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|  |  | **SHIPS** |

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

CONTRACT SSA/004/04

ANNEX E TO SCHEDULE A

**Integrated Test Evaluation and Acceptance Plan (ITEAP)**

Issue: v 2.1

Date: January 2016

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**Power Generation and Machinery Control And Surveillance (MCAS) Update (PGMU)**

**INTEGRATED TEST, EVALUATION AND ACCEPTANCE PLAN (ITEAP)**

File Ref: <file reference>

Version: <2.1>

Dated: <14/05/15 >

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# STRATEGIC CONTEXT AND ITEA OBJECTIVES

## Military Capability (MC) Context

## Aims and Objectives of the ITEAP

1. The aim of the ITEAP is to provide a framework document and outline Acceptance Strategy for PMGU, agreed by T23 Team Leader (TL) and relevant stakeholders. It gives a common understanding of project intent and visibility of the criteria, methodology, organisation and maturity of project planning, to achieve In Service Acceptance of PGMU. ITEA is a methodology intended to optimise the acceptance process by:
   1. Identifying the risks that can be mitigated by testing;
   2. Assigning appropriate test methods;
   3. Testing at an appropriate time.
2. The ITEAP captures, records and assigns responsibility for the actions, stages and decisions needed to ensure that the PGMU capability is delivered. The principles of ITEA are set out in the Acquisition Operating Framework (AOF). This document covers delivery of the capability endorsed under the PGMU User Requirement Document (URD) and System Requirement Document (SRD). It has been produced to satisfy the following purposes:
3. To provide the Project Team (PT) with an acceptance strategy as defined in the Requirements and Acceptance Management Plan (RAMP);
4. To reduce costs and risks by applying a progressive and incremental acceptance process, making best use of carry forward evidence.
5. It outlines the acceptance strategy, organisation and high level processes planned for progressive acceptance of PGMU with stakeholders, along with their roles and responsibilities for acceptance of the Defence Lines of Development (DLoD). It articulates, in conjunction with the Schedule and the Verification and Validation Requirements Matrix (VVRM), how the cumulative evidence required to demonstrate the achievement of User and System Requirements for PGMU is to be obtained. This maintains traceability to the PGMU SRD, and thence to the URD and Key User Requirements (KURs) therein. This ITEAP, together with the URD and the SRD, has been produced according to the requirements of the RAMP[[1]](#footnote-2).

## ITEAP Management

1. The ITEAP contents will be agreed by all DLoD owners and progressively refined prior to final endorsement by the Acceptance Authority. The ITEAP will be revised and reissued at stages throughout the life-cycle of the equipment. The role of the ITEA WG is to co-ordinate activities across all the organisations involved in order to ensure the development of the ITEA strategy into a detailed plan (the ITEAP), covering all DLoDs and service domains, for the acceptance of the required PGMU capability. Once supporting elements of industry are on contract, representatives from the companies will also attend the WG and help develop the ITEAP into a final version that will govern the testing and trials. The ITEA WG will continue to meet until PGMU Trials and Acceptance activities have reached a steady state (expected to be no earlier than completion of ship 2).

## System Description

1. Figure 1-1 below illustrates the boundary of the PGMU system for the purposes of this ITEAP. The Type 23 Power Generation and MCAS Update (PGMU) project is a merger of the Power Generation System Update (PGSU) and the Machinery Control and Surveillance (MCAS) update projects that have been combined due to the close physical integration of the two systems thereby reducing overall project risk and avoiding additional costs in project management, approvals and system integration.

**Figure 1-1: PGMU System Boundary**

## Requirements Management

1. The capability required by the User was developed during the requirements capture phase and is recorded in the URD in the form of User Requirements (UR) statements, with minimum and desired capability levels and accompanying context statements. These URs are brigaded under KUR headings, defined as: ‘those individual (User) requirements that are assessed as key to the achievement of the mission need. The KUR are considered key to the achievement of the Military Capability and therefore clearly bound what must be achieved when assessing potential capability trade offs.
2. The definition of “Update” is significant in its application to this project. Essentially a cost constraining term, it means that PGMU is not seeking to improve capability; rather it is seeking to maintain the current capability for longer. A consequence of this is that for many requirements, the acceptable performance level defaults to “no worse than for the current capability.” This leaves room for improvement, depending on what Suppliers propose, but makes it clear that capability improvements are not being funded. In January 2013, following stakeholder consultation and the Sponsor’s endorsement, Issue 3 of the URD and Issue 4 of the SRD were published.
3. This ITEAP assumes that the SRD captures all legislative and other mandatory requirements and embodies key requirements across all DLoDs. Where the delivery of Military Capability depends on work not arising out of the SRD (for example tasks included in a contractual Statement of Work or a Ministry of Defence (MOD) Internal Business Agreement) this need is captured in the VVRM as an ‘Acceptance Objective’ and can therefore be subjected to the same acceptance process.
4. The System Requirement hierarchy for PGMU is shown in Figure 1-2 below:

**Figure 1-2: PGMU System Requirement Hierarchy**

1. The PGMU ITEA approach is primarily concerned with confirming the achievement of the Acceptance Criteria listed in the SRD and URD but also ensuring that the detail from the Technical Equipment Specification (TES) and General Technical Requirements (GTR) which are linked back to the SRD. However provision may be made for additional testing to be carried out for purposes that may not be explicitly linked to specific SRs, for example:
2. To validate assumptions;
3. To increase confidence or reduce risk.
4. Created, managed and coordinated by the PGMU Requirements manager (RM), using best practice from other procurement programmes, the Portfolio of Evidence (PoE) will take two forms: a Dynamic Object Orientated Requirements Set (DOORS) database where all the testing and acceptance evidence will be collated, and written reports following test events. The DOORS dataset will be used to collate all testing and acceptance events and deliver reports on the achievement of the UR and SRs. Broadly it will cover:
5. DLoD Maturity;
6. PoE Scope at ISD;
7. Satisfaction of UR;
8. Outstanding Acceptance Events & Trials;
9. Assurance Statements from each of the DLoDs.



**Figure 1-3: DOORS Database Logical View**

## DLoD and Capability Integration

1. The suppliers of the equipment are contracted to supply parts of the outputs required from other DLoDs (most particularly Training), the remainder being supplied from within the MOD or through the MOD from other contractors. In order to achieve integration of the PGMU capability into service, suitable representation is required from across Navy Command and DE&S staff.
2. The ITEAP covers acceptance of the integrated outputs of all the DLoDs that contribute to Military Capability. Interoperability, which impacts on all DLoDs, is also included. A summary of the contribution to Military Capability by each DLoD is given below.
3. The PGMU DLoD Assurance matrix will record the progress of the key deliverables of each DLoD and provide assurance to the Project Board (PB) that the overall capability is being achieved to target across all DLoDs.

### Training

1. For PGMU the Training requirements entail the training of operators and maintainers to levels commensurate with the Training Information Paper and Training Analysis, Interim training of ship’s staff, training developers and instructional staff delivered by the contractors. It is anticipated that steady state training to follow will be conducted at Her Majesty Ship SULTAN delivered by uniformed and contracted staff[[2]](#footnote-3), using training materiel provided by the PGMU suppliers. The Training Steering Group (TSG) will manage progress of the Training Line of Development (TLoD).

### Equipment

1. The provision of military systems (including updates to legacy systems) needed to outfit/equip an individual, group or organisation. As well as covering the actual equipment within the PGMU boundaries as defined in Figure 1-1, this ITEAP also seeks to cover the interfaces with other systems at both the physical and functional levels.

### Personnel

1. This ITEAP assumes that there will be no change to manning levels for PGMU both for maintainers and operators.

### Information

1. Coherence with the Ship’s Definition Database is currently the only requirement in the SRD under the Information DLoD.

### Concept and Doctrine

1. For PGMU, Naval Command Head Quarters (NCHQ) will support the development of procedures for the employment of this equipment captured in updates to the BR 6620 series of documents.

### Organisation

1. There are no organisational changes envisaged as a result of the introduction of PGMU as this is an update of current capability.

### Infrastructure

1. A constraint on the PGMU project is that it shall not require additional shore facilities, nor shall it require additional infrastructure with the exception of that training infrastructure which is within the scope of the project. It was agreed at the 11 Sep 14 ITEA WG meeting that Training infrastructure would be managed by the TLoD.

### Logistics

1. The Restricted procurement strategy meant that there could not be any negotiation over the support solution: an approach accepted by the Support Assurer. To mitigate this issue, Contractors will work jointly with the Integrated Logistic Support Manager (ILSM) in the Logistics Support Committee (LSC) to develop and execute a Supportability Test Evaluation & Verification (STEV) Plan. A series of Logs Demos will take place with the intention to declare a Logistics Support Date 3 months before the start of SAT (ME). The LSC will manage the process and the ILSM will report progress back to the ITEA WG.

## Project Documentation

1. The ITEAP is the “controlling document” for, test evaluation and acceptance of the end-to-end PGMU capability. It will be informed and updated by the Master Data Assumption List (MDAL) in parallel with the RAMP, URD and SRD. As a living document the ITEAP and its subordinate products will continue to inform and update the MDAL in turn.
2. Subordinate to the ITEAP are four ‘living documents’ that are progressively updated as the programme matures:
3. The VVRM which has yet to be compiled. At this time a number of high level acceptance events have been identified in the URD and SRD and these require further refinement, by the relevant DLoDs to distil the verification and validation requirements and set the acceptance criteria. The VVRM will also record the outcome of acceptance activities to create the Acceptance Case. It will cover requirements across all the DLoDs and will be the focus of the MOD’s acceptance activity. The Contractors will provide input and help mature the VVRM through their participation in the ITEA WG;
4. The PGMU ITEA Schedule will show the expected delivery of requirements, products, activities, outputs and resources against the key project milestones. It defines the logical series of events needed to deliver the Capability Need. The ITEA Schedule will be published at two levels;
5. Level 0: An outline schedule in a simple format showing the timing of major events and milestones, covering all DloDs, intended for general information, planning and reporting purposes is at Annex C;
6. Level 1: A detailed schedule adding lower level events including trial durations, dependencies and critical resource requirements. This schedule will be produced when detailed testing and trials planning commences.
7. THE ITEA Risk and Opportunities register details specific risks relevant to Testing and Evaluation. These are captured at Annex E and feed into the project risks;
8. THE ITEA Assumption List details specific assumptions relevant to Testing and Evaluation. These are captured at Annex F and feed into the project assumptions.
9. The ITEAP will operate in conjunction with other project documents including (but not limited to) the Safety & Environmental Management Plan (SEMP), Integrated Logistic Support Plan (ILSP), and the PGMU Project Master Schedule..

## Contractual Elements

1. The PGMU system has been split into a number of separate contracts of Lots. These are:
2. Lot 1 – Diesel Generators;
3. Lot 2 – Power Conversion Equipment (Motor Generators);
4. Lot 3[[3]](#footnote-4) - Electrical Distribution Systems;
5. Lot 4 – Machinery Control and Surveillance System (MCAS);
6. Lot 5 – System Integrator (SI).
7. All equipment suppliers[[4]](#footnote-5) are contracted to provide evidence of Testing and Evaluation of their products including Factory Acceptance Tests (FAT)s, through-life support management, quality assurance, safety and environmental management. In addition, suppliers are required to produce a draft TEA schedule for their equipment. The role of the ITEA WG is to coordinate these individual plans and produce the most efficient combined plan for the PGMU system.
8. It is essential that until PGMU has been successfully delivered into service the Suppliers of the key equipments (Providers of Lots 1 to 4) develop and maintain effective working relationships with the PGMU PT, the suppliers of the other key equipments and wider stakeholders as appropriate to ensure a successful integrated PGMU solution is installed. The Authority will contract the services of a SI (Lot 5) to act as delegated technical authority and to manage the PGMU equipment suppliers and deliver the capability specified in the PGMU requirements set. A summary of the 5 Lots is at Annex H
9. The need for a PGMU SI has arisen from the procurement strategy of purchasing PGMU equipment in 4 different Contracts, without appointing a Prime Contractor. The resulting integration risks are well understood by the Authority and the T23 PGMU Integration Strategy explains how the risks are mitigated.

# STAKEHOLDERS & RESPONSIBILITIES

## Stakeholders & Responsibilities

1. The major ITEA Stakeholders, i.e. those who will form the ITEA Working Group, are listed in the table below:

| **Organisation** | **DloD / Stakeholder** | **DloD 1\*/DACOS Owner** | **Desk Officer / Contact** |
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**Table 1: DLoD and Other Stakeholder Responsibilities**

## Organisations

1. The PGMU Acceptance Authority, ACOS(SSM), is ultimately responsible for and governs the overall Acceptance process of which ITEA is a major part. Management of the ITEA in the period leading up to IOC is wholly devolved to the ITEA WG including the SI and equipment suppliers.

## ITEA Responsibilities

1. The responsibilities of all the ITEA Stakeholders are articulated at Annex A.
2. It should be noted that ITEA roles and responsibilities will evolve as the project develops. At this early stage, responsibilities will be focussed around setting targets and planning activities. At later stages, the roles will be focussed on acceptance against the targets set.

### Acceptance Authority

1. The Acceptance Authority will be responsible for:
2. In consultation with the Users and PGMU PT, authorising PGMU Capability Acceptance;
3. Agreeing this ITEAP with the PGMU PT.

### User

1. The User, DACOS SSM will be responsible for:
2. Accepting the PGMU capability from the Acceptance Authority and employing the capability after declaration of the In-Service Date (ISD);
3. Providing the necessary Evidence to satisfy the Acceptance Authority’s requirements for pan-DLoD Acceptance;
4. Supporting acceptance activities by providing personnel where necessary for trials and evaluation;
5. Supporting the PGMU PT by providing Suitably Qualified Experienced Personnel (SQEP) embedded into the Project Team, Trials teams and Vessels;
6. Attending ITEA WG meetings.

### Project Team

1. The PGMU Project Team consisting of DE&S personnel and the Naval Design Partnering (NDP) team will be responsible for:
2. Managing the Acceptance process on behalf of the Senior Responsible Owner (SRO);
3. Producing, owning and acting as the authority for this document, the ITEAP;
4. Defining the Verification Methods and Criteria against the SRs on behalf of the SRO;
5. Developing the Requirements and Acceptance Database;
6. Managing Acceptance Evidence gathering and presentation;
7. Ensuring trials preparation is in place including cooperative assets, ranges, expendables and equipment certification;

### PGMU Project Board

1. The PGMU Project Board, chaired by NAVY SSM-SSE CSOE DACOS is responsible for:
2. Providing the leadership and management required to integrate the Capability requirements set against the DLoD demands;
3. Providing a clear view of Project progress to internal and external communities;
4. Acting as the primary Project interface with the In-Service Capability Management Board (ISCMB);
5. Agreeing PGMU input, e.g. assumptions, risks, issues and required decisions, to the Maritime CMG;
6. Managing requirement trades;
7. Understanding, managing and maintaining cross-dependency links.

### PGMU ITEA Working Group

1. This document outlines the ITEA WG membership. Its purpose is to plan and manage the execution of T&E activity, collate evidence of requirement satisfaction leading to a recommendation to the AA to accept PGMU into service.

### Suppliers Responsibilities for V&V

1. The Suppliers[[5]](#footnote-6) will propose the method of verification for each of the TES and applicable GTR requirements that they are responsible to deliver. The acceptance method must demonstrate compliance to the requirements in the most cost effective manner. The ITEA WG with the SI will integrate the proposed verification tests into the PGMU VVRM and formally accept the methods proposed by the suppliers. The ITEA WG has the responsibility to propose changes deemed necessary to provide the body of evidence required by the Acceptance Authority. Changes if necessary will be agreed between the suppliers and the ITEA WG during the development of the VVRM.

# Test and Evaluation

## T&E Strategy

1. A test is an event designed to measure the capability of performance of a System in controlled circumstances while Evaluation is the formal analysis of existing or collected Evidence used to inform Acceptance decisions. Test and Evaluation is the means by which Verification and Validation are achieved, enabling Acceptance, and is applicable across all PGMU DLoDs.
2. PGMU will conduct a number of tests 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 the 4 equipment lots which equate to PGMU sub-system tests. The intention is that lots/sub-systems will be combined for integration and system-wide testing before installation, to be confirmed by the ITEA WG. The objective is to de-risk any ‘surprises’ by assuring compliance early and planning V&V efficiently such that minimal testing is required whilst ensuring evidence is available to verify each SR. The overarching strategy for PGMU T&E is to:
3. Capture all T&E activities required to validate both equipment and non-equipment DLoD URs;
4. Plan the tests to make efficient use of all resources, i.e. test the right aspect at the right time;
5. Adopting a policy of progressive acceptance whereby T&E activities will take place as and when it is most appropriate and cost-effective to do so, so that a body of acceptance evidence can be compiled that progressively build user confidence and reduces risk throughout the project;
6. Maximise the use of existing evidence, i.e. test once but use the data many times;
7. Identify and manage any technical and operational risks and opportunities.
8. Associated with the T&E measures is a wide range of evidence collection and evaluation activities. Evidence will be gathered in a comprehensive and systematic manner, before being collated to form a progressive body of acceptance evidence. The VVRM will form a single repository of acceptance evidence.

## T&E Process

1. The ITEA Process for PGMU will:
2. Decide, agree and endorse the required levels of Evidence;
3. Consider the validity and applicability of any existing or closely related Evidence;
4. Decide on the method for collecting Evidence;
5. Produce a Test schedule;
6. Conduct Testing to collect Evidence;
7. Evaluate collected Evidence for Acceptance;
8. Plan and conduct re-trials as necessary.
9. PGMU testing covers both equipment and system trials for the project. The Suppliers of Lots 1 and 2 are expected to require a degree of development before a physical product set and range of integration solutions would be available that could fulfil the complete requirement. Therefore, a strategy of progressive assurance with phased testing carried out in stages will be undertaken, in order to minimise the risk to the MOD of development issues. The progressive assurance strategy will be described in fuller detail in Section 4 of this ITEAP.

## Verification and Validation (V&V)

1. Implementing the strategy requires V&V to be fully integrated into the Systems Engineering process as shown in Figure 3-1.

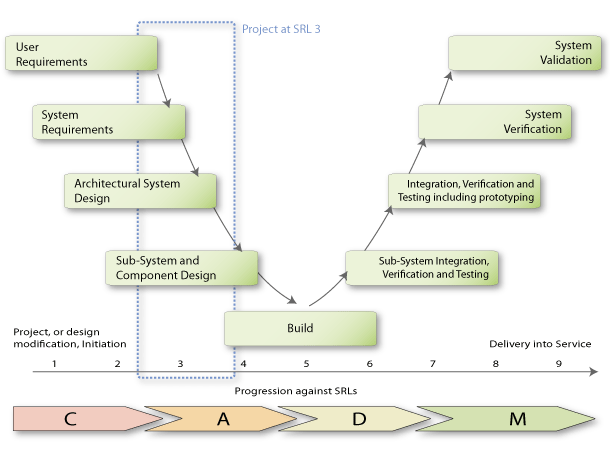


Figure 3-1: V&V integrated with Systems Engineering

1. Validation will confirm that the PGMU System meets the User’s Capability need as articulated in the URD, i.e. ensuring that the correct system was built. Verification will confirm that the PGMU System meets the relevant SRs, i.e. ensuring the System was built correctly.

## Suppliers Responsibilities for V&V

### Test Events

1. The Suppliers are responsible for carrying out a series of tests and trials progressively to 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 ITEA WG. This includes a test of the integration of the DG set with the MG set, procured in Lot 2, prior to Ship installation. Formal Design Reviews will also be undertaken as part of the progressive assurance process.
2. The Suppliers from each lot will 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 and reviews required by the equipment Suppliers for which the ITEA WG will require evidence are:
3. **Critical Design Review (CDR).** The equipment Suppliers will each arrange a CDR at which the evidence demonstrates that the equipment will meet the requirements of the TES and GTR will be presented to the Authority. The required outcomes of the CDR have yet to be agreed with the Authority but will be at least 2 weeks before the date of the review. The objectives of the CDR are as follows:;
   * + 1. Ensure the equipment or installed system has a reasonable expectation of satisfying the capability requirements;
       2. Ensure whole design coherency;
       3. Assess each element or sub-system for technical compliance, feasibility and performance to the individual specification and any related interface documentation;
       4. Ensure that the boundary, interface and interoperability issues and risks are understood and managed;
       5. Confirm that the system definition is sufficiently mature to start detailed design and test procedure development.
4. **Factory Acceptance Test (FAT).** The equipment Suppliers will each arrange appropriate FATs and propose the scope of the test based on its understanding of the TES, GTR and other requirements documents provided. FAT will be undertaken at the Suppliers’ facility. Lot 3 will not undergo any FATs;

1. **DG/MG Functional Test.** The Supplier of Lot 1 will arrange a test to demonstrate the combined functionality of the DG and MG sets with the Supplier of Lot 2 and demonstrate to the Authority and SI.
2. **PGMU System Integration Tests.** The Suppliers will participate in the planning and conduct of PGMU system integration tests to demonstrate the combined functionality of the main elements of PGMU under the guidance of the SI. The details of the system-wide tests will be developed by the SI with the ITEA WG;
3. **System Readiness Review (SRR).** This will occur after the modelling and the agreed pre-installation tests have been completed. The purposes of the SRR are to determine whether or not the pre-installation extent of functional integration of PGMU has been achieved, and to recommend whether to proceed with the installation of PGMU into the FoC. The SRR is the gate at the boundary between the Demonstration and Manufacture phases and equates to the whole system critical design review. The SI will produce a report at least 10 working days before the SRR is held;
4. **Installation Inspections (II).** The Suppliers will liaise with the relevant agencies to plan and conduct II. The DG sets will be installed by the Upkeep Contractor but the DG set Supplier will certify that installation has been completed satisfactorily before Setting to Work commences;
5. **Setting to Work (STW).** The Suppliers will liaise with the relevant agencies to plan and conduct STW. For the First of Class (FoC) installation the Suppliers will 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 Suppliers shall support and attend STW;
6. **Harbour Acceptance Trials (HAT) Console.** The Lot 4 Supplier will liaise with the relevant agencies to plan and conduct HAT(Console). MTAU will lead the HAT(Console) and the Supplier will support and attend HAT(Console) trials;
7. **Harbour Acceptance Trials (HAT) Mechanical Engineering (ME).** The Suppliers will liaise with the relevant agencies to plan and conduct HAT(ME). Machinery Trials Assessment Unit (MTAU) will lead the HAT(ME) and the Suppliers will support and attend HAT(ME) trials,
8. **Sea Acceptance Trials (SAT) Mechanical Engineering (ME).** The Suppliers will liaise with the relevant agencies to plan and conduct SAT(ME). MTAU will lead the SAT(ME) and the Suppliers will support and attend SAT(ME) trials;
9. **Magnetic/Noise Ranging**. The Authority will conduct magnetic and noise ranging pre and post-refit. The acceptance criteria are that the post update performance is no worse than the current capability, which will be set by the appropriate Acceptance Authority during the development of the ITEAP. The Suppliers will be responsible for ensuring that their equipment does not exceed the levels set;
10. **Vibration Trials.** The DG set and to a lesser extent the MG set, is a major contributor to the underwater radiated noise produced by the Type 23: a characteristic that is strictly controlled. The DG and MG TES contain a table of broadband and narrow band vibration limits. The Suppliers of Lots 1 and 2 will demonstrate conformance to these limits as part of the FAT and performance will be verified in post-upkeep ranging;
11. **Shock Trials.**
    * 1. The DG sets and equipment are required to conform to the standards defined in the GTR document for Shock requirements and already be shock qualified. The Suppliers will supply Shock Qualification evidence to support claims made in the ESQL;
      2. It is expected that the Authority will undertake a whole Ship Shock Trial on the first Ship installed with PGMU as a minimum. The Suppliers will support the Authority in developing the scope of this trial and analysis of results with respect to their equipment.
12. For the tests that are supplier-led (CDR, FAT, DG/MG integration test, II and STW), the Suppliers will produce test forms and obtain 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 Suppliers will support the ITEA process and contribute to the development of all test forms where their equipment is involved. The test forms will then be further developed by the Upkeep Contractor,(Dockside Test Organisation (DTO)) into platform specific forms applicable to the individual Ship receiving PGMU. It is the Suppliers responsibility to liaise with the Upkeep Contractor throughout this development.

### Integrated Logistic Support (ILS)

1. The Suppliers will be responsible for demonstrating that their Support Solution complies with the requirements of the Authority’s AOF and Support Solutions Envelope (SSE). The Interim Contractor Logistic Support (CLS) period commences at SAT(ME) of the first T23 Ship to be installed with the PGMU equipment.
2. The Suppliers will be responsible for providing an Integrated Support Plan (ISP) for the management and execution of the ILS requirement satisfaction deliverables. The Suppliers will report to and attend Logistic Support Committee (LSC) Meetings.
3. The Suppliers will develop a Support and Test Equipment (S&TE) Plan for diagnosing defects on and maintaining the equipment and linked to the maintenance task requirements.
4. The Suppliers will develop and deliver a Supportability Test Evaluation and Verification (STEV) Plan to the ITEA WG. The plan will identify the test and evaluation services/facilities required to enable it to be integrated into the overall Project test and trials programme.
5. Supportability demonstrations will be undertaken concurrently with maintainability demonstrations as part of a Logistics Demonstration (Log Demo). The Suppliers will be required to select candidate items for test during the Log Demo and submit the Candidate Items List (CIL) to the MILSM, as part of the STEV Plan, who will then select the items to be demonstrated.
6. The Suppliers will support an In Service Reliability Demonstration (ISRD), as described in the ILSP, should the Authority decide that such a demonstration is required.

### Acceptance

1. The VVRM contains the acceptance criteria for each requirement in the TES, GTR, SRD and URD and the Suppliers will propose acceptance test methods to demonstrate compliance with the requirements in the most cost effective manner. The VVRM will be used to monitor acceptance progress and after each test event that the Supplier is responsible for, they will provide evidence in test reports in an agreed format that clearly attributes evidence to TES and GTR requirements, SRs and URs as applicable.

## Role of the System Integrator (SI)

### General

1. The role of the SI is to achieve the functional and physical integration of PGMU consisting of the 4 equipment lots. Central to successful integration is the control of interfaces that allows for the timely passage of interface data between the Suppliers of the other Lots. In fulfilling this role, the SI will proactively liaise with and coordinate the effects of all the PGMU equipment suppliers. The SI will provide support and advice to the Authority in executing the Prime Contractor function throughout the project.
2. The SI will play a key role at ITEA WG meetings as the means to coordinate the 4 equipment suppliers’ test and evaluation proposals. The ITEA process will ensure that evidence is gathered to show compliance with requirements in the most cost effective manner. The SI attends all ITEA WG meetings and jointly with the Authority, plan, conduct and evaluate the results of test events.

### ILS and Training WGs

1. The SI will support the LSC and the TSG WGs in his role on the ITEA WG. These 2 groups will support the ITEA process by coordinating test activities to provide evidence for inclusion into DOORS that the ILS and Training requirements have been achieved. The SI will attend their meetings and provide the support needed to deliver the coherent training system.

### Modelling[[6]](#footnote-7)

1. Development of a modelling strategy and modelling validation plan is the responsibility of the SI who will be responsible for the modelling and simulation of system behaviour using computer-based software or physical models. This will help the design proving prior to manufacture, and for early evaluation of parameters that could otherwise be demonstrated only during the operational trials. Modelling will be carried out at 4 stages:
2. Existing System;
3. Replacement System Pre-FAT;
4. Replacement System Post-FAT;
5. Replacement System Post-SAT (ME) (tbc).

### Test Forms

1. The SI is responsible for drafting and developing test forms to be approved by the ITEA WG a minimum of 2 weeks before the test event, for all system-level tests.

### Pre Installation Testing

1. At this stage it is not known if a Shore Test Facility will be conducted for full-system trials as part of the pre-installation system-level testing on the grounds of cost versus benefit. The alternative to full-system trials is to de-risk the project by progressive assurance through analysis, reviews, and the conduct of high fidelity mathematical modelling. In the event that this does not happen then the SI will propose a level of pre-installation physical testing to meet the requirement. The SI will liaise with the Suppliers of the other equipment lots, the Upkeep Contractor and other stakeholders as required in order to effectively and efficiently conduct system-level tests.

### Installation

1. It is assumed that the upkeep Contractor will plan and conduct the installation and testing of the equipment delivered by the Suppliers of Lots 1 (DG sets) and 2 (MG sets). It is also assumed that, due to the specialised work involved, the Suppliers of Lots 3 (Electrical Distribution Systems) and the Lot 4 (MCAS) will install their own equipment. A further assumption is that the Suppliers will certify that installation has been completed satisfactorily before Setting to Work commences. The role of the SI during installation will consist of but not limited to:
2. Overseeing all PGMU installation inspections;
3. Liaising with Original Equipment Manufacturer (OEM)s and DTO to resolve system issues;
4. Working with the Authority, via the ITEA WG, to jointly agree its responsibilities during the equipment installation phase.

### Setting to Work

1. The SI is responsible for the resolution of issues during equipment and system STW where system functionality is not achieved. The role of the SI during STW will consist of but not limited to:
2. Recording the STW processes of the individual PGMU Lot equipment;
3. Leading the system STW process to ensure that both the design intent is maintained and that System Requirements are achieved;
4. Ensuring that PGMU functionality is achieved by managing the equipment Suppliers to resolve performance issues.

### Acceptance

1. The SI will work closely with the equipment Suppliers, ensuring that the different elements of PGMU combine effectively to deliver the functionality described in the requirements documents. The VVRM will be used to monitor acceptance progress and following a test event, the SI will evaluate the results, make recommendations for any changes or re-testing and provide evidence in test reports to the ITEA WG. In his role as the SI, evidence will be required at a number of milestones. The key milestones are:
2. **System Readiness Review (SRR).** The SI will produce a SRR Report at least 10 working days before the SRR is held and update it within 5 days following the SRR;
3. **Approval of the Installation Solution (IS).** The SI will support Design Management Services (DMS) in the delivery of the IS;
4. **HAT (ME).** The exact series of tests has yet to be defined by the ITEA WG, however, the testing will be based on extant tests for the T23 MCAS and power and propulsion systems, tailored to generate evidence for the acceptance of PGMU requirements;
5. **SAT (ME).** The exact series of tests has yet to be defined by the ITEA WG, however, the testing will be based on extant tests for the T23 MCAS and power and propulsion systems, tailored to generate evidence for the acceptance of PGMU requirements
6. In addition to the above deliverables, other activities that the SI will deliver for presentation at the ITEA WG are:
7. Organise, conduct and agree the SRR scope with the Authority. The SI will present the evidence gathered to key stakeholders and at which the project Sponsor will decide whether or not to commit to fit PGMU in the FoC;
8. Undertake dynamic electrical modelling before installation;
9. Attend and provide test reports for post-installation system-level testing that includes as a minimum; Control System Integrity Check (CSIC); HAT (ME); and SAT (ME);
10. The SI will conduct a Quality of Power Supply (QPS) study and produce a report to determine the impact of PGMU on the main supply system. The study will include a baseline assessment of the existing ship power system and an assessment of the ship power system;
11. Conduct a system fault study and produce a report to allow the protection systems and distribution equipment to be assessed. The fault study includes an assessment of system fault current levels through a range of supply system operating configurations and include an assessment of both maximum and minimum fault levels;
12. Conduct a system protection study to allow the optimum protection system settings to be assessed.

### Integration

1. The SI is responsible for defining in detail the integration of each sub-system to the others constituting an end-to-end solution. The plan will detail each of the Integration tests that would address the integration of all the sub-systems and equipments in a structured manner to achieve the desired outcome of full and successful PGMU functionality and include as a minimum;
   1. Generate Electrical Power;
   2. Distribute Electrical Power;
   3. Monitor and control the generation and distribution of electrical power;
   4. Manage Propulsion equipment, auxiliary equipment and support services;
   5. Provide MCAS services including data display and recording;
   6. Shock, noise, vibration and environmental requirements;
   7. EMC control;
   8. Signature Assessment;
   9. Safety Management (including software);
   10. Security;
   11. Training Management;
   12. Support (including logs & Demos);
   13. Availability, Reliability and Maintainability.

## The Role of DLoDs in T&E

1. To build the Acceptance Case and support acceptance decisions, evidence of satisfaction of every DLoD associated with each of the requirements will be recorded in the VVRM. The Suppliers are responsible for providing evidence to support the satisfaction of SRs that meet the URs. The source of evidence to satisfy URs will be from validation test events such as HATs and SATs.

## Schedule of ITEA activities

### Create the ITEA Schedule

1. As detailed in Section 2 an outline ITEA Schedule using Microsoft Project can be found at Annex C. The schedule will be developed by the WG as the project progresses. The schedule will incorporate tests and show dependencies between them and on outside influences (e.g. platform availability) and outputs from other DLoDs (e.g. safety and training issues). More detailed schedules are produced for each ITEA WG and these versions encapsulate the most relevant Milestones applicable to each stage and version of the ITEAP itself. In particular it includes and maps the relationships of:
2. Verification and Validation Milestones;
3. The SRs that have been delegated to the LSC & TSG Working Group. The Working Groups are empowered to manage the gathering of the evidence for the SRs;
4. The risks that are relevant to that Working Group;
5. Tests and Trials. Some tests and more particularly trials require booking of facilities and the provision of equipment. These become ‘hard’ dates within the programme;
6. Acceptance Milestones. As progress is made towards the various levels of Acceptance, milestones are reached that provide both Assurance and latterly Compliance with the Acceptance Case;
7. Full Operating Capability (FOC). Achievement of FOC takes place during the in-service phase of the programme and falls outside the scope of this issue of this ITEAP.

### Develop the Test Specifications

1. Test Specifications will be developed by the SI through ITEA WGs and contain information essential to the detailed planning of the trials programme and will include:
2. The aim of the test including the evidence needed for the Acceptance Case;
3. Platform or facility requirements;
4. Prerequisite tests, inspections and preparations;
5. External requirements, including environmental limitations;
6. Documentation needed;
7. Test equipment needed;
8. Manpower requirements including SQEP and pre testing training;
9. Records required and any subsequent analysis needed;
10. An estimate of the time required.

## ITEA Trials Programme

### Trial Readiness

1. Trials will provide the evidence that the Suppliers have met the requirements. Once the required evidence has been identified and the most likely method of Evidence collection determined, the Trials Programme can be identified and will consider the following areas:
2. How combined testing could be used to generate a more efficient Trials Programme;
3. How Trials can be planned to build upon Evidence collected and evaluated, enabling confidence to be built up in stages and preventing system level tests being initiated before individual elements have been confirmed as successful;
4. How more risky elements of the system could be tested in order to provide confidence that they will work in a system context. This will form part of the wider PGMU Risk Management process.

### Trial Roles and Responsibilities

1. The execution of ITEA activities can be defined in terms of the tasks to be carried out by the various authorities involved. The Presenting Authority is the authority responsible for presentation of the equipment for inspection or trial. Prior to installation onboard it will normally be the contractor; for Installation Inspections and Trials it will be the organisation who installed or fitted the equipment and for Harbour Trials it will normally be the STW Authority. Sea Trials are normally presented by ship staff supported by PT and industry as required. In presenting equipment for inspection or trial the Presenting Authority is responsible for ensuring that the equipment is in all respects ready for the trial. Specifically the Presenting Authority is responsible for:
2. Ensuring that all relevant prerequisites have been met;
3. Arranging all facilities required for the effective, safe and timely conduct of the trial;
4. Ensuring that all supporting documentation and test equipment is available;
5. Checking that all involved authorities, including other contractors and agencies, have met their responsibilities;
6. The specific presenting authority associated with specific trials and tests will be identified in the VVRM.
7. The Conducting Authority is the authority responsible for the conduct of the Inspection or Trial and for recording evidence and reporting the outcome formally to the appropriate organisations. MTAU will carry out this activity on behalf of PGMU.
8. The VVRM states who will have authority to accept evidence against the SRD provided by the suppliers, evidence management will be the responsibility of the PGMU RM acting on behalf of both the PGMU PT and ACOS(SSM). The specific acceptance authority associated with specific trials and tests will be identified in the VVRM.

### Clearance for Use

1. PGMU cannot be proven fully in the shore environment and hence there will be a requirement to conduct staged / progressive trials on board a host ship.  To enable this, the PGMU PT will be required to release the equipment to the Service under specific and agreed conditions and to certify the limitations under which the equipment is to be operated, maintained and supported and this will be detailed in the authorised Trials Order, PGMU Maintenance Plan, ME CCU and the extant PGMU Safety and Environmental Report.  Although the PT is responsible for the capability of PGMU, Platform Directorates retain responsibility for the overall capability, availability, readiness and safety of the platform.  Director Ships will therefore assume responsibility for endorsing the documentation suite prepared by the PGMU PT and offered to the T23 Team Leader / Team for acceptance prior to trials commencement.  Once Full System Acceptance has been achieved, the aforementioned limitations will be reviewed, updated or removed, if required, by directed letter from DE&S Warship Support.

## Evaluate and Manage Evidence

### Evaluating Evidence

1. The Acceptance Case identifies the evidence required for verification and its place within the Validation process. As the evidence is gathered reports will be generated for comment and acceptance of the evidence as applicable, involving Subject Matter Experts (SME)s, LSC and TSG WGs as required. Time will be allowed for multiple Stakeholders to review the same Evidence and each to produce Evaluation reports with Acceptance recommendations before the next increment of testing. Evidence of compliance will be recorded but the evidence will not be finally accepted until the applicability of the evidence to the build standard being used at ISD is defined and any necessary regression testing is conducted.

### Managing Evidence

1. Test data will be presented in reports. Examples of these reports for PGMU include;
2. Test / Trial reports;
3. Post Trial analysis reports;
4. Exception reports;
5. Non-Equipment DLoD reports.
6. These reports will clearly articulate compliance with the requirements and provide robust data to support the conclusions. Where there is non-compliance, the reports will identify the gap in performance and the impact this will have on overall system performance, including any remedial action that is required (together with a date when that action must be completed).
7. The Acceptance Case is the summary of achievement that can be used to quantify progress and is the basis for making recommendations for acceptance.

### Managing failure

1. Issues identified in the acceptance tests and trials will be captured in an Acceptance Issues Log by the SI. The ITEA WG will examine the issue identified, with the original test or trial and agree the appropriate follow-up action. The Issues Log will record this and include a decision as to whether a re-test is necessary and also outline any regression test policy. This will be developed further in Annex E.

### Managing technical change

1. The resolution of technical issues, whether arising from test failures or elsewhere, may require engineering changes involving software or hardware that raise questions about the continuing validity of evidence from tests already successfully completed. The ITEA WG will therefore be responsible for deciding as to whether tests, if any, need to be repeated. In these circumstances a risk-based regression testing process will be invoked. Following an engineering change the main steps will be;
2. Assess whether the engineering change made could potentially alter the outcome of one or more of the tests previously completed, or invalidate previously provisionally accepted requirements;
3. If a definite impact on a specific test can be identified, the test must be reviewed;
4. If a possible impact is identified, the risk of not reviewing the test must be assessed. The criterion in this case is whether the risk (in terms of performance, cost or time) of discounting regression testing is greater than the known penalties of carrying out the test;

1. Each test in question is reviewed. The aim of the review is to establish what form a repeat test should take: in some cases a more or less rigorous test may be appropriate (for example, analysis might replace a demonstration or vice versa).

# Acceptance

## Acceptance Strategy

1. The Acceptance Strategy is one of progressive approvals and acceptance of DLoD evidence and deliverables with sea trials providing final supporting proof of performance. A continuous process based on the cumulative collation of evidence to support System and User acceptance and ultimately the delivery of the military capability. The strategy has been designed to approve and accept design, system and capability as early as possible in the lifecycle, exposing potential problems at the earliest opportunity.
2. Acceptance of PGMU embraces as one inclusive activity:
3. The individual but concurrent and contextual Verification of each DLoD that contributes to the capability;
4. The Validation of the capability as a combination of these DLoDs;
5. The formal confirmation that PGMU capability has been achieved.
6. The acceptance strategy is a phased approach with prioritised testing of critical functions and interfaces. The aim is to avoid duplication of effort by allowing acceptance evidence at one level to be pulled through to concurrently satisfy acceptance at another (so long as there are no emergent ‘integration’ issues at the higher levels). This incremental acceptance allows continuous monitoring of the preparations for, and status of, Equipment and non-Equipment capability acceptance.
7. Any new or additional functionality offered by the supplier’s will be tested and accepted as an integral part of the subsystem acceptance activities and system capability revalidation to ensure there is no degradation to current capability.
8. The PGMU IS will be produced by DMS using initial design information from the Naval Design Partnering (NDP) and interface data of the new equipment being purchased. The SI will be responsible for providing data regarding the interfaces between PGMU equipment and the auxiliary systems and support services of the Ship to DMS contractors and specified in the Interface Control Documents (ICD) to enable IS production.

### Verification

1. Responsibility for Verification, Planning and Conducting test events lies with the equipment Suppliers. The Suppliers acceptance events will demonstrate the success criteria defined in the SRD having been met to the ITEA WGs satisfaction. The Suppliers will document all tests conducted in Test Reports, which will then be submitted to the ITEA WG for evaluation and approval. The test report will be recorded in the VVRM. In addition the non equipment acceptance will also be provided when delivered.

### Validation

1. Validation is primarily an ITEA WG activity. The ITEA RM along with the SI will maintain a DOORS database containing links showing which SRs satisfy each UR. Supplier generated evidence against the SRs will inform validation of parent URs but situations may occur where the sum of the SR verification evidence is insufficient to validate the parent URs. In these instances DLoD owners will be required to conduct the necessary validation to provide the necessary evidence. Results of the V&V activities will be documented by the ITEA RM and SI into the VVRM.

### Acceptance

1. The Verification and Validation of evidence to enable Acceptance of PGMU equipment will include the following activities:
2. Acceptance of each equipment Lot from industry of the contracted elements of the system that are covered by the TES and GTR – Contract Acceptances;
3. Acceptance of those elements of the system and capability across the DLoD elements that are covered by the SRD – Systems Acceptance;
4. Acceptance of the whole system and capability contained in the URD across all DLoDs by NCHQ which leads to declaration of IOC;
5. The declaration of FOC by NCHQ.

## Acceptance Process

1. The responsibility for defining the Acceptance outputs listed above and therefore the detailed process by which they are created will be defined in a later iteration of this document once the Acceptance Authority has been fully defined and agreed.
2. During the design process Approvals and Acceptance are effectively conducted in parallel. Design deliverables are agreed regularly between PGMU PT, NDP, SI, DMS and the Suppliers. Only on agreement of the CDR will the Suppliers be allowed to start the build of their equipment.
3. Progressive assurance will involve gathering and evaluating acceptance events throughout the process and will include the following activities:
4. Confidence building through design, modelling and test evidence gathered both for agreed calendar driven project reports and event driven ITEA project milestones;
5. Technical and project risk mitigation for identified risks held in the ITEA Risk Registry;
6. Technical and Project assurance through formal design and project reviews;
7. Incrementally building up acceptance, as definite evidence is gathered over time to populate the VVRM;
8. Modelling;
9. Inspections;
10. Third Party Certification.
11. All test documentation including methodologies and procedures will be submitted for approval by the ITEA WG prior to formal acceptance testing. Test plans and procedures will be submitted, prior to the installation of the PGMU System at the shore based facility, for each phase. The results from formal testing, including verification of testing performance by Authority witnesses, will be submitted to the ITEA WG for approval and system acceptance.
12. To confirm that the levels of project, technical and system maturity have been achieved at the appropriate times, acceptance of these elements will be determined at a series of review meetings. Recommended corrective actions will be reviewed throughout the system development lifecycle and actioned before the next design or production phase commences.

### Integrated Test, Evaluation and Acceptance Plan

1. Each equipment supplier is responsible for providing input into the ITEAP in consultation and approval by the ITEA WG for each integration phase to validate the system. Forms of Validation that the WG will require include but not be restricted to:
2. Certificates of Conformity;
3. Design Specifications;
4. Modelling results;
5. Test equipment calibration certificates;
6. Test results;
7. Demonstration results;
8. Safety certification and assurance;
9. Security certification and assurance.
10. MTAU and/or members of the ITEA WG, or delegated personnel, will witness all formal acceptance activities and will provide signatures to confirm that test steps were properly executed and the results accurately recorded. Similarly the Suppliers will be expected to ensure that appropriate representation is made available for all formal trials and testing events.

## Acceptance Milestones

### Definition of Acceptance Milestones

1. A table of Acceptance Milestones with dates (to be populated once on contract) is at Annex B and an explanation of the key acceptance points are below.
2. **Preliminary Design Review (PDR)[[7]](#footnote-8).** Not a contracted deliverable but it is envisaged that each equipment Supplier will hold a PDR to ensure that the PGMU system solution will meet the stated performance requirements in the TES/GTR;
3. **Critical Design Review (CDR).** See 3.4.1;
4. **System Readiness Review (SRR).** See 3.4.1;
5. **Installation Inspection (II).** See 3.4.1;
6. **Setting to Work (STW).** See 3.4.1;
7. **Logistic Support Date (LSD).** This is the date from which logistic support will be required by the User. For PGMU this is 3 months before SAT (ME) for the First of Class. This support should include: spares, Support and Test Equipment, technical documentation, maintenance training and facilities. The Integrated Logistic Support Manager will declare LSD to signify that PGMU is supportable as a precursor to IOC.
8. **Ready for Training Date (RFTD).** This is the date when all training course materials, technical documentation and training equipment are available to support training and those personnel who will deliver the Steady State training are themselves trained.
9. **Harbour Trials (HAT).** Following installation and STW of systems on board the T23, a series of HT will take place in accordance with the agreed plan. A HT Document, in the form of a TF, will be produced by MTAU, which will be submitted to the PGMU PT, for agreement, at least 6 weeks prior to the commencement of the Trials. The completed HT documentation will form a comprehensive record of all tests and trials undertaken during Harbour Trials, and will be provided as part of the Acceptance Documentation on completion of PGMU.
10. **Sea Trials (SAT).** MTAU will undertake ST to prove the functionality of the PGMU Update at sea and to prove the performance of all aspects that cannot be verified during earlier tests. In order to both reduce costs and provide familiarisation opportunities for the ship’s company prior to Contract Acceptance, the MoD will provide sufficient and adequately trained ship’s staff to ensure the safe operation of the vessel, for the duration of MTAU ST. ST will be conducted by MTAU, supported by any sub-contractor necessary to carry out trials in a safe and efficient manner.
11. **Initial Operating Capability (IOC).** Is a milestone declared by ACNS(CAP) when: PGMU has been fitted to the first of class ship; has successfully completed the MCTA MTAU acceptance activities; and, had implemented any recommendations arising from the MCTA MTAU trials. Acceptance will include all DLoDs, including, Logistics, Information and Training. ACNS(CAP) will declare IOC at a Programme Board once the 1-star DLOD owners have reported that they are content that requirements in their areas of responsibility have been met.
12. **In Service Date (ISD).** Is a milestone declared by ACNS(CAP) when any recommendations following the MCTA MTAU trials have been implemented. ISD will be declared at IOC.
13. **Full Operating Capability (FOC).** FOC for PGMU will be achieved when 4 or more T23s have been fitted with PGMU, sufficient suitably trained manpower is available for these platforms, the full support solution is in place, the steady state training solution is in place, all necessary trials and acceptance activities have been successfully completed and all 1\* DLoD owners have made a declaration of their approval.
14. **Full Capability Delivery (FCD).** FCD will have been achieved when 12 of the T23s have been fitted with PGMU. ACNS(CAP) will not make a formal declaration at this time, however the T23 WSpt Team Leader will make a statement confirming that all PGMU fits have been fully completed and accepted.

## Acceptance Organisation

### ISCMB Board

1. The primary purpose of the ISCMB is to drive the funded programme forward to deliver the agreed outcome and benefits. The SRO mechanism for coordinating, directing, overseeing and assuring the integration of related projects (new and in-service) across all DLoDs, enabling NCHQ to generate Force Elements at Readiness / Sustainability.
2. The key functions of the ISCMB are to:
3. Direct the Programme to deliver the agreed outcomes and benefits set out in the Programme Mandate;
4. Direct mitigating and corrective actions to projects, DLoD and/or other Programmes as appropriate;
5. Ensure the Programme is operating efficiently/effectively and conforms with relevant legislation/MOD policy;
6. Exploit opportunities for more effective Capability Delivery and share approaches with the Capability Planning process;
7. Manage Programme interdependencies, risks, issues and opportunities for all relevant projects across all DLoD;
8. Ensure Programme assumptions relating to planning, budgeting and benefits are consistent, coherent and current;

1. Ensure development/agreement of the Programme Brief and Programme Management Plan.
2. The ISCMB is the 1-star forum at which DLoD owners will recommend that PGMU can declare IOC.

### Project Board

1. The PGMU PB, chaired by DACOS CSOE SS carries out pan-DLoD governance of the project. The principal tasks of the PB are to oversee systems requirements definition, business case development and acceptance into service in order to ensure the DLODs are of sufficient maturity to meet the requirements of Initial Gate and Main Gate investment decisions and satisfy the User’s expectations at in-service acceptance. The PGMU PB will generally be convened twice a year.

### Project management Board

1. The Project Management Board is chaired by the PGMU GL and meets monthly. This board deals with the day to day project issues.

### ITEA WG

1. The ITEA WG is responsible for:
2. Planning the approach to Test and Evaluation, in preparation for Acceptance;
3. Verification of the system requirements for each of the contributing DLoDs;
4. Validation of the user requirements based upon the endorsed capability required;
5. Progressive and formal acceptance that the capability has been achieved;
6. Executing the ITEAP, specifically identifying, planning, resourcing, scheduling and costing the TE&A activities.
7. The ITEA WG for PGMU will comprise of the following:

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| --- | --- |
| **Title** | **DloD / Role** |
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## Acceptance Criteria

1. The acceptance criteria will be developed by the ITEA WG throughout the D&M phase and recorded in the VVRM which can be found at Annex D.

# Project Interdependencies

## Project Strategies

1. The following PGMU Project Strategies will feed into the ITEAP and includes:
2. Acquisition Strategy;
3. Government Furnished Assets (GFA) Strategy;
4. Procurement Strategy;
5. Safety Strategy.

## Project Plans

1. The following PGMU Project Plans will feed into the ITEAP and includes:
2. Project Management Plan (PMP);
3. RAMP;
4. Quality Assurance Plan;
5. Through Life Management Plan;
6. Safety and Environmental Plan (SEMP);
7. Risk Management Plan.

## Interdependencies

1. The following will have need to be planned for the successful delivery of PGMU and includes:
2. The Installation Solution is delivered 46 weeks before commencement of refit;
3. The High pressure Salt Walter Alteration & Addition (A&A) shall be completed before PGMU;
4. The convertor regulator A&A is completed before PGMU is fitted.

# Resources

## Manpower

1. A summary of the manpower resource requirements and who is responsible for providing them will be developed as the PGMU solution matures. There will be several groups of personnel involved in the test and evaluation phase of the PGMU project:
2. PGMU Project Team – to manage the project;
3. MTAU – test and trials authority;
4. Contractor Personnel – to operate and maintain pre acceptance equipment;
5. Ship’s Staff – to operate and maintain equipment;
6. NCHQ – to act as Intelligent Customer representing Pan-DLoD interests.
7. Upkeep Contractor – including the DTO and refit schedule planners.

## Finance

## Facilities

1. It is intended to use existing facilities and ranges. Further details will be available when the MOD and the Lot 5 provider agree the extent of the integration and system test events.

# Risks, Assumptions and LFE

## ITEA Risks and Opportunities

1. It is imperative that all risks identified through the ITEA process directly informs the wider risk management activity carried out by PGMU. The main ITEA risks have been taken from the PGMU Risk Register and are shown at Annex E.

## ITEA Risks

1. As the ITEA has a pan-DLoD remit, it is common that the wider DLoD risks are identified through the ITEA process. Therefore if an ITEA risk is identified the ITEA Manager must bring this to the attention of the PGMU Project Team. The risks will then be included in the PGMU Risk Register or transferred to appropriate owner/register and managed through the wider risk management activity carried out by the Project.

## ITEA Assumptions

1. The project’s MDAL has recently been updated prior to Main Gate. All MDAL entries and 3rd Order Assumptions (3OAs) which relate to ITEA for the PGMU Project are shown at Annex F but the MDAL is the authoritative source.
2. Test and Evaluation assumptions will be managed by the ITEA WG on behalf of the PT. 3OA assumptions are managed by the PT and held in the Assumptions Database Management Information System (ADMIS).

## Learning from Experience (LFE)

1. Learning from Experience is a through life process which allows organisational learning by:
2. Replicating success;
3. Avoiding mistakes;
4. Publicising and promoting good practice;
5. Keeping policy, processes and guidance up to date.
6. Throughout the PGMU Acceptance process cognisance will be taken of the LFE identified previously in other projects and the PGMU Acceptance process modified to utilise best practice especially from the Type 45 project and working closely with the Type 26 project. LFE will also be captured from this Project to assist further projects or future iterations of the PGMU Project.
7. As the PGMU Project matures the ITEA Manager will set up an ITEA Lessons Log that will feed into the projects lessons learned log which will consider, as examples, the following areas:
8. Identifying test over-kill and under-kill;
9. Assessing effectiveness of Test and Evaluation risk identification and mitigation;
10. Checking the validity of the ITEA assumptions;
11. Providing feedback of the use of Test and Evaluation facilities;
12. Assessments of the value gained from tests performed, including assessment of operational validity.

# Acronyms

|  |  |
| --- | --- |
| **A** |  |
| 3OA | Third Order Assumption |
| A&A | Alteration & Addition |
| ADMIS | Assumptions Database Management Information Systems |
| AO | Acceptance Officer |
| AOF | Acquisition Operating Framework |
| AP | Assessment Phase |
| **B** |  |
| **C** |  |
| CDR | Critical Design Review |
| CIL | Candidate Item List |
| CMG | Capability Management Group |
| CONEMP | Concept of Employment |
| CSIC | Control System Integrity Check |
| CSP | Capability Sustainment Programme |
| **D** |  |
| DE&S | Defence Equipment and Support |
| DG | Diesel Generators |
| DLoD | Defence Lines of Development |
| DMS | Design Management Services |
| DOORS | Dynamic Object Oriented Requirements System |
| DSAT | Defence Systems Approach to Training |
| DTO | Dockside test Organisation |
| **E** |  |
| **F** |  |
| FAT | Factory Acceptance Test |
| FCD | Full Capability Delivery |
| FM | Facility Management |
| FoC | First of Class |
| FOC | Full Operating Capability |
| **G** |  |
| GFA | Government Furnished Assets |
| GTR | General Technical Requirements (document) |
| **H** |  |
| HAT | Harbour Acceptance Trials |
| HMS | Her Majesty’s Ship |
| HPSW | High Pressure Salt Water |
| **I** |  |
| ICD | Interface Control Document |
| IG | Initial Gate |
| II | Installation Inspections |
| ILSM | Integrated Logistic Support Manager |
| ILSP | Integrated Logistics Support Plan |
| IOC | Initial Operating Capability |
| IS | Information Systems |
| IS | Installation Solution |
| ISCMB | In-Service Capability Management Board |
| ISD | In-Service Date |
| ISRD | In Service reliability Demonstration |
| ISP | Integrated Support Plan |
| ITEA WG | Integrated Test, Evaluation and Acceptance Working Group |
| ITEAP | Integrated Test, Evaluation and Acceptance Plan |
| **J** |  |
| **K** |  |
| KUR | Key User Requirement |
| **L** |  |
| LFE | Learning From Experience |
| LIMP | Logistic Information Management Plan |
| LSC | Logistic Support Committee |
| LSD | Logistic Support Date |
| **M** |  |
| MC | Military Capability |
| MCAS | Machinery Control and Surveillance |
| MCTA | Marine Commissioning and Trials Authority |
| MDAL | Master Data Assumptions List |
| ME | Mechanical Engineering |
| MG | Motor Generators |
| MGBC | Main Gate Business Case |
| MoD | Ministry of Defence |
| MTAU | Machinery Trials Assessment Unit |
| **N** |  |
| NCHQ | Navy Command Headquarters |
| NDP | Naval Design Partnering |
| **O** |  |
| OEM | Original Equipment Manufacturer |
| OSD | Out of Service Date |
| **P** |  |
| PB | Project Board |
| PCT | Performance, Cost and Time |
| PDR | Preliminary Design Review |
| PGMU | Power Generation and Machinery Control and Surveillance |
| PGSU | Power Generation System Update |
| PMP | Project Management Plan |
| PoE | Portfolio of Evidence |
| PT | Project Team |
| **Q** |  |
| QPS | Quality Power Supply |
| **R** |  |
| RAMP | Requirements and Acceptance Management Plan |
| RFTD | Ready for Training Date |
| RM | Requirements Manager |
| RN | Royal Navy |
| RR | Rolls Royce |
| **S** |  |
| SAT | System Acceptance Test |
| SAT | Sea Acceptance Trials |
| SCA | Strategic Class Authority |
| SEMP | Safety and Environmental Management Plan |
| SI | System Integrator |
| SME | Subject Matter Expert |
| SOP | Standard Operating Procedures |
| SQEP | Suitably Qualified and Experienced Personnel |
| SR | System Requirement |
| SRD | System Requirements Document |
| SRO | Senior Responsible Owner |
| SS(A) | Ship Support (Alliance) |
| SSE | Support Solutions Envelope |
| SST | Steady State Training |
| S&TE | Support & Test Equipment |
| S&TEV | Supportability & Test Evaluation Verification |
| STW | Setting to Work |
| **T** |  |
| T23 | Type 23 |
| TA | Technical Authority (consists of PT, NDP, DMS) |
| TBC | To Be Confirmed |
| TES | Technical Equipment Specification |
| TL | Team Leader |
| TLoD | Training Lines of Defence |
| TLMP | Through Life Management Plan |
| TNA | Training Needs Analysis |
| TOR | Terms Of Reference |
| TSG | Training Steering Group |
| TTP | Tactics, Techniques & Procedures |
| **U** |  |
| UAT | User Acceptance Test |
| UK | United Kingdom |
| UPSD | Upkeep Start Date |
| UR | User Requirement |
| URD | User Requirements Document |
| **V** |  |
| V&V | Verification & Validation |
| VVRM | Verification and Validation Requirements Matrix |
| **W** |  |
| WG | Working Group |
| **X Y Z** |  |

### 

1. RAMP v3 dated 13/12/13. [↑](#footnote-ref-2)
2. Contracted staff being those supplied by the company which currently provides instructional staff at HMS Sultan. [↑](#footnote-ref-3)
3. Lot 3 will no longer be competed but will be delivered by the contractor carrying out the refit. [↑](#footnote-ref-4)
4. Lot 3 will not undergo FAT tests since the work required is updating copper pipework. [↑](#footnote-ref-5)
5. In this section the Suppliers means the Equipment Suppliers of Lots 1, 2, 3 and 4. [↑](#footnote-ref-6)
6. The amount of Modelling carried out by the SI will be dependent on when the contract is let. Any shortfall will be contracted out until such time that the SI is on contract. [↑](#footnote-ref-7)
7. Not a formal approval point but one that the WG will require at an early stage for confidence. [↑](#footnote-ref-8)