**Statement of Work**

**Procurement of Meteorological Observation System**

Contents

1 Statement of Work 1

1 INTRODUCTION 4

1.1 General Information 4

1.2 Project Objectives 4

1.3 General project Description 4

1.4 Purpose of this Document 4

1.5 Document Overview 5

1.6 Intended Audience 5

1.7 Language 5

2 REFERENCED DOCUMENTS 6

3 SCOPE OF DELIVERY 7

3.1 General Scope of Delivery 7

3.2 Scope of delivery: systems 9

4 SYSTEM DESIGN 10

4.1 Technical Reviews 10

4.2 System/Subsystem Design Description 11

4.3 Interface Design Description (IDD) 11

4.4 Software Development Plan 11

4.5 Programmes, Drawings, Calculations 11

5 MANUFACTURING 12

5.1 Technical Construction File 12

5.2 Manufacturing 12

5.3 Adequacy of the Equipment Furnished 12

5.4 Surface Coating 12

5.5 Nameplates 12

6 TESTING 13

6.1 Test Plan 13

6.2 Test Description 13

6.3 Test Reports 13

6.4 Testing 13

6.5 Test and Material Certificates 14

7 WORK on SITE 15

7.1 Conditions for Implementation 15

7.2 Shipment to the Site(s) 15

7.3 Access to the Site(s) 15

7.4 Storage Area 15

7.5 Contractor’s Supervisor 15

7.6 Continuation of the Operational Processes 15

7.7 Changes in the Implementation Schedule 16

8 DOCUMENTATION AND TRAINING 17

8.1 Manuals 17

8.2 Drawings of Existing Equipment 17

8.3 Contractor’s Drawings of Work 17

8.4 Conversion of Drawings 17

8.5 Other Exchange Formats 17

8.6 Set of Final Documentation 17

8.7 Training 17

9 PROJECT MANAGEMENT AND QUALITY ASSURANCE 19

9.1 Overview 19

9.2 Scope 19

9.3 Project Management 19

9.4 Cost Management 20

9.5 Quality Management 20

9.6 Human Resource Management 20

9.7 Communication Management 20

9.8 Site Management Plan 22

9.9 Risk Management Plan 22

9.10 Purchaser’s Project Organisation 23

10 IMPLEMENTATION SCENARIO 24

10.1 Preconditions for Implementation 24

10.2 Implementation Phases 24

11 PLANNING CONSTRAINTS 26

12 NOTES 27

12.1 LIST OF DEFINITIONS 27

12.2 LIST OF TERMS AND ABBREVIATIONS 27

Appendix I: Software Development Plan 28

# INTRODUCTION

Many NMHS already have template documents to cover all aspects of the procurement of all or part of an Observation Network.

In the absence of these, this document is provided as an example Statement of Work which may be adapted.

Text in red italics should be replaced by information relevant for this Procurement.

The aim of the example documents is to provide guidance. Most NMHS have their own documents/templates/formats should be used for this purpose. These example documents allow a NMHS to check their own documentation against these examples to ensure their Procurement considers the relevant aspects.

These documents have not been checked or approved by WMO legal. They are provided as examples only and should not be used without specific endorsement by the NMHS’s own legal departments.

## General Information

NMHS to insert a general description including:-

* Any relevant background or history to this work
* Introduction to the new work to be undertaken
* Description of aspects of Observation Network Aspects to be procured. That is, this procurement for
	+ AWS Network and Sensor Components or full system
	+ Meteorological Information Processing System Components or full system
	+ Lifecycle Management Aspects

## Project Objectives

The main project objectives may be summarised as follows:

1. NMHS to insert objectives. May include:
2. Replacement or installation of AWS and/or MIPS equipment.
* The project must be finished within <# months> after the signing of the Agreement.
	1.

## General project Description

The aim of the project is to procure the a-meteorological observation networks as described in terms of its components above. The project may be for replacement of an existing meteorological observation network or for a new meteorological observation network.:

The delivery of requested systems and services is contained within one lot.

Purchaser shall act as the requesting party.

The systems that are needed for this project, may be installed by Purchaser staff after receiving required training to enable them to do that. Also the central acquisition and database computer (MIPS) will be installed in Purchaser HQ in the project by the Contractor.

In this project, Purchaser suggests a possible configuration for the new system architecture. However, alternative concepts of architectures may be suggested by potential suppliers within the restriction that the functionality as described in the Requirement Specification document is respected. The maximum number of architectures to be provided by tender applicants is limited to two (2). The same holds for the maximum number of quotations: two (2) per tender applicant.

## Purpose of this Document

The purpose of this document is to describe conditions which are specific for the project concerning:

1. Scope of delivery;
2. System design;
3. Project Management;
4. Configuration Management;
5. Work at site;
6. Implementation;
7. Measures and precautions to be taken to minimise risks in disrupting the operational process;
8. Tasks and responsibilities for the Contractor and the Purchaser.
9. Acceptance procedures

## Document Overview

This document is set-up as follows:

Chapter 1 Introduction

Chapter 2 Referenced Documents

Chapter 3 Scope of Delivery

Chapter 4 Conditions Related to System Design

Chapter 5 Conditions Related to Manufacturing

Chapter 6 Conditions Related to Testing

Chapter 7 General Conditions Related to Work at Site

Chapter 8 Conditions Related to Documentation and Training

Chapter 9 Conditions Related to Project Management and Quality Assurance

Chapter 10 Implementation Scenario

Chapter 11 Planning Constraints

Chapter 12 Notes

Appendix I: Software Development Plan

## Intended Audience

From here on the tendering entity, usually a NMHS, is referred to as ***Purchaser***. The company that will provide the meteorological observation system is called the ***Contractor***.

This document is intended for the following parties:

1. Tendering entity, the Purchaser that publishes the tender documents with the objective to procure a meteorological observation network from the Contractor.
2. Potential suppliers of the meteorological observation network;
3. Involved Purchaser’s staff;
4. Purchaser’s project team.

## Language

All documents supplied by the Contractor and all correspondence shall be in the <language> language.

# REFERENCED DOCUMENTS

[MIL\_498] Military Standard Software Development and Documentation, AMSC NO. N7069, December 5, 1994.

[MIL-STD-1521B] Military Standard Software Development and Documentation

[WMO\_CM8] WMO-No. 8, Guide to Meteorological Instruments and Methods of Observation: (CIMO guide), WMO, 2012 (2008 edition updated in 2010).

[WMO\_CM816] WMO-No. 8-16, Guide to Meteorological Instruments and Methods of Observation: (CIMO guide), WMO, provisional 2014 ed., approved by CIMO-16.

# SCOPE OF DELIVERY

The Agreement signed by the parties concerned, confirms the complete delivery of the systems by the Contractor to the Purchaser in compliance with this project specification and the product specifications, as described in the Requirement Specification document and Interface Requirements Specifications document.

## General Scope of Delivery

This section describes the general scope of delivery, applicable for the complete delivery of the *Procurement of a Meteorological Observation Network.*

1.

### Products

The scope of delivery of products includes:

**Observation Network systems**

1. All required standard software, application and embedded software, including all required licenses;
2. All required hardware systems for deliveries specified in sections 3.2 and 3.3;
3. Delivery of systems/equipment for testing and maintenance;

**Mechanical equipment**

1. Surface preparation, painting and identification labels;
2. Supports for all equipment, as far as not already existing;
3. Any required supports for conduits;
4. Specific test and support systems.

**Electrical and communication equipment**

1. Cabinets, panels, etc.;
2. All required data communication equipment needed to transmit the data from the AWS stations to the MIPS, including all interface systems;
3. Equipment for installation of the new systems to run in parallel to the existing AWS systems, if required;
4. All interconnecting cabling for all equipment, including all necessary materials for cable fitting, cable routes, conduits, etc.;
5. Cabinets for electrical and measurement network systems;
6. Specific test and support systems.

**Documentation**

1. Operating manuals;
2. Maintenance manuals;
3. Training manuals;
4. Software documentation;
5. Final documentation including ‘as built’ drawings;
6. Drawings, part lists, PCB-designs for firmware;
7. List of recommended spare parts;
8. Test plans;

General

1. Acceptance;
2. Acceptance reports.

### Services

The scope of delivery of services includes:

**Meteorological Observation Network Systems**

1. Design of the systems according to the Requirement Specifications document and in the IRS;

**Electrical equipment**

1. Connection to and extension of the low voltage distribution systems;

**Implementation**

1. Transport, unloading, storing and installation at the sites (if applicable);
2. Commissioning;
3. Acceptance tests and reliability testing;
4. Complete cabling of all equipment, including all necessary materials for cable fitting, cable routes, conduits, etc.
5. Anchoring of all equipment, including the supply of anchoring bolts (if required);
6. Hoisting and scaffolding, as required;
7. Installation of cabinets;
8. Testing, including supply of facilities of appropriate testing (e.g. tools, software);

**Training**

1. Operating instructions to Purchaser staff;
2. Installation instructions to Purchaser staff;
3. Maintenance instructions for the provided systems.

**General**

1. Project management for the Contractor’s project;
2. Support to the Purchaser project management;
3. Arranging review meetings (see Chapter 4) including agenda proposal and providing of the minutes;
4. Warranty;
5. List of recommended spare parts;
6. List of test and support systems;
7. Maintenance/support proposal.

### Excluded deliveries

The following products and/or services are excluded from the project:

1. Modifications to existing meteorological instruments or systems that are not part of the project;
2. Main power supply;
3. Adaptation of structural steelwork;
4. Adaptation of existing lightning protection systems;
5. Building and construction work.

## Scope of delivery: systems

This section describes the scope of delivery.

### Products

The implementation of the systems will be performed in two steps. Firstly, systems for testing will be supplied and after a successful completion of acceptance tests they will be accepted. In general, Purchaser shall require several of the accepted systems for operational use, and the additional systems will be delivered within the project after the acceptance of the test systems. Purchaser technicians will install these additional systems.

The components for the system can be divided into three separate deliveries:

* a test system to be delivered and installed in the Purchaser HQ (AWS and MIPS),
* after acceptance of the test systems, all remaining systems to be installed in the operational network (by Purchaser technicians).

Systems to be delivered and installed at Purchaser HQ:

1. <Customer to complete>

After acceptance of the test systems, Purchaser requires to have delivered for the meteorological observation network:

1. Complete delivery of <quantity> of AWS’, with the required instruments and configured to collect data from the instruments; everything installed in cabinets with all auxiliary equipment included;

### Excluded deliveries

The following products and/or services are excluded from delivery:

1. Installation and/or adaptation of existing Purchaser network infrastructures;

# SYSTEM DESIGN

All documents and review reports submitted shall be checked and signed as approved by Purchaser’s responsible personnel.

## Technical Reviews

### Milestones

During the Design and Development phase, the project shall go through the following major milestones. Other milestones will be derived from the plans and will be developed and proposed by the Contractor.

* System Requirements Review/System Design Review (SRR/SDR)
* Software Specifications Review (SSR)
* Critical Design Review (CDR);

These reviews shall be conducted in accordance with [MIL-STD-1521B].

Each review shall be performed based on the documents mentioned in Sections 4.2, 4.3 and 4.4. These documents shall, in draft, be made available to the Purchaser at latest one (1) month before the actual review. Purchaser’s comment on the design documents shall be incorporated into the design documents and submitted to Purchaser for approval within two (2) weeks after the review. This procedure shall be repeated until all design documents have been approved by Purchaser.

After the CDR a Human-Machine -Interface (HMI) prototyping review shall be conducted by the Contractor.

For the system design, documents must be in compliance with the standard [MIL\_498]. This chapter describes the minimum set of documents to be supplied in relation to system design. <Purchaser to remove what is not desired>

### System Requirements Review/System Design Review

The SRR/SDR - in accordance with MIL‑STD‑1521B - is conducted when the Contractor’s system design has proceeded to the point where major system elements are identified and defined.

Within this project a draft Product Baseline shall be defined at SRR/SDR.

The SRR/SDR shall be supported by analysis and study reports on system architecture, system interface, engineering speciality fields, system development, system production, system implementation and system verification. If hardware development is to be performed, mock-ups of to-be-developed hardware shall be presented.

### Software Specifications Review

The Software Specification Review (SSR) - in accordance with the MIL-STD-1521B - shall be a formal review of the CSCI’s requirements as specified in the Software Requirements Specification and the Interface Requirement Specification(s). It shall be held after System Design Review but prior to the start of CSCI Critical Design. Its purpose is to establish the allocated baseline for critical CSCI design.

### Critical Design Review

A CDR - in accordance with MIL‑STD‑1521B - is conducted for each configuration item (HWCI/CSCI), when the Contractor has completed detail design. It includes a review of all instruments, documentation, required certificates, etc., i.e. everything that requires reviewing for acceptance that is not regarded software.

Within this project the allocated Product Baseline shall be defined at CDR.

The Critical Design Review is conducted prior to production design release, e.g. before translating the engineering language, logic, and algorithms to coded instructions. A Critical Design Review shall ensure that the detail designs, as depicted in the draft Product Baseline, specify performance requirements defined by the development specifications. Only one successful review per HWCI/CSCI is required.

### HMI prototype review

Based upon the Product Baseline approved at the CDR. Contractor shall produce a prototype HMI. Contractor shall invite Purchaser to review the prototype HMI. Contractor shall allow Purchaser to provide comments within the approved Product Baseline. Contractor will perform any action required to incorporate these Purchaser’s comments.

## System/Subsystem Design Description

The System/SUB-System Design Description (SSDD) from the MIL-STD-498 shall be used to describe the system-wide functional, software, hardware and communication architectural design. The SSDD shall identify the Computer Software Configuration Items (CSCI), Hardware Configuration Items (HWCI), with, if relevant, reference to de-facto standard products, for example: software/hardware components and interconnectivity.

## Interface Design Description (IDD)

The Interface Design Description (IDD) from the MIL-STD-498 shall be used to describe the system-wide communication architectural design. The IDD must identify the applicable CSCI and HWCI, with, if relevant, reference to de-facto standard products, for example: interconnectivity concepts.

## Software Development Plan

The Software Development Plan (SDP) from the MIL-STD-498 shall be used to describe a developer's plans for conducting a software development effort. The term ‘software development' in this Section is meant to include new development, modification, reuse, reengineering, maintenance, and all other activities resulting in software products.

The SDP provides the Purchaser insight into and a tool for monitoring, the processes to be followed for software development, the methods to be used, the approach to be followed for each activity, and project schedules, organisation, and resources. The content of the SDP is described in Appendix I (also see also MIL-STD-498), including the chapter and section numbering that shall be used. Note that this plan is required only if a considerable amount of software development is required/planned, which will also be included in the quotation.

## Programmes, Drawings, Calculations

Programs, drawings, calculations, and designs submitted shall be checked and signed as approved by the Purchaser’s responsible engineer. All dimensions of components and replaceable items supplied shall be specified in metric units. All drawings shall be detailed in metric units and in compliance with the S.I. standard.

# MANUFACTURING

## Technical Construction File

All system components and, tools and test systems, shall be fully compliant with < directives that are applicable for the region where the system will be installed>. The Contractor shall deliver a certificate from an independent testing or certification organisation, which meets the requirements of the directive. The system components shall have an environmental classification of domestic, commercial and light industry.

Equipment shall comply with <applicable directives that are applicable for the region where the system will be installed>. The Contractor shall deliver a certificate from an independent testing or certification organisation, which meets the requirements of the directive.

## Manufacturing

Development and manufacturing will take place at the Contractor’s/Subcontractor’s premises. All materials and equipment of the systems shall be new and of specified quality. For all materials used in the fabrication, material certificates in accordance with <Euronorm 25 or equivalent> shall be made available for the Purchaser on request.

No filling or plugging for the correction of defective work shall be permitted without approval of the Purchaser.

## Adequacy of the Equipment Furnished

Approval by the Purchaser does not relieve the Contractor of his responsibility to certify the adequacy of the system components.

## Surface Coating

All systems shall be completely shop applied and all structures and equipment shall be delivered to the erection site complete with coating system. Reports of inspection shall be forwarded to the Purchaser. The Contractor shall repair any damaged painted surfaces. The system after repair shall at least have the same paint quality as before the damage occurred. Repair work shall always cover a complete surface element to avoid a patchwork appearance of the installation. Colour of the system components shall be mutually agreed upon by Purchaser and Contractor.

## Nameplates

The manufacturer’s name if incorporated on panels, shall be in the letters, style and size to be approved by the Purchaser.

# TESTING

## Test Plan

A Test Plan, i.e., descriptions of plans for testing of system requirements and specified Computer Software Configuration Items (CSCIs) and Hardware Configuration Items (HWCI), will be supplied by the Contractor. The Test Plan shall comply with the requirements as mentioned in the Test Procedures document. Software tests shall be in compliance with Software Test Plans as described in [MIL\_498].

The Software Test Plan (STP) describes plans for qualification testing of Computer Software Configuration Items (CSCIs) and software systems. It describes the software test environment to be used for the testing, identifies the tests to be performed, and provides schedules for test activities.

There is usually a single STP for a project. The STP enables the Purchaser to assess the adequacy of planning for CSCI and, if applicable, software system qualification testing.

## Test Description

Test Descriptions (TD) define the preparations, test cases and test procedures to be used for qualification testing of system capability requirements and will be supplied by the Contractor. Test Descriptions shall be in compliance with the agreed Test Plan.

The Software Test Description (STD) from the MIL-STD-498 shall be used to describe the test preparations, test cases, and test procedures to be used to perform qualification testing of a Computer Software Configuration Item (CSCI) or a software system or subsystem. The STD enables the Purchaser to assess the adequacy of the qualification testing to be performed. The Contractor shall test software according to the STD given in the MIL-STD-498 and he shall supply the relevant documentation accordingly.

## Test Reports

Test Reports contain the results of the tests performed as stated within the TDs according to the qualification testing of system capability requirements.

## Testing

Contractor shall submit drafts of his Test Plan to Purchaser for approval at least 1 months prior to the scheduled start of testing.

Contractor shall submit drafts of his Test Description to Purchaser for approval at least 6 weeks prior to the scheduled start of testing. Purchaser shall comment within one (1) month. Contractor shall submit a final version of these documents (in which Purchaser’s comment has been incorporated) at least one (1) week prior to the scheduled starting date of the test.

Testing of the systems will be performed in phases. In general, for each system component and finally the system as a whole, the following procedure will be followed:

* Submission of Factory Acceptance Test (FAT) proposal documents to Purchaser for approval;
* Performing FAT;
* Submission of Provisional Site Acceptance Test (PSA) proposal documents to Purchaser for approval;
* Performing PSA;
* Submission of Final Site Acceptance Test (FSA) proposal documents to Purchaser for approval;
* Performing FSA;
* Submission of Final Project Acceptance Test (FPA) proposal documents to Purchaser for approval;
* Performing FPA (the System);

Purchaser additionally has the right to require Factory Inspection Tests for System Components.

For a detailed description of the test procedures, see the Test Procedures document.

## Test and Material Certificates

All relevant information on test equipment and material certificates that will be used during PSAs and FSA, shall be submitted to the Purchaser before shipment to the site.

# WORK on SITE

## Conditions for Implementation

Prior to the implementation of system components, the following general preconditions must be satisfied:

1. All the factory acceptance tests (FAT) must have been performed in compliance with the requirements by a Purchaser approved test program and successfully completed;
2. The most recent versions of operational systems are to be installed by the Contractor. If during later installations, software updates or modification are included and approved by Purchaser, these shall also be incorporated in earlier deliveries at no extra costs.
3. The Purchaser will notify the Contractor immediately on modifications of existing software or hardware components that are related in some way to the systems to be installed by the Contractor;
4. The low voltage power supply must have sufficient capacity to power the new systems, including additional load as specified by the Contractor;
5. The Contractor shall submit for approval to Purchaser for each site where equipment is to be installed a Site Preparation Requirement and Installation Plan (SPRIP) two (2) months prior to installation;
6. Contractor shall submit the Installation Schedule and Activity Plan (ISAP) for approval to the Purchaser. The ISAP will become an integral part of the Installation Schedule and Activities document.

## Shipment to the Site(s)

Before shipment to any of the sites, the Contractor shall make inquiries on storage conditions, facilities and the situation of the installation site.

## Access to the Site(s)

Prior to entering installation sites, Contractor’s personnel shall need authorisation. The arrangements for these authorisations will be will be made when necessary during the project.

## Storage Area

Storage area will be made available for the Contractor. The Purchaser has no legal obligation for goods stored by the Contractor on his premises.

## Contractor’s Supervisor

The Contractor shall have a supervisor present at a site when Contractor and/or Sub-contractor’s personnel is working. The supervisor shall be the Contractor’s representative at the site, responsible for all activities of the Contractor and/or Subcontractor’s personnel.

## Continuation of the Operational Processes

All Contractor’s work at the site shall not jeopardise the continuation of the operational processes.

For the implementation of systems, the following special conditions apply:

1. Implementation of systems are performed according to the schedule given in the Installation Schedule and Activities document, under the conditions that installation activities do not disrupt the operational process in any way, nor will they affect the operational tests performed by the Purchaser;
2. Major implementation activities will not take place in the period during the summer holidays and in the period during Christmas holidays (exact periods to be determined by Purchaser and Contractor in mutual agreement). Activities that will not be performed during these periods include integration of new systems with existing systems, commissioning and SATs;
3. Major installation activities for which the existing system must be placed out-of-order will only be performed after written permission of the Purchaser; most systems can be placed out-of-order for only short periods of time.
4. During the whole implementation period, the installation sites and the systems under installation are accessible on work days from 8:30 AM to 17.00 PM; exceptions (extended hours or different periods) can be agreed upon by the Purchaser;
5. Permission to perform activities related to the implementation of new systems that can endanger the operational status of existing operational system, (partly) depends on the weather conditions;
6. The new systems to be implemented shall be installed leaving all existing operational systems operational and untouched
7. Basic input from meteorological sensors that is required to test the new systems, shall be retrieved from the new sensors/instruments.
8. All newly installed systems shall be tested in parallel to the existing operational network without interfering with these operational systems. During the period before the Acceptance of the System, the existing operational network and the new system shall both be operational, side by side. <if possible>
9. The final switch from the old system to the new system, shall only be made if and when all new system components have been accepted and have proven to be reliable during the test period.

## Changes in the Implementation Schedule

All change proposals by the Contractor shall be submitted in writing to the Purchaser for written approval. If the Purchaser desires changes in the implementation schedule, Contractor shall also be notified in writing and a mutual acceptable change will be discussed and agreed upon.

# DOCUMENTATION AND TRAINING

## Manuals

A draft of operating and maintenance manuals in the <language> language shall be available at least one (1) month before the scheduled start of field inspections and tests. Instructions shall be prepared for the equipment installed, covering all aspects of safe and efficient operation.

## Drawings of Existing Equipment

Drawings of the existing equipment shall, to a certain extent, be made available by the Purchaser on paper or in electronic format. If applicable, the Contractor shall modify these drawing or prepare a new set. Final documentation of the modified equipment shall be submitted to Purchaser for approval.

## Contractor’s Drawings of Work

Contractor’s drawings of the work as-built, shall be in such detail enabling Purchaser to operate, maintain, adjust and repair all parts of the system.

## Conversion of Drawings

The Contractor’s drawings shall be prepared in such way that conversion to the Purchaser’s system is possible. The software format in use by Purchaser is <software format 1>, version <x.y> and <software format 2> for drawings of electronic components.

## Other Exchange Formats

For other exchange formats an approval in writing from Purchaser is required.

## Set of Final Documentation

The Contractor shall deliver a complete set of final documentation including at least

1. Design Reports;
2. Various Manuals;
3. Software Manuals and descriptions (I/O, blocks, used flags etc.);
4. As Built Drawings.

All final documentation in writing shall comply with MIL-STD498 and be supplied in hardcopy format as well as in electronic format on USB memory in the following formats:

1. Documents in the latest version of Microsoft Word;
2. Presentations in the latest version of Microsoft PowerPoint;.
3. Spreadsheets in the latest version of Microsoft Excel;
4. Project management documentation such as Gantt Charts in the latest version of Microsoft Project;
5. Pictures in the latest version of Microsoft Visio.

For a more detailed description of the requested documentation and the number of copies required for each document, see the Training & Documentation document.

## Training

Experienced trainers shall be made available by the Contractor for training of Purchaser’s staff. The training shall be given in the <language> language in <location, country>. The Contractor shall make a training plan including training schedules and contents of the training, which will become an integral part of the Training & Documentation document. Contractor shall submit documents for approval to Purchaser. Training shall be concluded minimally four (4) weeks and maximally eight (8) weeks before starting the installation.

In general, Purchaser’s staff shall be trained on all hardware/software operation, configuration of systems, and maintenance. The Contractor shall state which level of skills is needed by the trainees in order to be able to follow the training.

Included in the training are at least the following topics:

1. Purchaser’s technicians shall receive training on the installation of various systems;
2. Purchaser’s technicians shall receive training on the calibration of all instruments;
3. Purchaser’s technicians shall receive training on aspects of maintenance of all delivered systems;
4. Purchaser’s system operators shall receive training on how to configure and maintain the systems;
5. Purchaser’s meteorologists and meteorological observers who will work with the new systems, shall receive training on how to operate them;

# PROJECT MANAGEMENT AND QUALITY ASSURANCE

## Overview

Project Management (PM) includes the planning, organising, monitoring and controlling of all aspects of the project in a continuous process to achieve its project objectives.

The Contractor shall prepare an overall and detailed Project Management Plan (PMP), which will fully describe the work in terms of:

1. Scope;
2. Time;
3. Costs;
4. Quality;
5. Resources;
6. Communications;
7. Procurement & manufacturing;
8. Site work;
9. Risk.

## Scope

The Contractor shall prepare a Work Breakdown Structure (WBS), that presents and describes the total scope of the project in terms of project phases, project components, work packages and deliverables and results of the project.

## Project Management

The Contractor shall prepare a Project Time Management Plan (PTMP), which shall fully describe the works in terms of activities, sequence of activities, estimated duration of activities, inter-activity dependencies, scheduling and the processes to ensure that the project is completed within the approved project schedule.

The Contractor shall clearly state which relevant and/or necessary inputs (documents or other information data), methods & techniques used for time management, as well as outputs (documents and other information results), are required and shall be used for the time management process.

The plan shall at least contain the following, but not be limited to:

1. **Activity Definition**
A list of all activities, which shall be performed within the project, their description and their relation to the WBS.
2. **Activity Sequence**
Identified activities shall be sequenced accurately and shall take the form of a (resource) critical path network.
3. **Duration Estimation**
Duration estimating includes:
* Estimation of the periods of time that will be needed to complete individual activities based on resource requirements and resource capabilities.
* Some indication of the range of possible results, in accordance with the risk management plan and calculated and presented as a three-point estimate, i.e. low, most likely and high estimate, and document all assumptions made.
1. **Project Schedule**
The Contractor shall submit a project schedule after analysing activity sequences, activity duration and resource requirements, where start and finish dates for all project activities are determined. This project schedule provides the basis for measuring and reporting schedule performance throughout the project and shall be presented as bar charts and network drawings in both summary and detailed forms against the key targets.

The Contractor shall discuss with Purchaser at least the development, quality, implementation, tests and acceptance tests as well as configuration management and maintenance planning. Approval of all aforementioned items by the Purchaser is required.

## Cost Management

The Contractor shall prepare a Project Cost Management Plan (PCMP), which shall fully describe the work in terms of cost and resources and the processes to ensure that the project is completed within the approved budget.

The Contractor shall clearly state which relevant and/or necessary inputs (documents or other information data), methods & techniques used for cost management, as well as outputs (documents and other information results), are required and will be used for the cost management process.

The plan shall at least contain the following, but not be limited to:

1. **Resource planning**
Resource planning determines what resources (labour, equipment, materials, supplies) and what quantities of each should be used to perform project activities;
2. **Cost Estimates**
Estimates of costs of the resources needed to complete project activities;
3. **Cost Budgeting**
Allocation of the overall cost estimate broken down to individual work packages;
4. **Cost Control**
Control of changes of the project budget.

## Quality Management

The Contractor shall provide a Quality Assurance Project Plan (QAPP) in accordance with Article 4 of the Agreement.

## Human Resource Management

The Contractor shall prepare a Project Human Resource Management Plan (PHRMP), which shall describe the people involved in the project, including the people supplied by Sub-contractors.

The Contractor shall clearly state which relevant and/or necessary inputs (documents or other information data), methods & techniques used for human resource management, as well as outputs (documents and other information results), are required and will be used for the human resource management processes.

The plan shall at least contain the following, but not be limited to:

1. **Organisational Planning**
This includes identifying, documenting and assigning project roles, responsibilities and reporting relationships within the Contractors project organisation for each project phase. Furthermore, a statement of the number of site personnel engaged in the work, for each activity during each project phase is requested.
2. **Training Plan**
A description of all Contractor’s activities to enhance the necessary skills, knowledge and capabilities of Purchaser’s staff related to the design, development, construction, testing and implementation of the new system.

## Communication Management

The Contractor shall prepare a Project Communication Management Plan (PCMMP), which shall describe the communication process during the project to ensure timely and appropriate generation, collection, distribution and storage of project information. The Contractor shall clearly state which relevant and/or necessary inputs (documents or other information data), methods & techniques used for communication management, as well as outputs (documents and other information results), are required for the communication management processes.

The plan shall at least contain the following, but not be limited to:

1. **Communication Planning**
The communication planning shall include:
* Methods that will be used to gather various types of information and from whom;
* Production schedules, listing when each type of communication will be produced, procedures for updating;
1. **Information Distribution**
The information distribution shall include:
* The distribution structure which details to whom information (reports, data, schedules, technical documentation) will be sent, and what methods will be used to distribute various types of information (reports, minutes of meetings, etc.);
* Detailed description of each type of information to be distributed, including format, content, level of detail.
1. **Monthly Progress Reporting**
A detailed progress report shall be submitted for each month up to the date of final acceptance. The monthly report shall contain, but not be limited to:
* The progress of all activities as listed in the Work Breakdown Structure;
* Listing of late activities compared to the early finish schedule and baseline;
* Explanations for late activities and problem areas that are having, or are likely to have, impact on the project progress;
* Details of measures proposed to bring late activities back on schedule;
* Outstanding data and measures proposed to expedite the issue of critical data;
* Demonstration of the achievement of all milestones;
* Forecast of completion of all outstanding activities and the deviation against the plan in the next three months;
* Forecast of attainment of all outstanding milestone activities and deviation against the plan.

In addition to the schedule-related activities referred to above, the monthly progress report shall also include the following:

1. Cover letter and executive summary;
2. Problem areas and details of measures being taken to resolve problems;
3. A statement on the number of site personnel engaged in the work during the reporting period;
4. Purchasing and manufacturing schedule associated with major or significant items of equipment (to be agreed by the Purchaser), marked up to show status of procurement & manufacturing activities;
5. Update of Gantt charts;
6. Risk evaluation.

The monthly progress report shall be in accordance with the Work Breakdown Structure.

Progress of the implementation of systems shall be reported on a two-weekly basis.

## Site Management Plan

The Contractor shall prepare a Project Site Management Plan (PSMP), which fully describes the site works and required conditions. The Contractor shall clearly state which relevant and/or necessary inputs (documents or other information data), methods & techniques are in use for human resource management, as well which outputs (documents and other information results), are required and will be used for site management processes. The PSMP shall be submitted by the Contractor to the Purchaser for approval one (1) month after approval of the CDR (see Chapter 4).

The plan shall at least contain the following, but not be limited to:

1. Time schedule for implementations;
2. A milestone chart;
3. List of the subcontracted work and subcontractors, to be working on site;
4. Personnel and non-personnel resources for implementation activities;
5. Required utilities, such as: area, power, water and gas consumption;
6. SPRIP shall be part of the PSMP;
7. ISAP shall be part of the PSMP.

## Risk Management Plan

Project Risk Management is considered as an essential management technique that helps smooth the project’s progress and avoids crisis management. The aim of risk management is to minimise the impact of potential negative events and to take full advantage of opportunities for improvement. PRM includes the process of identifying, analysing and responding to uncertainty. The management of risk for this project shall include design, development, manufacture, installation, integration of subsystems, testing, implementation and training.

The Contractor shall prepare a Project Risk Management Plan (PRMP) which shall explain how the risk strategy will be carried out. The PRMP will also document the procedures that will be used to manage risks throughout the project.

The Contractor shall clearly state which relevant and/or necessary inputs (documents or other information data), methods & techniques used for risk management, as well as outputs (documents and other information results), are required and will be used for the risk management processes.

The plan shall at least contain the following, but not be limited to:

1. **Risk Identification**
Risk identification shall at least include the following aspects:
* Description of sources of risks and risk events that may be expected to affect the project, on the basis of the WBS and the effect thereof;
* Description of tools and techniques, including software, if any, and how the different identification and analysis techniques will be carried out;
* The key risks, i.e. those for which the probability of occurrence or magnitude of loss (time, cost, quality, resources), is relatively high;
* How the change in key risks will be identified and managed;
* The use of experience and historical data from previous projects.
1. **Risk Quantification**
Risk quantification includes:
* The impact of the risks and the likelihood of their occurrence;
* Determination of which risk events warrant response;
* A listing of opportunities that should be pursued or ignored and threats that require mitigation or are accepted;
* Risk relation matrix, indicating the influence and dependencies of risks on each other.
1. **Risk Mitigation**
The mitigation of risks shall at least include the following aspects:
* Risk contingency plans;
* How risks will be mitigated;
* Description of tools and techniques to respond to a potential opportunity or risk, such as contracting, contingency planning, alternative strategies, insurance;
* Contractual agreements as appropriate in order to avoid or mitigate threats.
1. **Risk Control**
Risk control handles the following aspects:
* How the PRMP will be executed and updated during the project;
* How, when and in what form risks will be monitored and reported within the Contractors organisation;
* How and in what form risks will be described in a Monthly Progress Report (see section 9.8).

## Purchaser’s Project Organisation

Within the Purchaser’s project organisation, a co-ordination group will be defined. The co-ordination group will be responsible for the co-ordination of:

1. Installation activities;
2. Commissioning activities;
3. Test activities;
4. Related other projects;

Prior to the installation, the Test Plans, PSMP, and QAPP will be reviewed and approved by this group. This co-ordination group minimally includes:

1. Purchaser’s coordinator;
2. Purchaser’s Project Supervisor;
3. On-site Contractor Supervisor.

# IMPLEMENTATION SCENARIO

This Chapter describes the implementation scenario for the new observation network. The first two sections provide a general introduction to the implementation process. The last sections of provide specific details on the implementation of the systems. Before an implementation of systems can start, a number of preconditions must be fulfilled.

## Preconditions for Implementation

Prior to the implementation of the systems the general preconditions as stated in section 7.1 must be satisfied. Additionally, the following preconditions apply:

1. The complete implementation period shall not exceed a period between <minimum # of months> and <maximum # of months>, starting from the date the Agreement between the Purchaser and Contractor has been signed.
2. The AWS and MIPS test systems provided to Purchaser must have passed their SATs successfully;

If these preconditions are not met at the planned starting date of the implementation, the implementation cannot start.

## Implementation Phases

The following implementation phases can be distinguished

1. Delivery and implementation of the test AWS’ with instruments and the MIPS the Purchaser’s HQ; a PSAT shall be done to finalise this phase.
2. Delivery of all remaining pre-configured and FAT accepted AWS’ with instruments; a PSAT shall be done to accept all AWS stations and instruments;
3. Implementation of all AWS systems on the observation sites by Contractor or Purchaser <define who will do the on-site station implementation>; each station shall be tested (PSAT) after installation and connection to the MIPS.
4. Testing of the entire new network, followed by the FSAT and FPAT, the latter when the system has been commissioned and made operational.

The general philosophy behind this implementation schedule is that the key component, the MIPS, needs to be installed and tested first (step 1 above), while at the same time the full AWS configuration is tested as a separate unit and by connecting it to the MIPS.

Once the MIPS and the test AWS’ have been accepted, all other AWS systems with sensors can be delivered. They will still be going through a SAT at the Purchaser’s technical department before the site installations will start.

After each site installation, an acceptance test shall be done. These tests shall be identical for each station according to a fixed test protocol defined by the Contractor, approved by the Purchaser.

The final step is the implementation and testing of the system as a whole (step 4), which shall be concluded with the FPAT.

Note that the above mentioned numbering does not automatically mean that this is also the order in which systems are to be implemented: several activities can be done simultaneously.

Implementation of System Parts consists of 5 steps:

1. Installation
2. Pre-PSAT activities
3. PSAT
4. FSAT
5. FPAT

The following sections describe the implementation steps in more detail.

### Installation

Prior to the installation of any system component, the preconditions as stated in section 7.1 must be satisfied. The implementation starts with the installation of the test AWS’ with instruments and the MIPS. The installation includes all hardware, software, network components, electrical components and cabling (where applicable). During this phase the new systems are not yet connected to any operational systems or instruments.

### Pre-PSAT activities and PSAT

When the test AWS’ with instruments and the MIPS have been installed at the Purchaser’s HQ (or other selected site), the system will be prepared for the PSAT. All the functionality from instrument observations to report generation and transmission to the MSS, will be tested. This shall be done in parallel to the operational system, which will not be touched. As part of the test, the results from the new system shall be comparted with the results of the operational system.

The Pre-Sat program shall at least include:

1. A test in which Contractor demonstrates that the performance of the AWS’ with instruments and MIPS is in agreement with the specifications;

If the Pre-SAT activities prove that the system is working according to the specification, the formal PSAT is done and signed.

Once the PSAT for the test AWS’ and the MIPS has been done, the remaining AWS’ with instruments can be delivered. Purchaser will test them at arrival after which they can be installed at the observation sites. After each installation a PSAT per station shall be executed in which the operational functionality of the AWS is confirmed, and the connection for the data communication has been show to work correctly.

### FSAT and FPA

When all stations have been installed and went through their PSATs, a test for the system as a whole shall be executed. This test, the FSAT, shall demonstrate that the MIPS with all AWS stations with instruments, is working correctly. After the FSAT, a test period of 30 days is taken into account, during which no major issues are allowed. The final project acceptance (FPA) test can be signed after the 30 days’ test period.

Before signing of the FPA, all training has to be given, and all documentation has to be received and approved in the final versions.

# PLANNING CONSTRAINTS

The implementation schedule should comply with the following restrictions:

1. The implementation will be performed according to the General conditions for implementation (sect. 7.1), Preconditions for implementation (sect. 10.1) and conditions concerning the Continuation of the operational process (sect. 7.6);
2. Acceptance of the last new systems must be ultimately between <minimum # of months> and, <maximum # of months>, starting from the date the Agreement between the Purchaser and Contractor has been signed.;
3. Timely delivery of documentation is essential for the Purchaser.
4. Contractor shall be fully responsible for taking care that system components and the system as a whole connected to existing infrastructure, shall perform according to the requirements.

Contractor is invited to propose an alternate implementation schedule in compliance with the restrictions stated above.

# NOTES

## LIST OF DEFINITIONS

|  |  |
| --- | --- |
| Deliverable | Any measurable, tangible, verifiable item that must be produced to complete the project. |
| Development | All activities to be carried out to create software and hardware products. |
| Milestone | A significant event in the project, usually completion of a major deliverable. |
| Project Phase | A collection of logically related project activities, usually culminating in the completion of a major deliverable. |
| Purchaser | The procuring NMHS. |
| Scope | The sum of the products and services to be provided as a project. |
| Software | Intellectual creation comprising the programs, procedures, rules and any associated documentation pertaining to the operation of a data processing system. |
| Software product | Complete set of computer programs, procedures and associated documentation and data for delivery to a user. |
| Validation (software) | The process of evaluating software to ensure compliance with specified requirements. |
| Verification (software) | The process of evaluating the products of a given phase to ensure correctness and consistency, with respect to the products and standards provided as input to that phase. |
| Work BreakdownStructure (WBS) | A product-oriented ‘family tree’ of project components which organises and defines the total scope of the project. Each descending level represents an increasingly detailed definition of a project component. Project components may be products or services. |

## LIST OF TERMS AND ABBREVIATIONS

|  |  |
| --- | --- |
| AWS | Automatic Weather Station |
| CDR | Critical Design Review |
| CMP | Cost Management Plan |
| FAT | Factory Acceptance Test |
| FPAT | Final Project Acceptance Test |
| FSAT | Final Site Acceptance Test |
| IDD | Interface Design Definition |
| IRS | Interface Requirements Specification |
| ISAP | Installation Schedule and Activity Plan |
| MIL-STD-498 | Military Standard Software Development and Documentation |
| MIL-STD-1521B | Military Standard Technical Reviews and Audits |
| MIPS | Meteorological Information and Processing System |
| PCMMP | Project Communication Management Plan |
| PCMP | Project Cost Management Plan |
| PHRMP | Project Human Resource Management Plan |
| PM | Project Management |
| PMP | Project Management Plan |
| PSAT | Provisional Site Acceptance Test |
| PSMP | Project Site Management Plan |
| PQMP | Project Quality Management Plan |
| PRMP | Project Risk Management Plan |
| PTMP | Project Time Management Plan |
| QAPP | Quality Assurance Plan |
| SDP | Software Development Plan |
| SDR | System Design Review |
| SPRIP | Site Preparation and Installation Plan |
| SRR | System Requirements Review |
| SSDD | System/Subsystem Design Description |
| SSR | Software Specification Review |
| SSS | System/Subsystem Specification |
| STD | Software Test Description |
| WBS | Work Breakdown Structure |

# Appendix I: Software Development Plan

1. Scope

This chapter shall be divided into the following paragraphs.

**1.1 Identification**

This paragraph shall contain a full identification of the system and the software to which this document applies, including, as applicable, identification number(s), title(s), abbreviation(s), version number(s), and release number(s).

**1.2 System overview**

This paragraph shall briefly state the purpose of the system and the software to which this document applies. It shall describe the general nature of the system and software; summarise the history of system development, operation, and maintenance; identify the project sponsor, acquirer, user, developer, and support agencies; identify current and planned operating sites; and list other relevant documents.

**1.3 Document overview**

This paragraph shall summarise the purpose and contents of this document and shall describe any security or privacy considerations associated with its use.

**1.4 Relationship to other plans**

This paragraph shall describe the relationship, if any, of the SDP to other project management plans.

2. Referenced Documents

This chapter shall list the number, title, revision, and date of all documents referenced in this plan. This section shall also identify the source for all documents not available through normal Government stocking activities.

3. Overview of required work

This section shall be divided into paragraphs as needed to establish the context for the planning described in later sections. It shall include, as applicable, an overview of:

1. Requirements and constraints on the system and software to be developed
2. Requirements and constraints on project documentation
3. Position of the project in the system life cycle
4. The selected program/acquisition strategy or any requirements or constraints on it
5. Requirements and constraints on project schedules and resources
6. Other requirements and constraints, such as on project security, privacy, methods, standards, interdependencies in hardware and software development, etc.

4. Plans for performing general software development activities

This chapter shall be divided into the following paragraphs. Provisions corresponding to non-required activities may be satisfied by the words ‘Not applicable’. If different builds or different software on the project require different planning, these differences shall be noted in the paragraphs. In addition to the content specified below, each paragraph shall identify applicable risks/uncertainties and plans for dealing with them.

**4.1 Software development process**

This paragraph shall describe the software development process to be used. The planning shall cover all contractual clauses concerning this topic, identifying planned builds, if applicable, their objectives, and the software development activities to be performed in each build.

**4.2 General plans for software development**

This paragraph shall be divided into the following subparagraphs.

**4.2.1 Software development methods**

This paragraph shall describe or reference the software develop­ment methods to be used. Included shall be descriptions of the manual and automated tools and procedures to be used in support of these methods. The methods shall cover all contractual clauses concerning this topic. Reference may be made to other paragraphs in this plan if the methods are better described in context with the activities to which they will be applied.

**4.2.2 Standards for software products**

This paragraph shall describe or reference the standards to be followed for representing requirements, design, code, test cases, test procedures, and test results. The standards shall cover all contractual clauses concerning this topic. Reference may be made to other paragraphs in this plan if the standards are better described in context with the activities to which they will be applied. Standards for code shall be provided for each programming language to be used. They shall include at a minimum:

1. Standards for format (such as indentation, spacing, capitalisation, and order of information)
2. Standards for header comments (requiring, for example, name/identifier of the code; version identification; modification history; purpose; requirements and design decisions implemented; notes on the processing (such as algorithms used, assumptions, constraints, limitations, and side effects); and notes on the data (inputs, outputs, variables, data structures, etc.)
3. Standards for other comments (such as required number and content expectations)
4. Naming conventions for variables, parameters, packages, procedures, files, etc.
5. Restrictions, if any, on the use of programming language constructs or features
6. Restrictions, if any, on the complexity of code aggregates

**4.2.3 Reusable software products**

This paragraph shall be divided into the following subparagraphs.

*4.2.3.1 Incorporating reusable software products*

This paragraph shall describe the approach to be followed for identifying, evaluating, and incorpo­rating reusable software products, including the scope of the search for such products and the criteria to be used for their evaluation. It shall cover all contractual clauses concerning this topic. Candidate or selected reusable software products known at the time this plan is prepared or updated shall be identified and described, together with benefits, drawbacks, and restrictions, as applicable, associated with their use.

* + - 1. *Developing reusable software products*

This paragraph shall describe the approach to be followed for identifying, evaluating, and reporting opportunities for developing reusable software products. It shall cover all contractual clauses concerning this topic.

* + 1. **Handling of critical requirements**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for handling requirements designated critical. The planning in each subparagraph shall cover all contractual clauses concerning the identified topic.

4.2.4.1 Safety assurance

4.2.4.2 Security assurance

4.2.4.3 Privacy assurance

4.2.4.4 Assurance of other critical requirements

* + 1. **Computer hardware resource utilisation**

This paragraph shall describe the approach to be followed for allocat­ing computer hardware resources and monitoring their utilisation. It shall cover all contractual clauses concerning this topic.

* + 1. **Recording rationale**

This paragraph shall describe the approach to be followed for recording rationale that will be useful to the support agency for key decisions made on the project. It shall interpret the term ‘key decisions’ for the project and state where the rationale are to be recorded. It shall cover all contractual clauses concerning this topic.

* + 1. **Access for acquirer review**

This paragraph shall describe the approach to be followed for providing the acquirer or its authorised representative access to developer and subcontractor facilities for review of software products and activities. It shall cover all contractual clauses concerning this topic.

**5. Plans for performing detailed software development activities**

This chapter shall be divided into the following paragraphs. Provisions corresponding to non-required activities may be satisfied by the words ‘Not applica­ble’. If different builds or different software on the project require different planning, these differences shall be noted in the paragraphs. The discussion of each activity shall include the approach (meth­ods/procedures/tools) to be applied to: 1) the analysis or other technical tasks involved, 2) the recording of results, and 3) the preparation of associated deliver­ables, if applicable. The discussion shall also identify applicable risks/uncertainties and plans for dealing with them. Refere­nce may be made to 4.2.1 if applica­ble methods are described there.

**5.1 Project planning and oversight**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for project planning and oversight. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.1.1 Software development planning (covering updates to this plan)

5.1.2 CSCI test planning

5.1.3 System test planning

5.1.4 Software installation planning

5.1.5 Software transition planning

5.1.6 Following and updating plans, including the intervals for management review

**5.2 Establishing a software development environment**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for establish­ing, controlling, and maintaining a software development environ­ment. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.2.1 Software engineering environment

5.2.2 Software test environment

5.2.3 Software development library

5.2.4 Software development files

5.2.5 Non-deliverable software

**5.3 System requirements analysis**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for participating in system requirements analysis. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.3.1 Analysis of user input

5.3.2 Operational concept

5.3.3 System requirements

5.4 System design

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for participating in system design. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.4.1 System-wide design decisions

5.4.2 System architectural design

**5.5 Software requirements analysis**

This paragraph shall describe the approach to be followed for software requirements analysis. The approach shall cover all contractual clauses concerning this topic.

**5.6 Software design**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for software design. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.6.1 CSCI-wide design decisions

5.6.2 CSCI architectural design

5.6.3 CSCI detailed design

**5.7 Software implementation and unit testing**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for software implementation and unit testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.7.1 Software implementation

5.7.2 Preparing for unit testing

5.7.3 Performing unit testing

5.7.4 Revision and re-testing

5.7.5 Analysing and recording unit test result

**5.8 Unit integration and testing**

This paragraph shall be divided into the following sub­paragraphs to describe the approach to be followed for unit integration and testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.8.1 Preparing for unit integration and testing

5.8.2 Performing unit integration and testing

5.8.3 Revision and re-testing

5.8.4 Analysing and recording unit integration and test results

**5.9 CSCI qualification testing**

This paragraph shall be divided into the following sub­paragraphs to describe the approach to be followed for CSCI qualification testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.9.1 Independence in CSCI qualification testing

5.9.2 Testing on the target computer system

5.9.3 Preparing for CSCI qualification testing

5.9.4 Dry run of CSCI qualification testing

5.9.5 Performing CSCI qualification testing

5.9.6 Revision and re-testing

5.9.7 Analysing and recording CSCI qualification test results

**5.10 CSCI/HWCI integration and testing**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for participating in CSCI/HWCI integration and testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.10.1 Preparing for CSCI/HWCI integration and testing

5.10.2 Performing CSCI/HWCI integration and testing

5.10.3 Revision and re-testing

5.10.4 Analysing and recording CSCI/HWCI integration and test results

**5.11 System qualification testing**

This paragraph shall be divided into the following sub­paragraphs to describe the approach to be followed for participating in system qualification testing. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.11.1 Independence in system qualification testing

5.11.2 Testing on the target computer system

5.11.3 Preparing for system qualification testing

5.11.4 Dry run of system qualification testing

5.11.5 Performing system qualification testing

5.11.6 Revision and re-testing

5.11.7 Analysing and recording system qualification test results

* 1. **Preparing for software use**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for preparing for software use. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.12.1 Preparing the executable software

5.12.2 Preparing version descriptions for user sites

5.12.3 Preparing user manuals

5.12.4 Installation at user sites

* 1. **Preparing for software transition**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for preparing for software transition. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.13.1 Preparing the executable software

5.13.2 Preparing source files

5.13.3 Preparing version descriptions for the support site

5.13.4 Preparing the ‘as built’ CSCI design and other software support information

5.13.5 Updating the system design description

5.13.6 Preparing support manuals

5.13.7 Transition to the designated support site

**5.14 Software configuration management**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for software configuration management. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.14.1 Configuration identification

5.14.2 Configuration control

5.14.3 Configuration status accounting

5.14.4 Configuration audits

5.14.5 Packaging, storage, handling, and delivery

**5.15 Software product evaluation**

This paragraph shall be divided into the following sub­paragraphs to describe the approach to be followed for software product evaluation. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.15.1 In-process and final software product evaluations

5.15.2 Software product evaluation records, including items to be recorded

* + 1. Independence in software product evaluation

**5.16 Software quality assurance**

This paragraph shall be divided into the following sub­paragraphs to describe the approach to be followed for software quality assurance. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.16.1 Software quality assurance evaluations

5.16.2 Software quality assurance records, including items to be recorded

* + 1. Independence in software quality assurance

**5.17 Corrective action**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for corrective action. The planning in each subparagraph shall cover all contractual clauses regarding the identified topic.

5.16.1 Problem/change reports, including items to be recorded (candi­date items include project name, originator, problem number, problem name, software element or document affected, origination date, category and priority, description, analyst assigned to the problem, date assigned, date completed, analysis time, recommended solution, impacts, problem status, approval of solution, follow-up actions, corrector, correction date, version where corrected, correction time, description of solution imple­mented)

* + 1. Corrective *action system*

**5.18 Joint technical and management reviews**

This paragraph shall be divided into the following subparagraphs to describe the approach to be followed for joint technical and management reviews. The planning in each subparagraph shall cover all contractual clauses­ regarding the identified topic.

5.18.1 Joint technical reviews, including a proposed set of reviews

5.18.2 Joint management reviews, including a proposed set of reviews

**5.19 Other software development activities**

This paragraph shall be divided into the following sub­paragraphs to describe the approach to be followed for other software development activities. The planning in each subpara­graph shall cover all contractual clauses regarding the identified topic.

5.19.1 Risk management, including known risks and corresponding strategies

5.19.2 Software management indicators, including indicators to be used

5.19.3 Security and privacy

5.19.4 Subcontractor management

5.19.5 Interface with software independent verification and validation (IV&V) agents

5.19.6 Co-ordination with associate developers

5.19.7 Improvement of project processes

5.19.8 Other activities not covered elsewhere in the plan

6. Schedules and activity network

This section shall present:

1. Schedule(s) identifying the activities in each build and showing initiation of each activity, availability of draft and final deliverables and other milestones, and completion of each activity.
2. An activity network, depicting sequential relationships and dependencies among activities and identifying those activi­ties that impose the greatest time restric­tions on the project.

7. Project organisation and resources

This section shall be divided into the following paragraphs to describe the project organisation and resources to be applied in each build.

**7.1 Project organisation**

This paragraph shall describe the organisational structure to be used on the project, including the organisations involved, their relationships to one another, and the authority and responsibility of each organisation for carrying out required activities.

**7.2 Project resources**

This paragraph shall describe the resources to be applied to the project. It shall include, as applicable:

1. Personnel resources, including:
2. The estimated staff-loading for the project (number of personnel over time)
3. The breakdown of the staff-loading numbers by responsibility (for example, management, software engineering, software testing, software configuration management, software product evaluation, software quality assurance)
4. A breakdown of the skill levels, geographic locations, and security clearances of personnel performing each responsibility
5. Overview of developer facilities to be used, including geographic locations in which the work will be performed, facilities to be used, and secure areas and other features of the facilities as applicable to the contracted effort.
6. Acquirer-furnished equipment, software, services, documentation, data, and facilities required for the contracted effort. A schedule detailing when these items will be needed shall also be included.
7. Other required resources, including a plan for obtaining the resources, dates needed, and availability of each resource item.
8. Notes

This section shall contain any general information that aids in understanding this document (e.g., background information, glossary, rationale). This section shall include an alphabetical listing of all acronyms, abbreviations, and their meanings as used in this document and a list of any terms and definitions needed to understand this document.

1. Appendixes

Appendixes may be used to provide information published separately for convenience in document maintenance (e.g., charts, classified data). As applicable, each appendix shall be referenced in the main body of the document where the data would normally have been provided. Appendixes may be bound as separate documents for ease in handling. Appendixes shall be lettered alphabetically (A, B, etc.).