 00-600 and JSP886, Volume 5;
       2. Logistics Information:
          1. The Contractor shall ensure that all data generated as a result of performing SA is recorded and delivered to the Authority;
          2. Sub-Contractors who are Contracted to supply equipment or systems for integration into the platform shall also supply to the Contractor all relevant support data and whole life cost data;
          3. The Contractor shall ensure that all support data for equipment is provided by the equipment suppliers, Sub-Contractors, and for GFA, by the MOD Project Manager.
       3. Data Exchange:
          1. The Contractor shall define in the ISP the interface between the MOD PT and the Contractor’s ILS team.
    2. **Project Hardware Requirements:**
       1. The Authority currently uses UMMS, MIMIC3 and CRISP inventory management systems. The Contractor shall state how his inventory management systems will link to the Authority’s current and future systems/applications, noting that the stated systems may evolve or be replaced during the PGMU in service life.
    3. **Design Influence:**
       1. The Contractor ILS Manager (CILSM) shall participate in all major design reviews;
       2. Consideration shall be given by the Contractor, when undertaking design activities, to reducing the requirements for support.
    4. **R&M Interface:**
       1. Management:
          1. The Contractor shall develop and provide an R&M Programme Plan as an appropriately tailored section of the ISP;
          2. The Contractor’s R&M Programme Plan within the ISP shall be the single planning and controlling document for all R&M activities;
          3. The Contractor shall, through his R&M Programme Plan, demonstrate his commitment, understanding and approach to R&M, placing emphasis on how his proposed R&M programme fits into the overall programme;
          4. The Contractor shall update the ISP should a significant change occur to the programme;
          5. The Contractor shall ensure that R&M is a standard agenda item at Project Management Meetings, LSC meetings and Design Reviews;
          6. The Contractor shall undertake an R&M Programme in order to satisfy the Authority’s R&M requirements;
          7. The Contractor shall assign a suitably qualified and experienced person, who shall be responsible for all R&M aspects of the PGMU MCAS programme;
          8. The Contractor shall define in the ISP the interface between the CILSM and the Contractor’s R&M Manager;
          9. The Contractor shall state in the ISP how the consistency between the R&M and ILS programmes will be maintained;
          10. Integration procedures between SA and R&M shall be developed and documented in the ISP and R&M Plan;
          11. The Contractor shall state in the ISP who will advise on the impact of R&M activities, describing how and when this will be done;
          12. The Contractor shall attend the Authority’s R&M Project Panel Meetings when invited, to report on his R&M activities and the progressive assurance of R&M.
       2. Reports:
          1. The Contractor shall provide Summary Case Reports (SCR)as detailed in the Authority ILS Plan, including the submission of any existing R&M data. As a minimum this shall include:

The Inherent Availability of the equipment to be supplied;

Mean Time Between Failure (MTBF) for the equipment to be supplied;

The Mean Time To Repair (MTTR) for the equipment to be supplied.

* + - * 1. The Contractor shall, for his Summary Case Report and its evidence, allow for Authority review and audits;
        2. The supplier should indicate whether Accelerated Reliability Tests (ART) have been carried out or shall detail provision for these to be conducted. ART need not be conducted providing that suitable evidence supporting the reliability data of updated items is provided.
    1. **Supply Support:**
       1. The spares, tools and test equipment required to meet the defined Maintenance policies shall be analysed and defined. The use of existing T23 and ready codified equipment, tools and spares should be maximised. The following shall be taken into account:
          1. Spares, Tools and Test equipment to support trials prior to the Logistic Support date (LSD);
          2. Testing and Tuning Spares;
          3. On board Spares;
          4. Support Spares;
          5. Diagnostic Test Spares;
          6. Contingency Support Spares;
          7. Training Equipment Spares;
          8. Consumables;
          9. Fuels, lubricants and associated products.
       2. The proposed fuels, lubricants and associated products shall comply in all respects with the Montreal Protocol Treaty of 1987 and the Kyoto Protocol 1997;
       3. Supply Management:
          1. The Contractor shall develop and deliver a Supply Support Plan, as an appropriately tailored section of the ISP, in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 3002-01.
       4. Provisioning Data:
          1. The Contractor shall provide an Initial Provisioning List (IPL) in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 3003-03. **[DRL S18]**;
          2. The Contractor shall collate the provisioning data supplied by equipment suppliers and produce a rationalised list;
          3. The Contractor shall identify the recommended initial spares required to support the equipment supplied for an initial period of 2 years from the Ready for Sea Date (RFSD) in accordance with DEFCON 82. **[DRL S19]**;
          4. The Contractor shall identify long lead time items within the recommended initial spares and deliver a Long Lead Time Item (LLTI) list. **[DRL S20]**;
          5. The Contractor shall specify unique in-store maintenance instructions for all spares;
          6. The Contractor shall, where appropriate, prepare a Contract Repair Statement (CRS) for items which cannot be repaired or maintained by MOD sources. **[DRL S21]**;
          7. The CRS shall be presented in the Contractor’s Maintenance Plan outlined in the ISP;
          8. The Contractor shall state any requirements for a bonded store;
          9. The Contractor shall state the IPR conditions for each item;
          10. A Reprovisioning Plan shall be produced, as an appropriately tailored section of the ISP, in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 3006-01.
       5. Provisioning Technical Documentation:
          1. The Contractor shall supply Provisioning technical documentation, as an appropriately tailored Annex to the ISP to support justification of spares selection. This shall include (where appropriate):

Illustrated Parts Listing in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 3005-01;

Provisioning Schedules;

Manufacturers recommendations;

R&M data (where available);

Outline descriptions.

* + - 1. NATO Codification:
         1. The MOD will undertake NATO Codification action through the UK National Codification Bureau (UK NCB) and ensure that all Items that will enter the Authority Joint Support Chain (JSC) shall be NATO Codified;
         2. The Contractor shall provide the data for NATO Codification required in accordance with DEFCON 117 and JSP 886, Volume 7, Part 2, Annex B, PD 3004-01 for any items of equipment or spares that will enter the JSC and are not already codified. **[DRL S24]**.
      2. Spares Delivery:
         1. The Contractor shall deliver the required spares, consumables and fuels, lubricants and associated products to the Authority in accordance with the equipment delivery schedule.
      3. In service Supply Support:
         1. In service supply support instructions shall be produced, for the renewal of the existing PDS contract, in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 3007-01**. [DRL S25]**;
         2. The Contractor shall submit details of the organisation that would be established to meet the identified requirement for the renewal of the existing PDS contract. The size of the organisation in terms of resource numbers is to be defined;
         3. The Contractor shall provide a listing of spares types and provide a schedule of maximum response times within the supply support instructions;
         4. The Contractor shall include a brief description of the following within the supply support instructions:

How demands from deployed systems/equipments will be accommodated;

What procedures will be established for supply of spares by air freight, if required.

* + - 1. International Agreements:
         1. The Contractor shall identify, within the ISP, any items that are subject to International Trade in Arms Regulations (ITAR);
         2. The Contractor shall detail procedures, within the ISP, to be used for managing items subject to ITAR;
         3. The Contractor shall identify, within the ISP, any items that are subject to International Trade Cooperation Treaty (ITCT);
         4. The Contractor shall detail procedures, within the ISP, to be used for managing items subject to ITCT;
         5. The Contractor shall identify, within the ISP, any items that are subject to Import Duty Wavier (IDW);
         6. The Contractor shall detail procedures, within the ISP, to be used for managing items subject to IDW.
    1. **General Purpose Hand Tools:**
       1. The Contractor shall collate all General Purpose hand tools requirements and rationalise the requirements, to ensure that adequate hand tools are available to support the system;
       2. The Contractor shall identify and deliver a list of General Purpose hand tools required. **[DRL S26]**.
    2. **Special To Type Hand Tools (STH):**
       1. STH are designed specifically for use with particular equipment. Such tools are to be introduced only where essential and with the consent of the Authority. STH shall be provided with the equipment and, preferably, are to be securely stowed within the equipment close to the point of use;
       2. The Contractor shall justify the need for STH;
       3. Tools shall be selected in the first instance from existing General Purpose hand tools listings;
       4. The Contractor shall identify and deliver a list of STH required. **[DRL S27]**;
       5. STH Delivery:
          1. The Contractor shall deliver the required STH to the Authority in accordance with the equipment delivery schedule.
    3. **Support & Test Equipment:**
       1. A Support and Test Equipment (S&TE) Plan shall be developed and delivered, as an appropriately tailored Section in the ISP, in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 0004-01;
       2. All S&TE required to diagnose defects on, and maintain, the equipment shall be identified and linked to the maintenance task requirements;
       3. S&TE Delivery:
          1. The Contractor shall deliver the required S&TE, which is not already within the MoD inventory, to the Authority in accordance with the equipment delivery schedule. Where S&TE is already in the MoD inventory, the “Required in Yard” date shall be identified.
       4. General Purpose Test and Measurement Equipment:
          1. General purpose test and measurement equipment (GPTME) shall be selected from existing listings;
          2. The Contractor shall collate all general purpose test and measurement equipment requirements and rationalise the requirements, to ensure that adequate test equipment is available to support the system;
          3. The Contractor shall identify and deliver a list of suitable general purpose test and measurement equipment required to support the system. **[DRL S29]**.
       5. Special Purpose Test and Measurement Equipment:
          1. The Contractor shall justify the need for any Special Purpose Test and Measurement Equipment (SPTME);
          2. The Contractor shall identify and deliver a list of new SPTME required to support the system. **[DRL S30]**.
       6. SPTME Delivery:
          1. The Contractor shall deliver the required new SPTME to the Authority in accordance with the equipment delivery schedule.
       7. Support of Support Equipment:
          1. The required Technical Information for the use, calibration, maintenance, transportation and storage of S&TE shall be included as part of the Technical Documentation suite.
    4. **Facilities:**
       1. Policy:
          1. Existing facilities shall be used to the maximum extent possible.
       2. Analysis:
          1. The Contractor shall develop and deliver a Facilities Plan, as an appropriately tailored Section in the ISP, in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 0004-01;
          2. The Contractor shall analyse and state the requirements for the use of existing facilities for the renewal of the existing PDS contract;
          3. The Contractor shall state any new requirements in relation to existing facilities for the renewal of the existing PDS contract.
       3. New/Modified Facilities:
          1. The Contractor shall define any requirements for new or modified Facilities for the renewal of the existing PDS contract;
          2. These should be specified in outline as early as possible to allow minimisation if possible, or planning for future requirements or budgets to be undertaken;
          3. The need for new/modified facilities shall be justified and agreed with the Authority.
       4. Training Installations:
          1. Where required and agreed with the Authority, Facilities shall be established, or adapted, for the training of operators and maintainers.
          2. An update to the existing operator training Facilities at HMS Sultan is outside the scope of this Contract.
    5. **Human Factors:**
       1. Management:
          1. The Contractor shall develop and deliver an Human Factors Integration Plan that forms an element of the overall ISP in accordance with JSP 886, Volume 7, Part 08-09 and JSP 886, Volume 7, Part 2, Annex B, PD 0004-01;
          2. The plan shall demonstrate how the inputs from, and outputs to, Human Factors are to be managed for the renewal of the existing PDS contract;
          3. The Contractor shall comply with the requirements of JSP912;
          4. The Contractor shall identify top level Human Factors requirements and establish a common schedule for the interface with ILS tasks with the Human Factors Manager.
       2. Interface with ILS:
          1. The Contractor shall develop integration procedures to ensure compatibility between the HF and ILS activities for the renewal of the existing PDS contract;
          2. The Contractors policy for ensuring compatibility of HF and ILS data shall be defined.
    6. **Technical Documentation Management Plan:**
       1. Technical Documentation (TD) is the information necessary to operate, service, repair and support PGMU throughout its life. TD contains information covering the technical description, operating instructions, provisioning, maintenance, repair, support, and disposal of defence materiel. Note: The technical documentation will need to satisfy two main criteria: firstly to demonstrate that the MCAS update meets the agreed requirements and secondly to demonstrate that appropriate updates can be completed to BRs, IPCs etc. to enable support beyond the GD period;
       2. All Contractor TD activities undertaken as part of this procurement programme shall comply with JSP 886 Vol 7 (ILS) part 8.05 (Technical Documentation) which details the policies and requirements for the preparation, distribution and maintenance of Technical Documentation for the MOD and Armed Forces;
       3. If the Contractor proposes the use of a Company standard for Technical Documentation, this standard shall deliver JSP 886-compliant documentation;
       4. The use of a Company standard for Technical Documentation shall be agreed with the MOD;
       5. A copy of a Company standard for Technical Documentation shall be provided to the MOD;
       6. The Contractor shall develop and deliver a Technical Documentation Management Plan (TDMP) as an appropriately tailored Section in the ISP, in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 2001-01;
       7. The Contractor shall propose a technical information production and delivery schedule to be agreed with the MOD ILSM;
       8. The Contractor shall state the Guarantee Defect period and IPR conditions applicable to the technical documentation and information supplied:
          1. The Contractor shall produce Technical Documentation in electronic format as Electronic Technical Documentation (ETD) in .pdf format;
          2. The Contractor shall provide Technical Documentation covering all equipment supplied to support, maintain, train and provide technical support from the first usage, allowing it to be operated, managed, maintained and disposed of effectively, efficiently and safely.
       9. Validation:
          1. The Contractor shall specify how Technical Information configuration control will be integrated into the deliverable Quality Plan;
          2. The Contractor shall incorporate comments from MOD staff on the supplied technical documentation and information;
          3. The Contractor shall present validation certificates to MOD to facilitate acceptance of each technical document supplied. **[DRL S34]**.
       10. Publication and Maintenance:
           1. Processes for maintaining the Technical Documentation/Information suite shall be identified within the deliverable Quality Plan;
           2. Processes for publishing the Technical Information / Documentation suite to end users shall be identified within the deliverable Quality Plan;
           3. Processes for incorporating feedback from end users to facilitate updates of Technical Documentation/Information shall be identified within the deliverable Quality Plan.
       11. Publication Delivery:
           1. The final deliverable TD should be the most cost-effective solution consistent with the constraints of existing support policy: refer to GFA Item 21-37 (ILSP) Annex C (Technical Documentation Management Plan);
           2. The Contractor shall include, but not be limited to, the following:

Books of Reference (BR) in electronic (pdf) format. **[DRL S35]**;

Marine Engineering Guides (MEG) updates for on board distribution by Marine Engineer Officers (MEO). These guides are intended to be used in conjunction with the relevant BR and Operating Instructions. **[DRL S36]**;

* + 1. **Packaging, Handling, Storage and Transportation:**
       1. Management:
          1. The Contractor shall develop and deliver a Packaging, Handling, Storage and Transportation (PHS&T) plan as an appropriately tailored Section in the ISP in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 0004-01 and the ILSP.
       2. Packaging:
          1. The Contractor, or a specialist sub-Contractor, will be required to identify suitable levels of packaging, in conjunction with the Defence Packaging Group;
          2. Packaging shall be designed and manufactured in compliance with Def Stan 81-41 in order to meet the requirements of Military Level Packaging (MLP);
          3. Packaging development data shall be produced in accordance with the PHS&T plan;
          4. The Contractor, or a specialist sub-Contractor, shall label Spares in accordance with DEFCON 129J;
          5. The Contractor, or a specialist sub-Contractor, shall bar-code spares in accordance with STANAG 4329 for new items only.
       3. Handling:
          1. Where appropriate, the Contractor shall identify and deliver a list of Special handling equipment required to support the supplied equipment. **[DRL S39]**;
          2. The Contractor shall identify and specify any Special handling requirements for the equipment supplied;
          3. Maintenance and calibration requirements for special handling equipment shall be included in the Contractor’s Maintenance Plan section of the ISP;
          4. The forward and reverse supply chain shall be analysed and the demarcation of any new responsibilities between Contractor and the authority formalised;
          5. Where appropriate the Contractor shall define in-store Care and Maintenance procedures within the PHS&T Plan section of the ISP;
          6. Where appropriate the Contractor shall state the storage requirements for the equipment prior to delivery and installation within the PHS&T Plan section of the ISP;
          7. The Contractor shall ensure that stowage racks/containers are provided for built-in spares that cannot be stowed/housed within the parent equipment, but are required to be contained near to the equipment in order to meet the required Mean Time To Repair (MTTR).
       4. Transportation:
          1. A transportability summary shall be incorporated in the PHS&T Plan section of the ISP;
          2. Equipment being capable of being replaced outside UK areas shall be capable of being transported by air, in un-pressurised compartments, without sustaining damage or prejudicing safety.
    2. **Disposal Planning:**
       1. The Contractor shall develop and deliver a Disposal Plan as an appropriately tailored Section in the ISP in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 0004-01. Note:The MOD may wish to recover all user exchangeable parts, subject to review, at each ship fit;
       2. The Contractor shall supply a list of hazardous materials used within the equipment within the Disposal Plan for the renewal of the existing PDS contract;
       3. The Contractor shall supply a list of recyclable materials used within the equipment and its packaging within the Disposal Plan for the renewal of the existing PDS contract;
       4. A disposal strategy, which conforms to current UK safety and environmental legislation, shall be produced and incorporated within the Disposal Plan for the renewal of the existing PDS contract;
       5. The Contractor shall update disposal planning in light of changes to legislation, operational environment and/or modification to the system for the renewal of the existing PDS contract;
       6. The Contractor shall minimise the use of hazardous substances within the system and support equipment.
    3. **Software Support:**
       1. The Contractor shall develop and deliver a Software Support Plan, as part of the deliverable Quality Plan in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 0005-01;
       2. The Contractor's Software Support capability shall support all software supplied by the Contractor, including responsibility for third party software, used in any part of the system;
       3. Where the term "software support" is used it shall be taken to mean all the software, hardware, firmware, personnel and other resources required to correct a deficiency or design error, incorporate an enhancement, or respond to a hardware change/update;
       4. The Contractor's Software Support capability shall be subject to, and integrated with, the project Configuration Management programme;
       5. The System design shall enable authorised software updates to be incorporated on-board Ship without compromising the software integrity of the System.
    4. **Transfer to In Service Support:**
       1. The Contractor shall develop and deliver an In Service Support Plan for the renewal of the existing PDS contract;
       2. In Service Support arrangements will be defined and agreed with the MOD ILSM;
       3. The Contractor shall develop and deliver a Post Design Support (PDS) Plan, for the renewal of the existing PDS contract, detailing how support will be transitioned into the MES PDS contract.
    5. **ILS Test and Evaluation:**
       1. The Contractor shall develop and deliver a tailored Supportability Test Evaluation and Verification (STEV) Plan for new items only to demonstrate equipment scope and limitations. **[DRL S44]**;
       2. The plan shall identify the test and evaluation services/facilities required for the renewal of the existing PDS contract;
       3. The full STEV shall be prepared for the renewal of the existing PDS contract;
       4. Supportability demonstrations shall be undertaken concurrently with maintainability demonstrations as part of a Logistics Demonstration (Log Demo) for the renewal of the existing PDS contract;
       5. The Contractor shall initially select candidate items for test during the Log Demo;
       6. The Contractor shall submit the Candidate Items List (CIL) to the MILSM, as part of the STEV Plan, who will then select the items to be demonstrated for the renewal of the existing PDS contract;
       7. The MILSM reserves the right to select any other item. The Contractor shall acknowledge this right;
       8. Formal review of supportability and related supportability design Contract requirements shall be an integral part of each system and sub-system programme;
       9. The Contractor shall support an In Service Reliability Demonstration (ISRD), as described in the ILSP, should the Authority decide that such a demonstration is required for the renewal of the existing PDS contract.
    6. **Obsolescence Management:**
       1. The Contractor shall develop and deliver an Obsolescence Management Plan (OMP) in accordance with the Authority ILS Plan. **[DRL S45]**;
       2. The OMP shall address the issues concerning the obsolescence of COTS equipment and the effective management of alternative form, fit and function solutions that will allow the MCAS system to have an anticipated service life that aligns with the current OSD of the T23 Class;
       3. The Contractor shall supply evidence that:
          1. Retained I/O PEC boards will be supportable until the OSD of the T23 Class.
       4. Retained motherboards and ancillary PECs will remain supportable until the OSD of the T23 Class. The Contractor shall deliver an updated OMP prior to the end of the final Guarantee Defect period which addresses obsolescence for the equipment supplied under the Contract for the following 5 year period. [**DRL S45**]. The OMP delivered at this point shall address the assessment of obsolescence risks, issues and recommended mitigation strategies;
       5. The Obsolescence Management Standard to be used shall be proposed by the Contractor, identified in the OMP and agreed by the MOD ILSM;
       6. Based on a risk assessment, all services and items including spares, S&TE, their components and constituent parts shall be identified and recorded on an obsolescence management database;
       7. A system shall be established to update the OMP and manage obsolescence through life;
       8. The Contractor shall inform the Authority of any arising current or future obsolescence concerns regarding materials within the planned period of use of the equipment supplied under the Contract;
       9. The Contractor shall undertake Obsolescence mitigation investigations;
       10. Resolution of Obsolescence:
           1. The Contractor shall agree the mitigation strategy for obsolescence issues in conjunction with the Authority;
           2. The Contractor shall identify a route to counter obsolescence and implement the agreed obsolescence mitigation plan. Mitigation strategies may include, but are not limited to:

Recovery (and repair) of additional parts from stored (removed) equipment;

Supply alternative part with equivalent fit-form-function;

Modify the equipment to accept an alternative part;

Lifetime buy of current part;

Re-establishment of manufacture against original drawings;

Modification of the equipment performance requirements to remove the requirement.

* + - 1. Software Obsolescence Management Plan:
         1. The Contractor shall develop and deliver a Software Obsolescence Management Plan (SOMP) in accordance with the Authority ILS Plan. **[DRL S46]**;
         2. The SOMP shall address the issues concerning the obsolescence of COTS software and the effective management of alternative form, fit and function solutions that will allow the MCAS system to have an anticipated service life that aligns with the current OSD of the T23 Class.
      2. The Contractor shall provide evidence that management of software obsolescence will allow:
         1. The replacement MCAS System Software to remain supportable until the OSD of the T23 Class;
         2. The operating system to remain supportable until the OSD of the T23 Class.
      3. The SOMP shall include any software related tools including, but not limited to, tools used for the generation, compilation, emulation, conversion, programming and storage of the MCAS System Software and the proposed operating system.
      4. The Contractor shall demonstrate, through a Supportability Analysis, that the MCAS system will be able to provide and support the necessary formats for all data export until the OSD of the T23 Class;
      5. The Contractor shall deliver an updated SOMP prior to the end of the final Guarantee Defect period which addresses obsolescence for the Software supplied under the Contract for the following 5 year period. [**DRL S46**]. The SOMP delivered at this point shall address the assessment of obsolescence risks, issues and recommended mitigation strategies;
      6. The Contractor shall inform the Authority of any arising current or future obsolescence concerns regarding Software within the planned period of use of the equipment supplied under the Contract;
      7. The Contractor shall undertake Software obsolescence mitigation investigations;
      8. Resolution of Software Obsolescence:
         1. The Contractor shall agree the mitigation strategy for Software obsolescence issues in conjunction with the Authority;
         2. The Contractor shall identify a route to counter Software obsolescence and implement the agreed obsolescence mitigation plan.
    1. **Whole Life Costs (WLC):**
       1. The Contractor shall define the Company philosophy with respect to WLC for the renewal of the existing PDS contract. The Contractor shall describe his understanding of the rationale of the design to life cost philosophy and outline his programme for minimising design and support costs;
       2. The Contractor shall develop and deliver a Whole Life Costs (WLC) Plan in accordance with the Authority ILS Plan for the renewal of the existing PDS contract.
    2. **Safety:**
       1. The Contractor's ILS Manager shall provide inputs into the Equipment and Project Safety Cases;
       2. The interface between the ILS/SA team and the safety programme shall be identified within the Contractor’s ISP and the PMP.
    3. **Intellectual Property Rights (IPR):**
       1. The Contractor shall identify and report IPR Issues with information for the identification of support tasks and resources;
       2. In accordance with DEFCON 16 & 21 the MOD are required to retain IPR control of data required in the pursuit of Operation, Repair, Maintenance, Dismantling and Destroying the System at all times.

1. TRAINING
   1. **General**
      1. The update of the T23 MCAS System will require an update to existing T23 Marine Engineering training, delivered at HMS SULTAN. The PGMU Training Steering Group (TSG) has been established to direct and assure the training solution on behalf of the Training Line of Development. The TSG has approved a PGMU Training Information Paper (TIP), included at Annex D to this SOW, to inform the following:
         1. The scope for Interim Training delivery;
         2. The audience and associated skill set for training;
         3. The training objectives and equipment.
      2. An update to the existing operator training facilities (the T23 simulator) at HMS Sultan is currently outside the scope of this Contract.
   2. **Management**
      1. The Contractor shall adhere to the requirements of MOD's Defence System Approach to Training (DSAT) Quality Standard 001:2008, JSP 822, Part 4 – The Defence Manual of Training Management and The Defence Training Support Manuals.
      2. The Contractor shall attend TSG meetings as required to enable design and delivery of Interim Training.
      3. The Contractor shall produce and deliver a Training and Training Equipment (T&TE) Plan, as an Annex to the main Integrated Support Plan in accordance with JSP 886, Volume 7, Part 2, Annex B, PD 0004-01. **[DRL T1]**.
      4. The Contractor shall establish a training activities master schedule, to be included within the Training and Training Equipment Plan, and agreed with the Authority.
      5. The Contractor shall confirm and agree objectives and performance levels for each Training course with the Authority, based on levels of engineering capability as specified in the TIP. **[DRL T2]**.
      6. Training course length shall be kept to the minimum needed to achieve the required level of performance, as agreed with the Authority.
      7. The Contractor shall identify and manage Training risks as part of the overall PGMU risk management activity.
      8. The Contractor shall ensure that maintenance and update to training equipment does not adversely affect the availability of that equipment to deliver scheduled training.
   3. **Courseware**
      1. The Contractor shall develop and deliver all Training material, to be coherent with the wider PGMU support solution, in time for the Ready for Training date (RFTD). **[DRL T3]**.
      2. The Training Needs, as understood by the Contractor, to generate the knowledge and skills necessary to operate and maintain the equipment, shall be included in the T&TE Plan and covered by the training material. Where possible, this shall be referenced against existing Type 23 training documents for current equipment and shall maximise the re-use of any appropriate and relevant existing training, including learning content, training media, delivery infrastructures and support facilities.
   4. **Requirements**
      1. The Contractor shall deliver Interim Training to enable scheduled PGMU system/equipment acceptance, trials, and First and Second of Class PGMU training requirements to be met, as described in the TIP. The audience for this shall include, but not be limited to, Training Instructors, Ships Company, FOST Staff, Test and Trials Personnel, Upkeep Contractor Staff and others as identified in the TIP or by the Authority.

Note: The Contractor may wish to propose that Interim Training be conducted using the T23 Reference Test Facility located within the Contractors premises in Portsmouth rather than the existing facilities with HMS Sultan.

* + 1. The Contractor shall deliver training to Training Instructors to enable the Authority to deliver PGMU training as part of future steady-state training.
    2. The Contractor shall provide electronic versions of all training manuals, guides and documentation. **[DRL T3]**.This shall be made available in MS-Office format, without copyright or IPR restrictions that would preclude its use in training materials produced by, or on behalf of, the Authority.
    3. The Contractor shall provide details of the impact on all training support material and facilities resulting from Contractor update/development of PGMU equipment types.
  1. **Equipment and Training Aids**
     1. The Contractor shall define and update/supply MCAS training equipment to support the delivery of the full scope of T23 marine engineering training, as detailed in the PGMU TIP. This shall include but not be limited to, the supply of equipment detailed in paragraph 3.1.1b and additional diagnostic equipment (e.g. laptops).
     2. The Contractor shall engage with the TSG to provide input to the design of PGMU training facilities at HMS SULTAN, to ensure optimum fitness for purpose.
     3. The Contractor shall engage with both the TSG and the Contractor(s) to be employed by HMS SULTAN for the development and update of the existing T23 simulator facility. Note: the development and update of the existing T23 simulator facility in HMS SULTAN is not within the scope of this Contract. The Contractor shall provide details of changes to the layout and appearance of the sea-going MCAS Consoles and of changes to the functionality of the MCAS system such that the existing T23 simulator facility can be developed and updated by HMS SULTAN to be fully representative of the sea-going T23 MCAS System following the PGMU update.
     4. The Contractor shall liaise with all relevant agencies to plan and conduct required STW.
  2. **Training Conduct**
     1. The Contractor shall deliver training to Authority course designers if required.
     2. The Contractor shall provide alternative training facilities if the Contracted training equipment is not available for use at HMS SULTAN for the Ready For Training Date (RFTD).

ANNEXES

ANNEX A to SCHEDULE A - Lot 4 SOW

Technical Equipment Specification (TES) for the MCAS System

ANNEX B to SCHEDULE A - Lot 4 SOW

General Technical Requirements

ANNEX C to SCHEDULE A - Lot 4 SOW

ILS Definitions of Tasks

ANNEX D to SCHEDULE A - Lot 4 SOW

Training Information Paper

ANNEX E to SCHEDULE A - Lot 4 SOW

Integrated Test, Evaluation and Acceptance Plan (ITEAP) - Draft