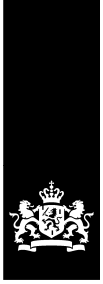

Defence Materiel Organisation
Ministry of Defence

Programme of Requirements

bird radar

Version 1.1

Date	5 October 2016
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Colophon

Directorate of Projects & Procurement
Bandbreedte projecten

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Version 1.1
Commisioned by Defense Materiel
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Project number 888.15.6020.00

Table of contents

List of terms and abbreviations

ATC	Air Traffic Control
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CI	Configuration Items
CM	Configuration Management
CMP	Configuration Management Plan
CTR	Control Zone around an airport
CWBS	Contract Work Breakdown Structure
DID	Data Item Description
DMO	Defence Material Organisation
FA	Factory Acceptance
FAT	Factory Acceptance Test
FSA	Final Site Acceptance
FSAT	Final Site Acceptance Test
LSA	Logistic Support Analyses
MAC	Month(s) after Contract Award
MTBO	Mean Time Between Outage
MTBF	Mean Time Between Failure
MTTR	Mean Time To Repair
MOD	Ministry of Defence
MPR	Monthly Progress Report
POR	Programme of Requirements
PM	Project Management
PMP	Project Master Plan
PMR	Program Management Review
PMS	Project Master Schedule
RMP	Recommended Maintenance Plan
POR	Programme Of Requirements
RNLAF	Royal Netherlands Air Force
RSPL	Recommended Spare Parts List
SAT	Standard Avian Target
SMP	Site Management Plan
SPRIP	Site Preparation Requirements and Installation Plan
TAT	Turn Around Time

Reference

A. POR fill in table Bird Radar Systems FILL IN DOCUMENT v1.1 final.xlsx, 5 October 2016

1 Introduction

This document describes the requirements for bird radar systems (hereinafter also referred to as 'the system') and its co-use by Air Traffic Control (ATC). The systems shall be installed on military airbases in the Netherlands. The system, that consists of several components, shall detect flying objects and is able to classify these into birds, aircraft and vehicles and display these in real-time to the users. The system will provide three different groups of users (operational bird control, bird control staff and operational ATC) with information.

This document starts with a general introduction of bird control in the Royal Netherlands Air Force (RNLAF) and outlines the dual use of the bird radar for both bird control and Air Traffic Control (ATC). Chapters 2, 3 and 4 describe the system requirements and system design, chapter 5 the project management, chapter 6 the conditions related to testing and chapter 7 conditions related to work at site. Annex A describes details of the six locations where the system shall be delivered, be installed and be put into operation and Annex B the Contract Data Requirements Lists (CDRL's) and Data Item Descriptions (DID's).

1.1 General description

For several decades bird strike prevention is an important issue in the Royal Netherlands Air Force (RNLAF), as well as en-route as on the airbase. In the RNLAF airbases both habitat management and active bird control are used to control bird hazard management, with innovation of new technics and methods as a third pillar. Like in the en-route bird strike prevention, an accurate detection of birds in the air on and around airports is crucial to reduce the number of bird strikes. The latest developments in this fields are dedicated bird radars.

Bird radars are capable of distinguishing between birds, aircraft and cars and therefore provide ATC users with important information not available for them at the moment. Bird radars with their own ADS-B receivers will be used as ground radar to support ATC with traffic information in the landing area to raise situational awareness, especially during bad weather situations. Furthermore the system will support ATC with the detection of runway incursions and applications in detecting air space infringements.

1.2 Scope

The bird radar system will be used for three different purposes:

- to prevent bird strikes;
- to judge risk assessments for spatial planning;
- to support ATC ground movement control, to prevent runway incursions and airspace infringements.

The three purposes of the system are related to the three different types of users as stated in the introduction: operational bird control, bird control staff and operational ATC.

1.2.1 Bird strike prevention

The objective of the bird radar system is twofold and both support the improvement of flight safety. On one hand measure the effectiveness of habitat management and active bird control, on the other hand supporting the operational process by informing the bird control unit with relevant information on bird activity in real-time. The information should consist of actual and historic bird movements in the runway environment, distinction of bird classes as well as alarming bird control when too many birds cross the runway.

1.2.2 Risk assessments in airport vicinity

New spatial planning activities in the airport vicinity within a range of 6 km are controlled for bird attractants. Maximum bird detection range should therefore reach or exceed 6 km range and 1 km height. Within this area, archived bird radar measurements will identify all bird movements, identifies so called bird hotspots (e.g. roosting birds), which underpin risk assessments. Future radar measurements will be used for monitoring and eventually adjust the activities.

1.2.3 ATC ground movement control, runway incursions and airspace infringements

The combination of bird radar as ground radar with ADS-B capacity will give ATC not only real-time awareness improvement operating under all weather conditions, but also a system which alerts ATC in case of a runway incursion or airspace infringement within its control zone (range of 15 km). Alerting ATC immediately offers them to react accordingly and correct the resulting situation. The system will help reduce the risk of those incidents. Furthermore, the possibilities to identify traffic in the runway environment, offers being pro-active and thus significantly improve flight safety.

1.3 Ground rules and assumptions

The following ground rules apply throughout this POR:

- This POR forms an integral part of the Agreement;
- The attached Appendices form an integral part of this POR.

2 System requirements

This chapter describes the requirements related to the operational use of the system. All requirements are also listed in the Excel file called *POR fill in table Bird Radar System* (ref A) which functions as a reply to all requirements.

2.1 General requirements

2.1.1 The bird radar system comprises the following subsystems:

- Bird radar with ADS-B receiver;
- Vehicle transponders (35 units);
- Portable device (tablet) for the bird control user;
- Two portable devices (tablets) for the ATC user;
- Communication (3G & 4G) between the system and all three tablet devices.

Each of the six military airbases will be equipped with the above mentioned system components. Bird control staff shall be equipped with a laptop for analyses of the bird radar data.

2.1.2 The system shall be delivered, be installed and be put into operation on six military airbases. In order to limit the number of obstacles in the runway environment, the bird radar with ADS-B receiver shall be installed in existing shelters/buildings if such shelters/buildings are available. Supplier shall take care of climate controlled conditions for their computers in all six locations. On two locations the bird radar with ADS-B receiver shall be installed in new shelters (chapter 4), to be delivered and installed by the Supplier. See Annex A for details of each location.

2.1.3 The bird radar system shall be (based on) an existing design and proven technology.

2.1.4 The bird radar shall give a 3D situation of the birds flying in the runway environment up to at least 6 km range and 1 km height according to the airport vicinity bird boundary area.

2.1.5 Preference: The bird radar shall give a 3D situation of the birds flying in the runway environment up to 10 km range and 1 km height.

2.1.6 Altitude information shall at least be given for those birds crossing an imaginary line on the runway.

2.1.7 Preference: The system is calibrated to discriminate between single birds and flocks.

2.1.8 Positions information of the bird tracks in the horizontal plane shall at least be updated every 2 seconds (30 RPM).

2.1.9 Preference: Positions information of the bird tracks in the horizontal plane shall be updated in less than 2 seconds.

2.1.10 Bandwidth of the 3G & 4G communication network shall be enough for real-time use of the portable devices for the bird control and ATC user (see 2.2 and 2.4).

2.1.11 The ADS-B receiver (see **Fout! Verwijzingsbron niet gevonden.**) shall be based on the 'extended squitter' (1090ES) technology.

2.1.12 The system shall be able to detect specific transponder codes of aircraft within at least the control zone of 15 km around the aerodrome and also all transponder equipped ground traffic on the aerodrome.

2.1.13 The data from the system shall be stored in a geo-spatial database and provided with software applications to analyse spatial and temporal patterns.

2.1.14 Preference: The database includes:

- Automatic database management to keep it fast and manageable;
- Is able to store at least one year of data;
- All stored data shall be accessible for bird control staff (bird data) or ATC user (aircraft and vehicle data);
- handling older (>1 year) data.

2.1.15 Preference: The database reporting tool shall be able to analyse at least one month of data in one time, without operational effect on the real-time operational devices.

2.1.16 The tracking algorithm of the system shall be able to continue bird tracks in the complex clutter runway environment.

2.1.17 Preference: Track fusion is part of the tracking algorithm for broken tracks due to clutter.

2.1.18 The system shall be calibrated against known targets;

2.1.19 A Standard Avian Target (SAT or in real life equivalent to one Carrion Crow) from the *FAA's Advisory Circular 150_5220_25* (RCS -16 dBm^2, mass 500 gram) shall be detected at the following ranges. Supplier shall provide theoretical proof that the system is able to do so:

- Range: 0.6 to 2 km. Target: 1 SAT up to an altitude of 1000ft (300 m);
- Range: 0.6 to 6 km. Target: 2 SAT (RCS -13 dBm^2) up to an altitude of 3000ft (900 m);
- Range: 6 km, target a Greylag goose (RCS 250 cm^2), altitude 1200ft (~400m).

2.1.20 The bird radar shall distinguish birds from vehicles and aircraft.

2.1.21 Preference: Aircraft, vehicles and bird related targets are classified with an accuracy of at least 90% within 6 km range. At least include the following aspects:

- within the runway environment;
- within the range up to 6 km;
- use of transponder information;
- classification performances in both cases.

2.1.22 Preference: The system is able to extract and analyse wing beat patterns.

2.2 Requirements related to operational bird control

The use by operational bird control is key in this project. The equipment and software shall meet the following requirements:

2.2.1 Bird control shall be equipped with a real-time portable device (minimum 10" tablet) in their car, powered through 12V connector of the car, which shows at least real-time and historic bird information.

2.2.2 3G & 4G Communication shall be used between the bird radar system and the portable device mounted in the car of operational bird control;

2.2.3 Preference: The system provides the following information on the portable devices:

- real-time information of (bird) tracks;
- historic information of bird activities (e.g. density map, hotspots);
- runway crossings over time;
- altitude information (tracks and over time);
- alarm(s);
- (open source) background layer;
- (fast) playback mode (1-30 min);
- user settings (e.g. colours, type of tracks shown on the display, map layers, playback mode).

2.2.4 Birds shall be divided into distinctive classes related to size and numbers.

2.2.5 Preference: Distinctive bird classes include at least the following aspects:

- single birds versus flocks;
- use of airspeed;
- 'fast-moving-flocks' (i.e. geese or other large flocking birds moving fast) with airspeed ≥ 16 m/s and classified as 'flock';
- non-bird related classes;
- user settings to toggle classes on or off.

2.2.6 Preference: Classification shall be based on Supplier's own field campaigns to validate the distinctive bird classes.

2.3 Requirements related to bird control staff

The 'Bird control staff' user's main task will be analysing the database, by using a laptop (see 2.1.1). The bird radar shall also be used as a monitor tool for performance indicators. This results in the following requirements:

2.3.1 The 'Bird control staff' user shall be equipped with a laptop for analysing the databases and monitoring the bird radars.

2.3.2 Preference: The database shall be accessible from remote computer(s) for the '*Bird Control staff*' user. The user is able to access, query and analyse the database from the systems laptop.

2.3.3 Preference: Bird control staff user will access the pre-programmed tools to analyse spatial and temporal patterns. These tools at least include the following topics:

- bird densities and bird fluxes over time;
- temporal patterns for a given area (e.g. runway, water or other user defined areas);
- near-miss calculation between bird and aircraft;
- hotspot identification in space and time;
- user selection of date-time stamps, distinctive bird classes, (altitude);
- spatial visualisations projected on a map.

2.3.4 Bird control staff user shall be able to playback historic and real-time bird movements on a map as background layer. The user shall be able to generate (common format) movies on user given date-time stamps.

2.4 Requirements related to ATC

The 'ATC user' does his work from the ATC-tower. This co-use of the bird radar system for ATC users, results in the following requirements:

2.4.1 Two portable devices (minimum 10" tablet) in the ATC tower to display (ground based) transponder movement within the airport (aircraft & vehicle transponders) or control zone (15 km, aircraft transponders). Normal electricity power (220V) will be used.

2.4.2 3G & 4G Communication shall be used between the bird radar system and the ATC devices.

2.4.3 The transponders of both vehicles and aircraft shall be detected and real-time presented to ATC on the portable devices in the control tower.

2.4.4 The mobile transponder shall be a portable system connected through 12V cigar lighter comprising of electronics and both antennas (transmitting and GPS).

2.4.5 The fixed transponder shall be a car mounted beacon case comprising of electronics and both antennas (transmitting and GPS).

2.4.6 Transponder performance parameters shall follow:

- Carrier frequency: 1090 MHz;
- Output power: 20W (pulse);
- Output message format: Mode S reply DF 18 (ES/NT) according to ICAO Annex 10, Vol.4;
- Protocol NMEA 0183 v2.3; WAAS, EGNOS supported;
- DC voltage: +9V to +32V;
- Operating temperature: -40°C to +70°C;

- Serviceability: Possibility to connect any computer (via standard interface) with software allowing to change the mode S DF 18 contents or to upgrade the firmware.

2.4.7 Runway incursions are defined as any occurrence at an aerodrome involving the incorrect presence of an aircraft or vehicle on the protected area of a surface designated for the landing and take-off of aircraft. The system shall use 'user-defined boxes' per aerodrome and transponder codes to generate runway incursion alerts.

2.4.8 Preference: The runway incursion implementation incudes at least the following aspects:

- the use of 'boxes' for presence/absence of transponders;
- vehicles crossing runway before/after aircraft movement;
- definition of 'boxes' ;
- definition/selection of 'sets' for operational runways;
- handling different types of traffic;
- alerting system to ATC (acoustic signals);
- property settings by user (radar display, labels, alerts, users);
- connection through standard data communication protocols to use GPS information and a unique coding for generating runway incursion alerts;
- future developments;
  The figure below will help explain the area of interest in two different situations. Transponders behind moving aircraft on the runway shall not give runway incursion alerts.

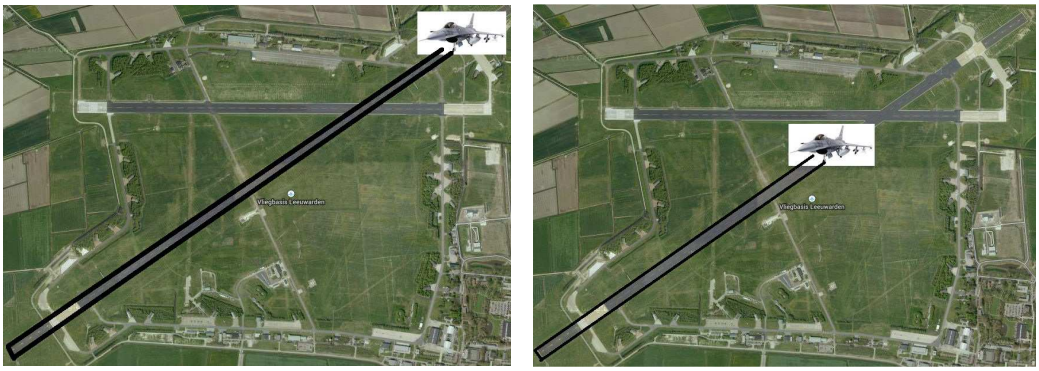


Figure 1: Area of interest for identifying runway incursions in two different situations. Runway incursions can only occur in the black rectangle between aircraft transponder and the end of the runway.

2.4.9 Airspace infringements shall be alerted when a specific transponder code (e.g. 7000) is detected within a user defined area (control zone or area up to at least 15 km) on the standalone device.

2.4.10 Preference: Airspace infringement user settings include at least the following aspects:

- control zone;
- flexibility further improvements;

- connection with third party databases which contain known flight plan- and transponder measurements;
- alerting system;
- exporting movies (commonly used types) on user selected date-time stamp.

3 Requirements related to system design

This chapter describes the requirements related to system design. All requirements are listed in the Excel file called *POR fill in table Bird Radar Systems*, (ref A) which functions as a reply to all requirements.

3.1 General

3.1.1 The system shall be designed to operate as an unattended system during twenty-four (24) hours a day, 365 days a year for at least ten (10) years counting from FSA of the last bird radar installed.

3.1.2 The system shall be designed to have an operational uptime of at least 98% during office hours (8.00 – 17.00 hours local Amsterdam time) for five out of six systems. The sixth system at Eindhoven airbase shall have an operational uptime of 98% from 7.00 – 23.00 hours local Amsterdam time during all seven days of the week. Uptime shall be based on monthly measurements per system.

3.1.3 Preference: The following aspects are included to calculate and verify the systems availability:

- use of structured method and reporting;
- technical and operational availability (preventive and corrective maintenance, system upgrades);
- downtime due to adverse weather conditions.

3.1.4 The system shall be designed to be operational up to wind speeds of 19 m/s (wind force 8).

3.1.5 All system components shall be designed to have an operational service life of at least 10 years.

3.1.6 The system shall have a control & monitor system on main- and subcomponents, which shows at least current status and uptime of the system.

3.1.7 System performance shall be automatically monitored and controlled from the Maintenance Supplier on at least main and sub-components to diagnose the system.

3.1.8 Malfunctioning of the system shall generate automatic alerts to both Maintenance Supplier and user(s).

3.1.9 Supplier shall ensure that logistic support, human engineering, ergonomics, high voltage protection, transportability, safety, security and electromagnetic compatibility considerations are an integrated part of all system designs.

3.2 Safety and regulatory requirements

3.2.1 The European R&TTE guidelines (1999/5/EC and changes) regarding emission shall be followed.

3.2.2 Electrical safety shall be compliant with European standards.

3.2.3 Lighting protection and safety shall be compliant with European standard (IEC 62305).

3.2.4 Equipment shall comply with the European Committee Low Voltage directive 73/23/EEG and the European Committee Machines directive 89/392/EEG.

3.2.5 Radar sensors shall be compliant with international standards (IEC 62388, 60945, 61993, 61162).

3.3 Environmental, safety and health requirements

3.3.1 The system shall be designed and built according to AECTP 200 Environmental conditions A3 and C0.

3.3.2 The system shall be designed, built and maintained with the least possible impact on health of people working on or around the system throughout the life cycle of the system.

3.3.3 Emissions shall be reduced to the level required for functioning of the system. Safe distances and emergency procedures for people working on or around the system will be provided by the Supplier.

4 Requirements related to the shelter

This chapter describes the requirements related to the shelter in which at least two systems will be placed. All requirements are listed in the Excel file called *POR fill in table Bird Radar Systems*, (ref A) which functions as a reply to all requirements.

4.1 General

4.1.1 The supplier is responsible for the integration of the radar system in and on the shelter.

4.1.2 The State will provide the necessary energy supply. The shelter has a connecting panel.

4.1.3 The State will provide the necessary hardening for the shelter.

4.1.4 The shelter has a life of type (LOT) of at least 10 years.

4.1.5 The shelter will be placed outside and is suitable for use in atmospheric conditions, including snow, hail, sleet and rain, in accordance with AECTP-230 leaflet 2311/1.

4.1.6 The exterior of shelter has a class 3 paint system in accordance with KN 00031 publication 2 and is coloured according to the basic marking patterns of ICAO Annex 14 (Aerodromes) in the colours 'white' and 'red-orange'.

4.1.7 The interior of shelter has the colour 'telegrey 4' RAL 7047.

4.1.8 The shelter has sufficient space to accommodate the radar installation and the processing equipment.

4.1.9 The shelter has a HVAC (heating, ventilation and air conditioning) unit to control the inside temperature between the required radar system specifications.

4.1.10 The shelter can be lifted with a crane. The shelter has lifting provisions for this purpose.

4.1.11 The roof of the shelter can provide support for the radar(s) and two people (100 kg each).

4.1.12 The shelter has an outward opening door (900 mm * 2000 mm) with a provision to use a padlock.

4.1.13 The container has a permanent ladder, compliant with ISO 14122, for safely reaching the roof of the system.

4.1.14 The interior of the shelter has an interior light (150 – 500 lux at system) with a switch.

4.1.15 The electrical system has two additional/spare 230 VAC 16 A connectors as per NEN-EN IEC 60309.

4.1.16 The 230 VAC circuit is compliant with NEN-EN IEC 60038.

5 Project management

5.1 Introduction

The project management tasks refer to the business and administrative planning, organising, directing, coordinating, controlling and approval actions designated to accomplish the overall project objectives.

The Contract Data Requirements List (CDRL) as referred to throughout this document, is described in Annex B. The applicable Data Item Descriptions (DID) are also attached in Annex B.

5.2 Contract Work Breakdown Structure

5.2.1 Supplier shall provide a Contract Work Breakdown Structure (CWBS) in accordance with CDRL 1, which 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.

5.3 Project Master Plan

5.3.1 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. Supplier shall establish, apply and maintain an overall and detailed Project Master Plan (PMP) in accordance with CDRL 2. The PMP shall be based on the CWBS and is, also in case of changes, subject to State review and approval.

5.3.2 All plans developed by Supplier shall be consistent with the PMP.

5.4 Project Master Schedule

5.4.1 Supplier shall establish, apply and maintain a Project Master Schedule (PMS), in accordance with CDRL 3 which shall fully describe the works in terms of activities, sequence of activities, estimated duration of activities, interactivity dependencies, scheduling and the processes to ensure that the project is completed within the approved project schedule.

5.4.2 Supplier 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.

5.4.3 Supplier shall discuss with the State 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 State is required.

5.5 Configuration management (CM)

5.5.1 In order to perform the required CM-tasks, Supplier shall establish, apply and maintain a Configuration Management Plan (CMP) in accordance with CDRL 4. The CMP shall meet the requirements of the Agreement and shall describe the processes, methods and procedures necessary to manage the functional and physical characteristics of the State approved Configuration Items (CI's). The CMP is, also in case of changes, subject to the State's review and approval.

5.5.2 Configuration management is similarly applicable to subcontractors.

5.5.3 Within his organisation Supplier shall appoint a single authority responsible for the CM tasks set forth in this POR.

5.6 Project communication management

5.6.1 Supplier shall organise Project Management Reviews (PMR's) up to Final Site Acceptance (FSA) of last bird radar system installed. During these progress reviews, project progress will be discussed on the basis of the Monthly Progress Report (MPR). In principle the PMR frequency is once a month, however the State shall have the right to adjust the interval between PMR's. The PMR's shall be held at project related facilities of Supplier or the State, to be mutually agreed for each PMR.

5.6.2 Supplier shall draft an agenda for each PMR and draft the minutes of each PMR. Both the agenda and the minutes are subject to the State's approval.

6 Conditions related to testing

This chapter describes the conditions related to testing of the system. All requirements are listed in the Excel file called *POR fill in table Bird Radar Systems*, (ref A) which function as a reply to all requirements.

6.1 Factory Acceptance Test (FAT)

6.1.1 All system components shall undergo a Factory Acceptance Test (FAT) at the Supplier's facility prior to delivery and installation. A system component shall be tested in the same configuration that shall be delivered and installed at the State's site. The State will verify the first Bird Radar System prior to the delivery of the second till the sixth Bird Radar System in order to ascertain whether it meets the requirements of this document. Procedures for final inspection and testing shall ensure that inspections and tests that should have been conducted at earlier stages have been performed. Successful completion of these tests shall be acknowledged by a certificate of conformity. Both a designated Supplier representative and the State's representative shall sign the recorded verification test data sheets.

6.1.2 In the presence of the State, the Supplier shall collect and analyse all system test data to verify that all test objectives are met and to ensure that deficiencies are noted and solved in a report.

6.1.3 Factory Acceptance (FA) is the act by which the State acknowledges by protocol, that *prima facie* it has been verified that all components and services are satisfactory completed and the system component is ready for delivery. The FA shall be achieved for each system component after installation and readiness for operation. The act of FA takes place when the following requirements have been met:

- Availability of all deliverable equipment;
- Successful completion of all verifications and the system component is well functioning;
- Fulfilment of all tasks directly related to FA without defects.

6.2 Final Site Acceptance Test (FSAT)

6.2.1 After a system component has passed its FA, a reliability test shall be performed. This test shall in general take more time (1 month in total), in which the system component shall work uninterruptedly without critical failures, to demonstrate its reliability. Final Site Acceptance (FSA) is the act by which the State acknowledges by protocol that Supplier has met the following:

- Accomplishment of the FA;
- Correction of all deficiencies, as listed in the relevant FA protocols;
- Fulfilment of all tasks directly related to FSA without defects and/or deficiencies;
- Correction of all defects/deficiencies occurred after FA;
- Delivery of the final documentation.

6.2.2 The FSA shall be achieved for the system and system component after installation and readiness for operation.

7 Conditions related to work at site

This chapter describes the conditions related to work at site. All requirements are listed in the Excel file called *POR fill in table Bird Radar System* (ref A) which functions as a reply to all requirements.

7.1 General

7.1.1 For the location where equipment is to be installed by Supplier, Supplier shall submit for approval to the State at latest 1 month prior to the installation a Site Preparation Requirement and Installation Plan (SPRIP). The SPRIP (CDRL 5) shall define the requirements and responsibilities for the coordinated, integrated State and Supplier site preparation, installation and validation efforts of the system.

7.1.2 To limit the number of obstacles in the runway environment, the new 'bird radar with ADS-B receiver' will be put on top of existing buildings as much as possible. Details on the radar location, shelter and surroundings are given in Annex A.

7.1.3 The SPRIP shall describe in detail the facilities and infrastructure needed at the installation sites (shelter, power, data lines, etc.). It will also contain a description of the facilities that are already present at the installation sites (based on the site survey) and which are to be provided by the State before installation can start. Furthermore, it will state specifically Supplier and the State's responsibilities in the processes of installation, implementation and testing of system components.

7.2 On-site installation

7.2.1 Supplier shall perform the on-site installation for the system components in accordance with the State approved SPRIP (CDRL 5).

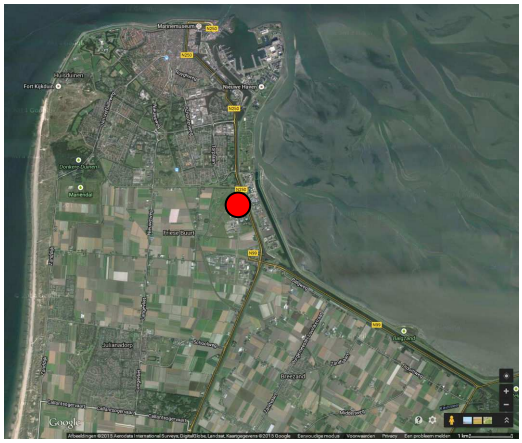
7.2.2 Supplier shall incorporate a delivery plan and schedule as part of the PMP (CDRL 2) and PMS (CDRL 3).

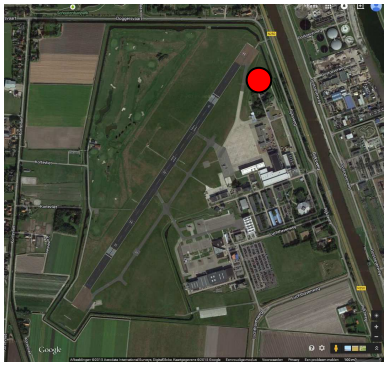
7.2.3 Supplier shall operate, maintain and remain owner of all on-site delivered equipment and computer programs until successful completion of the applicable Final Site Acceptance (FSA).

8 Annex A – Details of the six radar locations

The number of obstacles in the runway environment should be limited as much as possible. Therefore, existing buildings in the runway environment are selected as preferred locations. However, the Supplier is allowed to optimise the location by their own site survey and discuss the optimal locations with the State. Final decision however will be done by the State.

Bird radar location and details for airbase De Kooij



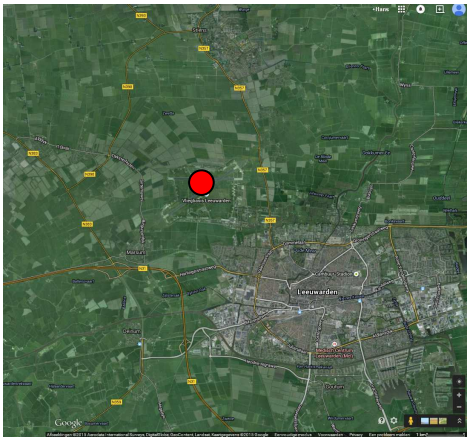


Surrounding (left) and details (right) of airbase De Kooij. The proposed position of the radar is shown as a red dot.

Details about location

Latitude	52.926466N
Longitude	4.786527E
Location	On wall of earth / dike
Equipment building	YES
Description location	Probably both antenna's will be placed on the dike, while the shelter will be down on the ground. This location will be part of discussion with the Supplier

Bird radar location and details for airbase Leeuwarden

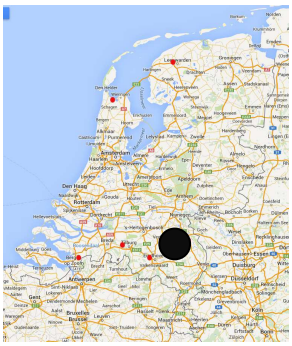


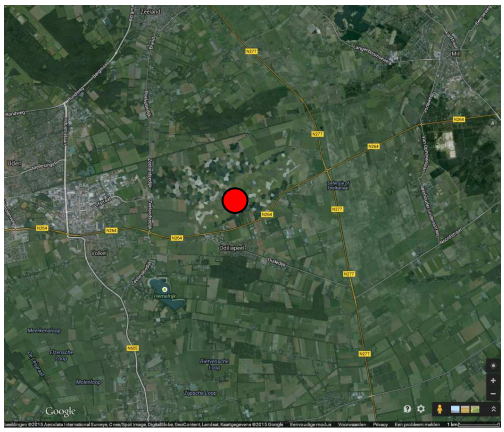
Surrounding (left) and details (right) of airbase Leeuwarden. The proposed position of the radar is shown as a red dot.

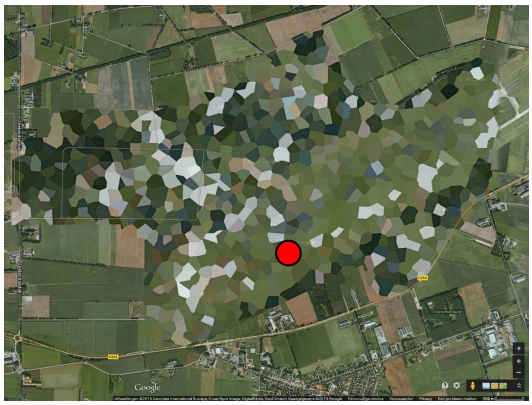
Details about location

Latitude	53.226765N
Longitude	5.751236E
Location	On the ground/roof building, centre of airbase
Equipment building	NO
Description location	TACAN building 

Bird radar location and details for airbase Volkel





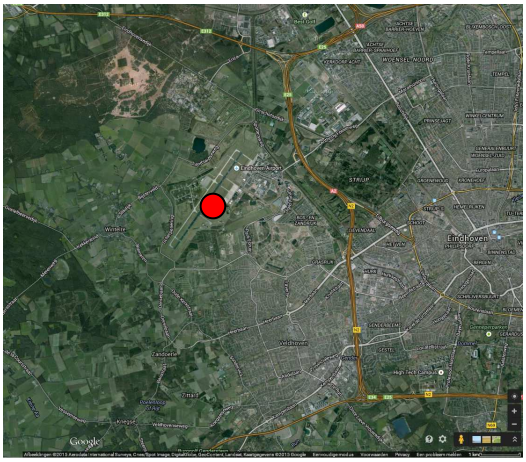


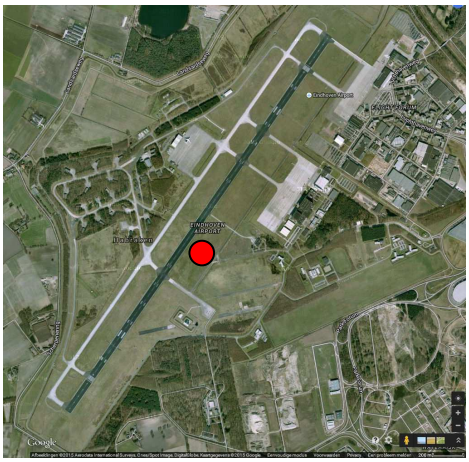
Surrounding (left) and details (right) of airbase Volkel. The proposed position of the radar is shown as a red dot.

Details about location

Latitude	51.653374N
Longitude	5.700344E
Location	On top of building, +4m
Equipment building	NO
Description location	TACAN building (picture of TACAN and snapshot roof)  

Bird radar location and details for airbase Eindhoven



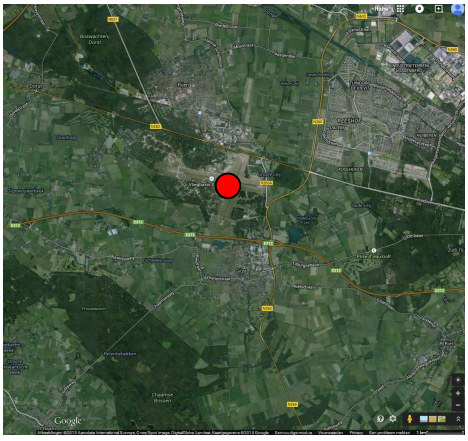


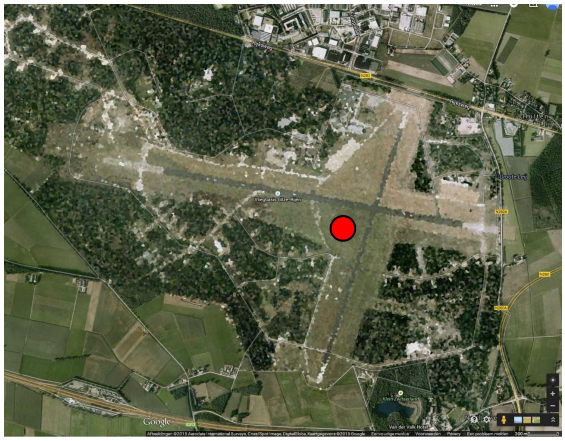
Surrounding (left) and details (right) of airbase Eindhoven. The proposed position of the radar is shown as a red dot.

Details about location

Latitude	51.448210N
Longitude	5.374886E
Location	On top of building (+4m)
Equipment building	NO, in TACAN building
Description location	Location of TACAN mast 

Bird radar location and details for airbase Gilze-Rijen



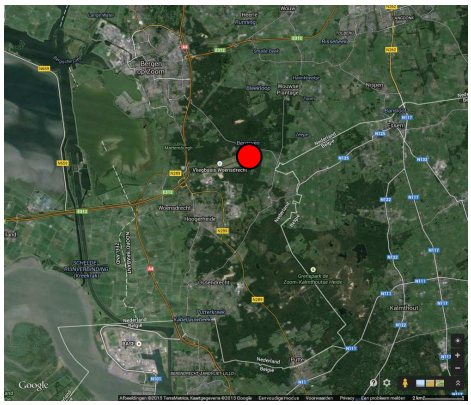


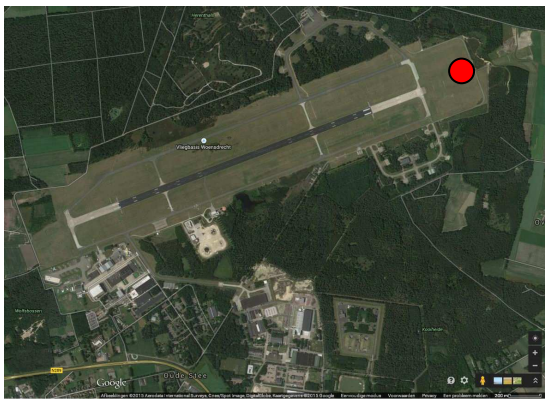
Surrounding (left) and details (right) of airbase Gilze-Rijen. The proposed position of the radar is shown as a red dot.

Details about location

Latitude	51.565531N
Longitude	4.936042E
Location	On top of building (+4m)
Equipment building	NO, in TACAN building
Description location	Location of TACAN mast 

Bird radar location and details for airbase Woensdrecht





Surrounding (left) and details (right) of airbase Woensdrecht. The proposed position of the radar is shown as a red dot.

Details about location

Latitude	51.454361N
Longitude	4.362050E
Location	On top of building (+3m)
Equipment building	YES
Description location	If the location of ILS antenna can be used, there will be no use of systems own shelter too. Otherwise system will be placed next to ILS shelter.

9 Annex B – CDRL

9.1 Introduction

The Contract Data Requirements List (CDRL) contains the data items that the Supplier shall deliver to the State in accordance with the POR. The CDRL describes the frequency of delivery, dates for submission and the number of copies required for each referenced Data Item. Data Item Descriptions (DID's) are incorporated as addenda to the CDRL.

9.2 General requirements

Unless otherwise specified in the CDRL, data submitted in response to these requirements shall be identified on the title page with the following elements:

- Document title;
- Suppliers Identification;
- Contract Number;
- CDRL Sequence Number;
- Version number and release date;
- Approval Requirements.

Data that are dependent on events that may or may not occur during the performance of the contract shall be submitted on an 'As Required' (A/R) basis. Should these events fail to occur, the Supplier shall state so and in doing so shall satisfy the requirements.

Requirements for periodic revisions to data, where no changes have occurred since data of last submission, may be satisfied by a letter from the Supplier stating that 'no changes have occurred since the last submission'. In such case, the Supplier's letter shall identify the data in question and appropriately identify the letter of transmittal of the prior data submission.

Data shall be submitted for receipt by the State in accordance with the CDRL delivery schedule.

Where multiple data submittals are required, e.g. per each configuration item (CI), the quantity shown in the CDRL shall apply to each submittal.

Where appropriate, submittal dates shown in the CDRL shall be revised to comply with the PMS.

9.3 Explanation of the CDRL-form

Block 1: CDRL-number. Self-explanatory.
Block 2: DID-number. Self-explanatory.
Block 3: Title. Self-explanatory.
Block 4: Frequency. Self-explanatory.
Block 5: Date of first Submission. The initial submission date, related to a specific event or milestone, is entered in Block 5.
Block 6: As of Date. Not applicable for this project.
Block 7: Date of Subsequent Submission/Event ID. If the data are of a recurring type, the sub-sequent submission dates, related to specific events or milestones, are entered in Block 7.

Block 8: POR reference. The paragraph number(s) of the POR, in which the concerning CDRL Sequence number is mentioned.
Block 9: Distribution/Quantities. The distribution addresses and quantities set forth in Block 9 are subject to unilateral alterations by the State.
Block 10: Remarks. If the information mentioned in any of the above blocks requires further clarification or if additional information is necessary, this will be written in Block 10.

9.4 Acceptance and approval requirements

Data items of the CDRL which require the State's acceptance or approval shall be so indicated in Block 10 of each CDRL-entry. If no acceptance or approval requirements are listed, the data item is to be submitted for information only.

If the entry in Block 10 is 'Approval Required', the State shall provide written approval in an undefined time period. As long as a written approval is not provided, the data item shall be considered to be not approved.

If Block 10 comprises the entry 'Approval within (x) days required', the State shall provide written approval within (x) days after receipt by the State. If written approval is not provided within the required period of time, the data item shall be considered to be approved.

If Block 10 comprises the entry 'Approval required within (x) days after completion of event', the State shall provide written approval within (x) days after the completion of the event, indicated in Block 5, 7 or 10, provided the data item was delivered on schedule. If written approval is not provided within the required period of time, the data shall be considered to be approved.

If the data item is approved with comments the Supplier may submit the changes resulting from the comments in form of individual change pages rather than a revision of the entire document for approval. New pages should be marked: 'Revised per State's letter'. The cover letter should provide document change instructions for the recipient.

If the data item is disapproved, the Supplier shall revise the item based on the disapproval comments and resubmit the complete data item for approval.

Unless indicated otherwise, all approvals with comments and disapprovals shall be considered to be within the scope of this contract. If the Supplier disagrees, he shall provide written notification to the State within 10 days.

9.5 CDRL and DID overview

CDRL Nr.	DID Nr.	Title
CDRL 1	DID 001	Contract Work Breakdown Structure (CWBS)
CDRL 2	DID 002	Project Master Plan (PMP)
CDRL 3	DID 003	Project Master Schedule (PMS)
CDRL 4	DID 004	Configuration Management Plan (CMP)
CDRL 5	DID 005	Site Preparation Requirement and Implementation Plan (SPRIP)

9.6 Contract Data Requirement List

Contract Data Requirement List	
DMO bird radar project	
1. CDRL Sequence number 1	2. DID Number DID 001
3. Title **Contract Work Breakdown Structure (CWBS)**	
4. Frequency One	5. Date of 1st Submission Draft version with Proposal
6. As of Date	7. Date of Subsequent Submission Final version with Contract Award.
8. POR reference 4.2	9. Distribution/Quantities DMO/PO; Softcopy 1x
10. Remarks 10.1. The draft CWBS will result in an approved (final) CWBS, which is part of the Contract.	

Contract Data Requirement List

DMO bird radar project

1. CDRL Sequence number	2. DID Number
2	DID 002
3. Title **Project Master Plan (PMP)**	
4. Frequency One/R	5. Date of 1st Submission Draft version with Proposal
6. As of Date	7. Date of Subsequent Submission One (1) MAC; A/R
8. POR reference 4.3; 6.2	9. Distribution/Quantities DMO/PO; Softcopy 1x

10. Remarks

10.1. Approval or disapproval will be given within 1 month after receipt of the deliverable.

10.2. Supplier's statement about the DMO comments - if applicable - shall be received within 15 days after receipt of the DMO comments.

10.3. Final approval will be given within 1 month after receipt of the - with the mutually agreed changes/amendments – updated deliverable and minuted at the first PMR after approval date.

Contract Data Requirement List

DMO bird radar project

1. CDRL Sequence number	2. DID Number
3	DID 003

3. Title

Project Master Schedule (PMS)

4. Frequency	5. Date of 1st Submission
Monthly	Draft version with Proposal
6. As of Date	7. Date of Subsequent Submission
	integrated with the Monthly Progress Report (MPR)
8. POR reference	9. Distribution/Quantities
4.4; 6.2;	DMO/PO; Softcopy 1x

10. Remarks

10.1. The draft PMS is subject to the State approval and will result in a PMS baseline, which is part of the Contract.

10.2. The subsequent PMS's, to be submitted as an attachment to each 'Monthly' Progress Report (MPR), will be discussed during the first PMR after submission. Approval or disapproval for the subsequent PMS's will in principle be given during the PMR concerned, but no later than 15 days after this PMR.

Contract Data Requirement List

DMO bird radar project

1. CDRL Sequence number	2. DID Number
4	DID 004

3. Title

Configuration Management Plan (CMP)

4. Frequency	5. Date of 1st Submission
One/R	Two (2) MAC
6. As of Date	7. Date of Subsequent Submission
	A/R
8. POR reference	9. Distribution/Quantities
4.5;	DMO/PO; Softcopy 1x

10. Remarks

10.1. Approval or disapproval will be given within 1 month after receipt of the deliverable.

10.2. Supplier’s statement about the DMO comments - if applicable - shall be received within 15 days after receipt of the DMO comments.

10.3. Final approval will be given within 1 month after receipt of the - with the mutually agreed changes/amendments - updated deliverable and minuted at the first PMR after approval date.

Contract Data Requirement List

DMO bird radar project

1. CDRL Sequence number	2. DID Number
5	DID 005

3. Title

Site Preparation Requirement and Installation Plan (SPRIP)

4. Frequency	5. Date of 1st Submission
One/R per site	see block 10
6. As of Date	7. Date of Subsequent Submission
	A/R
8. POR reference	9. Distribution/Quantities
6.1; 6.2	DMO/PO; Softcopy 1x

10. Remarks

10.1. A SPRIP shall be established for the bird radar at each airbase, to be submitted at least two (2) months prior to the applicable start of the installation activities and one (1) month after approval of the CDR.

10.2. When the SPRIP is disapproved by the State, the plan shall be updated (A/R) by the Supplier in such a time that approval by the State can be given no later than one (1) month prior to the applicable start of the installation activities.

10.3. Approval or disapproval will be given within 2 weeks and minuted at first PMR after approval date.

9.7 Data Item Descriptions

DATA ITEM DESCRIPTION

1. Title	2. DID nbr.
Contract Work Breakdown Structure (CWBS)	**001**

3. Description/Purpose

The Contract Work Breakdown Structure (CWBS) is a product-oriented family tree, composed of hardware, software, services and other work tasks, which displays the elements of work to be accomplished and relates them to each other and to the end product.

4. Approval Date	5. Reference(s)
	MIL-HDBK-881

6. Application

7. Preparation Instructions

7.1. The CWBS will be reflected in a report, which consists of the WBS format.

7.2. The CWBS shall be to that level required to fully identify the planning and control of the Supplier's work packages. It shall contain all programme activities including in-house and subcontracted areas.

7.3. All costs will be allocated to specific items within the Contract Work Breakdown Structure at the level specified in 7.2.

DATA ITEM DESCRIPTION

1. Title	2. DID nbr.
Project Master Plan (PMP)	**002**

3. Description/Purpose

The Project Master Plan describes the Supplier's organisation, assignment of functions, duties and responsibilities, management procedures and policies, and reporting requirements for the conduct of contractually-imposed tasks.

Separate sections of the Project Master Plan shall include or reference to the Supplier's project-related Design and Development Plan, Configuration Management Plan, Test Plan. The PMP shall be the base document for these separate plans and shall make clear the coherence between them.

4. Approval Date	5. Reference(s)

6. Application

7. Preparation Instructions

7.1. General. The Project Master Plan shall consist of the organisational structure, the assignment of functions, duties and responsibilities, the procedures and policies, and the reporting requirements that are established for the initiation, monitoring, control, completion, test and verification, and reporting of contractual tasks, projects and programmes.

7.2. Minimum Contents. As a minimum, the PMP shall cover the organisational structure, programme management, methodology, personnel, security and reporting structure. It shall provide a clear reference concerning the coherence between other project-related plans and documents. Other subjects may also be included, such as:

a. Design Control;
b. Reliability/Availability/Maintainability (RAM);
c. Configuration Control;
d. Standardisation;
e. Quality Assurance;
f. Codification;
g. Interface Control;
h. Delivery Procedures;
i. Tests;
j. Certifications;
k. Training.

DATA ITEM DESCRIPTION

1. Title	2. DID nbr.
Project Master Schedule (PMS)	**003**

3. Description/Purpose

To portray the phases, major milestones and major segments of the design, production, installation, test and support activities necessary to accomplish the objective.

4. Approval Date	5. Reference(s)

6. Application

7. Preparation Instructions

7.1. Milestone Schedule. The Supplier shall prepare a Milestone Schedule showing activities and milestones, which are actions or accomplishments that can be scheduled for a specific point-in-time and evaluated on a basis of actual accomplishment. These schedules shall be shown as realistic as can be estimated at the time of preparation.

a. An optimum number of control points (milestones) indicating essential or controlling actions and accomplishments shall be shown below the time spans to which they pertain. Examples of significant milestones which shall be included (but not limited to) are the following:

(1) Dates on which sources or decisions (by either the DMO or the Supplier) or other accomplishments are scheduled.
(2) Tests. Category testing on a specific system to be performed, reflecting both targets dates for beginning and ending of each major subdivision of the overall test programme and the date and the test on each item within each category of each major subdivision has been accomplished by the testing agency.
(3) Production Delivery. Delivery of system hardware, as appropriate, by type, model, series or operating units, showing date to be delivered for test and operational purposes, and actual date of delivery.
(4) Operationally. Unit training/site activation, and operational ready dates, etc., in summary form to include actual dates of progress for each

b. Progress symbols shall be used with adequate spacing to indicate quantities delivered or planned in the column used for progress symbols in the milestones schedule.

c. The slippages or other discrepancies between planned and actual

accomplishment and reasons for changes in forecasts shall be supported by a brief narrative discussion of the cause.

7.2. Design Schedule. The Supplier shall prepare and submit a Design Schedule, which describes the schedule for the design phase which at least covers the reviews mentioned in the POR.

7.3. Delivery Plan and Schedule. The Supplier shall prepare and submit a Delivery Plan and Schedule which shall describe the proposed plan and schedule for the delivery of the systems and tools and test-equipment.

7.4. Training Schedule. The Supplier shall prepare and submit a training schedule which describes the schedule for the training courses.

7.5. Site Activation Master Schedule. The Supplier shall prepare and submit a Site Activation Master Schedule which describes all on-site activities per project location, including at least

a. Site Preparation Schedule.

b. Site Installation Schedule.

c. Site Validation Schedule.

d. Site Acceptance Schedule.

7.6. Codification Schedule. The Project Master Schedule shall include a codification schedule which describes all codification efforts by the Supplier and DMO.

DATA ITEM DESCRIPTION

1. Title	2. DID nbr.
Configuration Management Plan (CMP)	**004**

3. Description/Purpose

This plan is prepared by the Supplier to describe his assignment of responsibilities organisationally and the procedures used in his accomplishment of configuration management.

4. Approval Date	5. Reference(s)
	ISO 10007/MIL-STD-973

6. Application

7. Preparation Instructions

7.1. The Supplier shall describe in a configuration management plan, the organisational responsibilities and procedures used in the implementation of the configuration management requirements. The configuration management plan shall be prepared in accordance with the criteria set forth in ISO 10007 or MIL-STD-973.

DATA ITEM DESCRIPTION

1. Title	2. DID nbr.
Site Preparation Requirements and Installation Plan (SPRIP)	**005**

3. Description/Purpose

This plan details the Supplier's methods and site specific plans for installation of all system parts for a particular project location. It provides the DMO the opportunity to review the Supplier's plans so any problem can be identified and resolved prior to installation start.

4. Approval Date	5. Reference(s)

6. Application

Engineering document for installation of a specific project location.

7. Preparation Instructions

7.1. General. The SPRIP shall contain a detailed description of the methods and procedures the Supplier intends to use in installing the system, based on the results of the site survey for the project location concerned. It shall detail the exact configuration the system shall be installed in. It shall also contain any site-specific plans for unique installation requirements at the applicable location. The plan shall be stand-alone to the maximum extent possible, references to other documents shall be kept to an absolute minimum.

7.2. Contents. The plan shall include at least the following topics:

a) List of equipment components to be installed.
b) Drawings indicating the location of equipment at the airbase.
c) Drawings and diagrams of civil works and proposed floor plan layouts.
d) Drawings of installation details.
e) Power requirements and cabling.
f) Communication requirements and cabling.
g) Infrastructural requirements and recommendations.
h) Installation schedule and implementation flowchart.
i) Detailed installation standards and procedures.

7.2.1. Hardware/Software List. The hardware/software list shall be provided as an appendix to the SPRIP. The list shall identify all hardware items and software items/modules to be delivered and installed by the Supplier. The hardware/software list shall contain the following information for each hardware item and software package:

a) Manufacturer’s or vendor's part nomenclature (and brief functional description).
b) Manufacturer’s or vendor's part number;
c) Quantity;
d) Equipment frame, shelf, position-slot number (hardware only).

7.2.2. Civil Works plan. The civil works plan shall be provided as a set of scaled drawings which indicate where and how the Supplier proposes to layout all civil works including cables and miscellaneous equipment. All civil works, equipment and layout dimensions and measurements shall be specified.

7.2.3. Floor Plan Layout. The floor plan layout shall be provided as a set of scaled drawings which indicate where and how the Supplier proposes to layout all equipment bays, cable racks and miscellaneous equipment. All equipment and layout dimensions and measurements shall be specified. Both front and top views shall be included.

7.2.4. Installation Detail Drawings. Installation detail drawings shall include detailed indications of how the Supplier proposes to install the equipment. These drawings shall detail how the equipment will interface government-furnished or commercial equipment, specifying demarcation points of interconnection. All connections required to locate, position, mount or attach equipment to the floor, walls or ceiling shall be specified in detail. Schematic or wiring diagrams of equipment bay interconnection shall be included.

7.2.5. Power and Cable Requirements. The power requirements and cable layouts shall be detailed in a separate set of drawings. Cable layouts shall include lists of cable sizes, lengths and wire gauges, exact termination locations, cable routings in racks, trenches, trays or any other location. All power distribution cables or system shall be detailed including battery rack and rectifier cabling diagrams, and distribution to equipment bays and racks. Information shall be provided on power requirements such as size and capacity of rectifiers, batteries, and any power boards to be furnished by the Supplier.

7.2.6. Communications and Cable Requirements. The communications requirements and cable layouts shall be detailed in a separate set of drawings. Cable layouts shall include lists of cable sizes, lengths and wire gauges, exact termination locations, cable routings in racks, trenches, trays or any other location.

7.2.7. Installation Schedule and Implementation Flowchart. The installation schedule shall cover the overall schedule and milestone dates such as delivery of equipment installation start, installation testing start, etc. An implementation flowchart shall be provided which indicates which critical tasks must be accomplished and in which particular order.

7.2.8. Responsibilities. All agreements and promises between representatives of Supplier and State, made during the site survey, shall be mentioned in an attachment to the

SPRIP. When such agreements result in action items, they shall be listed on an action item sheet indicating the responsible representative and the date of implementation.

7.2.9. All tasks and activities resulting from the SPRIP, of which the realization is a responsibility of the State, shall be clearly identified as such in the SPRIP.