

### **Public Authority for Civil Aviation**



# MAINTENANCE AND REPORTING PROCEDURE FOR AERONAUTICAL TELECOMMUNICATION FACILITIES

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### **Corrigendum of Amendments**

#### **FOREWORD**

- A. This Document, Maintenance and Reporting Procedure for Aeronautical Telecommunication Facilities has been issued by the Public Authority for Civil Aviation of Oman (hereinafter referred as PACA) under the provisions of the Civil Aviation Regulation (CAR) 171 Aeronautical Telecommunication/ Radio Navigation Service.
- B. This Document sets out:
  - 1. Guidance in carrying out maintenance of Aeronautical Telecommunication Facilities; and
  - 2. Guidance in maintenance reporting system to PACA; and
- C. The following standards have been basis for this Document:
  - 1. Civil Aviation Law, The Sultanate of Oman.
  - 2. ICAO Annex 10 (Standards and Recommended Practices for Aeronautical Telecommunications).
  - 3. ICAO Doc 8071 (Manual on Testing of Radio Navigation Aids)
  - 4. CAR 171 (Aeronautical Telecommunication / Radio Navigation Certification)
- D. The editing practices used in this document are as follows:
  - 1. 'Shall' is used to indicate a mandatory requirement and may appear in CARs.
  - 2. 'Should' is used to indicate a recommendation.
  - 3. 'May' is used to indicate discretion by the AUTHORITY the industry or the applicant, as appropriate.
  - 4. 'Will' indicates a mandatory requirement and is used to advise of action incumbent on the Authority

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#### **Glossary of Terms**

The following terms or acronyms may be used in any manual or document published by PACA. Reproduction in part or whole is allowed without prior approval. The Document Control Office reserves the rights to include such a listing in any PACA manual or document prior to publishing.

ACC Area control center of an aeronautical telecommunication/radio navigation

facility certificate.

**AFS** Aeronautical Fixed Service

**AFTN** Aeronautical Fixed Telecommunication Network

AIP Aeronautical Information Publication
AIS Aeronautical Information Service

**ATC** Air Traffic Control

AT/RN Aeronautical Telecommunication/Radio Navigation

AUTHORITY
CAT II
Category II landing procedure
DME
Distance Measuring Equipment
FDPS
Flight | Data Processing System

ICAO International civil aviation organization

**IFR** Instrument Flight Rules ILS **Instrument Landing System NDB** Non-Directional Beacon Precession Approach Radar **PAR PSR** Primary Surveillance Radar Rescue Coordination Center **RCC RDPS** Radar Data Processing System Remote Monitoring Unit **RMU** Secondary Surveillance Radar SSR

**UHF** Ultra High Frequency

**UPS** Uninterrupted Power Supply

VDL VHF Digital Link
VFR Visual Flight Rules
VHF Very High Frequency

**VOR** Very High Frequency Omni Directional Radio Range.

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#### 1. GENERAL

#### 1.1. Requirements

Each Aeronautical Telecommunication / Radio Navigation (hereinafter referred as AT/RN)
Service Provider shall maintain Aeronautical Telecommunication/ Radio Navigation Facilities.

#### 1.2. Implementation

In implementing of maintenance activity, service provider may cooperate with other Aeronautical Telecommunication Facilities Maintenance Organization approved by PACA.

#### 1.3. Objectives

The objectives of maintenance activity in paragraph 1.1 are:

- (a) prevent equipment not functioning according to standard;
- (b) prevent failure of operation;
- (c) prevent major failure to the equipment;
- (d) guarantee availability of equipment (Availability);
- (e) ensure operational reliability of equipment by extending Mean Time Between Failure (MTBF);
- (f) shorten the repair time or Mean Time To Repair (MTTR);
- (g) extend the life of the equipment operation;
- (h) reduce repair costs;
- (i) Increasing direct and indirect support for aviation security and safety.

#### 1.4. Influencing Elements

In order to achieve the maintenance objectives of AT/RN facilities as referred to in paragraph 1.3, it is necessary to provide the following elements:

- (a) human resources in accordance with adequate quality and quantity;
- (b) equipment maintenance fund;
- (c) work tools, measuring tools, testing equipment, spare parts (modules and / or consumables) and technical documents;
- (d) Maintenance guidelines.

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# 2. AERONAUTICAL TELECOMMUNICATION / RADIO NAVIGATION FACILITIES.

#### 2.1. Facilities

Aeronautical Telecommunication/ Radio Navigation Facilities, consist of:

- (a) Communication Facilities;
- (b) Radio Navigation Aids;
- (c) Surveillance Facilities;
- (d) Automation System.

#### 2.2. Communications

Communication Facilities as referred to paragraph 2.1. (a) covers:

- (a) Automatic Message Handling System (AMHS);
- (b) High Frequency Single Side Band (HF-SSB);
- (c) AFTN;
- (d) Direct Speech (DS);
- (e) Transmission System (Radio Link, VSAT, Fiber Optic);
- (f) Voice Switching Communication System (VSCS);
- (g) VHF Data Link;
- (h) Integrated Remote Control and Monitoring System (IRCMS);
- (i) Very High Frequency Air Ground Communication (VHF-A/G);
- (j) Automatic Terminal Information Service (ATIS);
- (k) High Frequency Air Ground Communication (HF-A/G);
- (I) Voice Recorder.

#### 2.3. Radio Navigation Aids

Radio Navigation Aid Facilities as referred to paragraph 2.1. (b) covers:

- (a) Non Directional Beacon (NDB);
- (b) Very High Frequency Omni Directional Range (VOR);
- (c) Distance Measuring Equipment (DME);
- (d) Precision Approach Radar (PAR);
- (e) Global Navigation Satellite System (GNSS) and the augmentation system.

#### 2.4. Surveillance

Surveillance Facilities as referred to paragraph 2.1. (c) covers:

- (a) Primary Surveillance Radar (PSR);
- (b) Secondary / Mono-pulse Surveillance Radar (SSR/MSSR);

#### 2.5. Automation Systems

Automation System as referred to paragraph 2.1. (d) covers:

- (a) Automatic Dependent Surveillance (ADS),
- (b) Controller Pilot Data Link Communication (CPDLC) Processing;
- (c) Radar Data Processing System (RDPS);
- (d) Flight Data Processing System (FDPS);
- (e) Aeronautical Information System (AIS).

#### 3. MAINTENANCE ACTIVITIES

#### 3.1. Maintenance Recording

The maintenance activities of AT/RN not limited to:

- (a) establishment of history of AR/RN Facilities;
- (b) maintenance planning of AT/RN facilities;
- (c) implementation of maintenance of AT/RN facilities;

#### 3.2. History of Facilities

The history of AT/RN facilities as referred to paragraph 3.1. (a) shall include:

- (a) date / month / year of equipment procurement / installation;
- (b) repair / replacement of units / parts / equipment modules;
- (c) recondition / overhaul equipment;
- (d) Repair / replacement of software.

The historical format of AT/RN Facilities as referred to in paragraph 3.2 (a) to (d) shall be contained in Attachment 1 to this Document.

#### 3.3. Planning

Planning for maintenance of AT/RN facilities as referred to paragraph 3.1 (b) shall include the following elements:

- (a) the planning of the technician's provision includes:
  - (1) quality and quantity of technicians;
  - (2) Training program.
- (b) budget planning to finance equipment maintenance;
- (c) planning of providing work tools, measuring tools, testing tools and calibration laboratory of measuring tools for improvement;
- (d) Planning of spare parts procurement.

#### 3.4. Implementation

Implementation of maintenance of AT/RN facilities as referred to paragraph 3.1. (c) shall cover the following activities:

- (a) preventive maintenance;
- (b) corrective maintenance;
- (c) Maintenance evaluation.

#### 3.5. Preventative Maintenance

Preventive maintenance as referred to paragraph 3.5. (a) aims to maintain performance of equipment, which activities include:

- (a) daily maintenance;
- (b) weekly maintenance;
- (c) monthly maintenance;
- (d) quarterly maintenance;
- (e) semi-annual maintenance;
- (f) annual maintenance

A list of preventative maintenance activities and the implementation of prevention maintenance activities as referred to in paragraph 3.6 (a) to (f) shall be contained in Appendix 2 and 2A of this Document.

#### 3.6. Corrective Actions

Corrective Maintenance as referred to paragraph 3.5. (b) aims to return equipment that is experiencing in disruption / failure back to normal conditions, which the activities include:

- (a) analysis of equipment failure;
- (b) re-adjustment of equipment;
- (c) replacement of components / modules / parts / units of equipment;
- (d) repair of modules / parts / unit's / equipment software;
- (e) equipment modification;
- (f) recondition or overhaul equipment.

#### 4. MAINTENANCE LEVEL

#### 4.1. Levels of Maintenance

Based on the level of difficulties, maintenance of the AT/RN facilities is divided into:

- (a) Maintenance level 1 (Preventative);
- (b) Maintenance level 2 (Minor Corrective Maintenance);
- (c) Maintenance level 3 (Moderate Corrective Maintenance);
- (d) Maintenance level 4 (Severe Corrective Maintenance).

#### 4.2. Preventative Maintenance

Maintenance level 1 as referred to paragraph 4.1. (a) is a preventive maintenance that is carried out periodically with the following activities:

- (a) cleaning of the room;
- (b) cleaning equipment, units / parts of equipment or modules;
- (c) inspection of equipment, unit / equipment parts or equipment modules;
- (d) meter measurement and indicator light tests;
- (e) measurement and recording of equipment's parameter;
- (f) replacement of indicator lights, safety components and other consumables

#### 4.3. Minor Corrective Maintenance

Maintenance level 2 as referred to paragraph 4.1. (b) consists of:

- (a) preventive maintenance that is carried out periodically, with the following activities:
  - (1) trials on equipment, unit / piece of equipment;
  - (2) view and target observation;
  - (3) Checking the output of equipment, unit / parts of equipment.
- (b) corrective maintenance for minor abnormalities / failure / failure, the activities as follows:
  - (1) failure analysis;
  - (2) adjustment of equipment parameters;
  - (3) replacement and adjustment of defective equipment units / parts / modules.

#### 4.4. Moderate Corrective Maintenance

Maintenance level 3 as referred to paragraph 4.1. (c) is corrective maintenance if the equipment is interrupted / failure moderately, with the following activities:

- (a) failure analysis;
- (b) repair and re-adjustment of defective unit / part / module of.

#### 4.5. Severe Corrective Maintenance

Maintenance of level 4 as referred to paragraph 4.1. (d) is corrective maintenance if the equipment is subject to severe failure, with the following activities:

- (a) failure analysis;
- (b) repair of software system of the equipment;
- (c) repair and re-adjustment of unit / part / module of equipment with complex failure by using external measuring instruments;
- (d) modification and re-adjustment of equipment units / parts / modules;
- (e) recondition or overhaul equipment

#### 4.6. Maintenance Methodology & Flow Charts

Maintenance of equipment in accordance with the levels of difficulty referred to paragraph 4.1, shall be carried out in accordance with the flowcharts as contained in Appendix 3 of this document.

#### 5. FAILURE CATEGORY

#### 5.1. Categories

Failure to equipment is categorized as follows:

- (a) category 1 (one);
- (b) category 2 (two);
- (c) category 3 (three)

#### 5.2. Category 1

Failure category 1 (one) equipment as referred to paragraph 5.1. (a), shall constitute a breakdown causing the discontinuation / cessation of equipment operation (main and standby).

#### 5.2.1. Rectification

Rectification works of failure category 1 (one) shall be done not later than 8 (eight) hours since the occurrence of failure.

#### 5.3. Category 2

Failure category 2 as referred to paragraph 5.1. (b), shall constitute a failure which causes the decrease of equipment's performance but not cause the discontinuation / cessation of equipment's operation. Upgrades to Cat 1 if not returned by due time.

#### 5.3.1. Provisions

Failure category 2 (two) as referred to in paragraph 5.3, occurs when the equipment has decreased in coverage or the emitted frequency is unstable.

#### 5.4. Category 3

Failure category 3 as referred to paragraph 5.1. (c), shall constitute equipment failure occurring on the supporting equipment but shall not affect the performance of equipment and If not corrected may turn into failure Category 1 or Category 2 (with specific date/time for restoration).

#### 5.4.1. Rectification

Rectification works of failure category 3 (three) shall be made not later than 24-72 hours after failure occurs.

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#### 6. FACILITY LOG BOOK

#### 6.1. Recording

Each maintenance activities as referred to paragraph 3.5. (a) and (b) shall be recorded in the facility log book.

This facility logbook is shown in Appendix 4 of this Document.

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#### 7. MAINTENANCE EVALUATION

#### 7.1. Evaluation

Evaluation of maintenance as meant in paragraph 3.4. (c), is conducted every 1 year for the determination of repair planning, provision of spare parts and equipment replacement.

The procedure of evaluation as intended in paragraph 7.1 is shown in Appendix 5 of this Document.

#### 7.2. Categorization

The evaluation results of AT/RN facilities as meant in paragraph 7.1 shall be categorized into 3 groups as follows:

- (a) a group of equipment that is very often disrupted / failure with availability <70%;
- (b) a group of equipment that often experience disrupted / failure with availability 70% <A <95%;</li>
- (c) any group of equipment with very rare disruption / failure with 95% availability.

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#### 8. REPORT

#### 8.1. Periodic Reports

Each maintenance activity of AT/RN shall be reported to the Air Navigation Safety Department periodically.

The above periodic report will consist of:

- (a) Monthly report, containing the following:
  - (1) the performance of AT/RN facilities;
  - (2) list of equipment and conditions.
- (b) Annual report, containing the activities of the corrective maintenance of AT/RN equipment.

#### 8.2. Special Reports

Special Reports shall contain failure and corrective maintenance reports on AT/RN facilities that suffered Category - 1 and Category - 2 failures that required the issuance of NOTAMs.

### 8.3. Formats of Reports

The format of periodic reports and special reports are contained in Appendix 6 - 6A, 6B, 6C and 6D of this Document.

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### Appendix 1

# HISTORY LOG SHEET AERONAUTICAL TELECOMMUNICATION/RADIO NAVIGATION FACILITIES

AIRPORT NAME :

FACILITY :

EQUIPMENT NAME :

BRAND / TIPE :

SERIAL NUMBER :

NO.	DATE	DESCRIPTION	REMARK
1	2	3	4

C.N.S Director	

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### Appendix 2

### LIST OF PREVENTIVE MAINTENNACE ACTIVITY AERONAUTICAL TELECOMMUNICATION /RADIO NAVIGATION FACILITIES

FACILITY: COMMUNICATION EQUIPMENT: AUTOMATIC MESSAGE HANDLING SYSTEM (AMHS)

		MAINTENAN	ICE ACTIVITIES			I
DAJLY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
1	2	3	4	5	6	7
l. General	General     Check main supply output     Clean the entire room of the equipment	General     Check the output power supply voltage of UPS / Stabilizer	General     Inspect all connectors	1. General	General     Clean the dust on the UPS and Stabilizer     Replace battery of UPS if necessary	
Supervisory     Check the brightness	Supervisory     Check the printer display introductory function	Supervisory     Check the keyboard function	Supervisory     Check interconnection system	Supervisory     Check the software function	Supervisory     Check the cooling fan function of the rack	
Check the paper supplies in the printer     Check the printer ribbon						
3. Reject Edit a. Check the brightness 5. Check the paper supplies in the printer 6. Check the printer ribbon 6. Check the printer ribbon 7. Check the printer ribbon 8. Reject Edit 8. Reject Edit 9. R	Reject Edit     a. Check printer output	Reject Edit     Check the keyboard function	Reject Edit     Check interconnection     system	Reject Edit     Check the software function	Reject Edit     clean filter cooling system     CPU	

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

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### LIST OF PREVENTIVE MAINTENNACE ACTIVITY AERONAUTICAL TELECOMMUNICATION /RADIO NAVIGATION FACILITIES

FACILITY: COMMUNICATION PERALATAN: DIRECT SPEECH (DS)

		MAINTENANC	E ACTIVITIES			)
DAILY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
1	2	3	4	5	6	7
×	Check the cleanliness of iPOS and indicators	Check physical equipment condition	Check the connection with the related section/unit	*	88	

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

FACILITY: COMMUNICATION

EQUIPMENT:

VOICE SWITCHING COMMUNICATION SYSTEM

(VSCS)

					MAINTENAN	CEA	CTIVITIES					
DAILY	1	8	WEEKLY	1	MONTHLY	3	QUARTERLY	1	SEMESTER	38	YEARLY	REMARK
1			2		3		4	I	5		6	7
. General -		a.	General Clean the entire equipment from dust / dirt	1.	General -	1. a	General Export the Monitor And Control Station configuration for backup	1.	General -	1. a.	General Replace the Fan Filter of the cabinet or rack	
			Check the room temperature									
. System Manag	ement	2.	System Management	2.	System Management	2	System Management	2.	System Management	2.	System Management	
. Check the monit brightness	tor	-	Check the event Log	38038	Check the power supply voltage of PLN / Genset	a	6	a.	83	a.	(20)	
			Check the cleaness of the rack	b.	Check the output power supply voltage of UPS / Stabilizer							
. Position Contro	ol	3.	Position Control	3.	Position Control	3.	Position Control	3.	Position Control	3.	Position Control	
. Check the monit brightness	tor	200	Cek Monitor/function Indicator	a.	Clean the MCS screen	a	· ·	a.	757	a.	15.	
Check the Monit Control Station - Display		-	Check the Touch Screen Panel									
. Check the status Applicable)	sof RAID (if	C.	Clean the touch Panel									
Check the status Duplicated MCS Applicable)	The state of the s											

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

FACILITY: COMMUNICATION

EQUIPMENT: VERY HIGH FREQUENCY AIR GROUND COMMUNICATION (VHF-A/G)

					MAINTENANC	E A	CTIVITIES					
	DAILY		WEEKLY		MONTHLY	- i	QUARTERLY	(3)	SEMESTER	35	YEARLY	REMARK
	1		2		3		4	2	5		6	7
1. a.	General Check the TX room temperature Check the power supply voltage out of the Stabilizer and UPS	1. a.	General Clean the entire Shelter of the equipment		General Check the power supply voltage out of the Stabilizer and UPS Check Obstacle around the shelter	1 a.	General Clean all equipment thoroughly	1	General	1. a. b.	General Check lightning protection and grounding system. Check condition of supply cable and control cable	
				C.	Perform physical check of shelter inside and out, for any sign of water filtration, damage, or other deterioration							
	Transmitter Check all indicators	2. a.	Transmitter Check meter reading based on BITE	10,000	Transmitter  Perform performance check as per approved form	1	Transmitter Perform Transmitter Power calibration	2. a.	Transmitter Check the coverage range by plane	2. a.	Transmitter Check all the external connector s are securely fitted	
).	Check LCD / Main Screen Display.	b.	Check Change over switch function	b	Check operational equipment using backup power supply	b	Check VSWR			b.	Perform frequency measurement using frequency counter	
					8* 000 00 1***	С	Measure DC level terminal with ON equipment condition			C.	Perform a BIT Interruptive Test	
										d.	Perform an AC and DC Change over check (if both supplies are connected)	
	Receiver Check all indicators	3. a.	Receiver Check meter reading based on BITE		Receiver  . Perform performance check as per approved form		Receiver Measure DC level terminal with ON equipment condition	3.	Receiver	3. a.	1000 St. 1000 St. 100	
).	Check LCD / Main Screen Display.	b.	Check Change over switch function	b	Check operational equipment using backup power supply		•					

	**	MAINTENANCI	E ACTIVITIES		nes :	
DAILY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
1	2	3	4	5	6	7
		b. Adjust Squelch to eliminate noise     c. Do recording paramater			b. Perform frequency measurement using frequency counter     c. Perform a BIT Interruptive     d. Perform an AC and DC Change over check (if both supplies are connected)	
. Antenna	4. Antenna a	4. Antenna	4. Antenna	Antenna     Perform antenna inspection	4. Antenna	

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

FACILITY: COMMUNICATION EQUIPMENT: AUTOMATIC TERMINAL INFORMATION SERVICE (ATIS)

Г			MAINTENANCE	ACTIVITIES			
	DAILY	Weekly	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
	1	2	3	4	5	6	7
1. a.	General Check the TX room temperature	General     Clean the entire equipment from dust / dirt     Check the power supply voltage	General     Check the backup power supply system (UPS)	1. General	General     Clean the dust on the     UPS and Stabilizer	General     Check Battery of UPS, do replacement if necessary	
2. a. b.	Console Check the monitor's brightness setting Check the Indicator of each Unit of Equipment	Console     Check the connection system between units	Console     Check the keyboard function     Check the mouse function	Console     Check the recording function     Check the play back function	Console     Clean air circulation filter (fan)	Console     Check system operation thoroughly	
	Transmitter Check the fan (fan) air conditioner Check all indicator lights	Transmitter     Check the transmitter indicators locally and remotely	Transmitter     Test switch over unit to play to standby and vice versa	Transmitter     Measure DC level terminal with equipment condition "ON"	Transmitter     Checking the transmitter working frequency	Transmitter     Measurement of power output     VSWR measurement	

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

FACILITY: COMMUNICATION EQUIPMENT: VOICE RECORDER

Г			KEGIATAN YANG	DILAKSANAKAN			
	DAILY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
	1	2	3	4	5	6	7
	Check the TX room temperature	General     Clean the equipment room     Clean the equipment, unit / part of equipment or module     Check main power supply     Check output UPS/backup suplly	General     Check UPS's battery	1. General a	1. General a	1. General a	
2	Management System	2 Management System	2 Management System	2 Management System	2 Management System	2 Management System	
а	. Check recording file	Check all events in the event log file	a. Do hard disk data back up	Do hard disk data cloning, if necessary	Check performance of voice recorder software	a. Check the connection from server to hardware	
b	. Check channel sttaus indicator					b. Check replay function	
		Work Station     Check mouse and keyboard function	Work Station     Clean screen display	Work Station     Perform audio quality     measurements of     recorded items	3 Work Station a. Check the PC function	Work Station     Check interconnection from server to hardware     Perform replacement of hard disk, if needed	

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

FACILITY: RADIO NAVIGATION AIDS

EQUIPMENT:

VERY HIGH FREQUENCY OMNI DIRECTIONAL

RANGE (VOR)

MAINTENANCE ACTIVITIES												
DAILY WEEKLY			MONTHLY		QUARTERLY		SEMESTER		YEARLY	REMARK		
	1		2		3	8	4	3	5		6	7
	General Check the TX room temperature Check the power supply voltage out of the Stabilizer and UPS		General Check the input power supply voltage of Main Supply or Genset	b.	the equipment	1 a.	General Clean all equipment thoroughly	1	General	1 a. b.	General Check lightning protection and grounding system. Check condition of supply cable and control cable	
	Transmitter Check all indicators		Transmitter Record meter reading on VOR system	2 a.	Transmitter Perform Ground Check/inspection as per approved Ground Check Form	2 a.	Transmitter Check Auto Transfer	2 a.	Transmitter Check Carrier output power	2 a.	Transmitter Check Audio Frequency	
b.	Check all Monitor Indicators	b.	Perform Change Over Unit	b.	Check operational equipment using backup power supply	b.	Reassign Mian /Standby Transmitter	b.	Check Station Ident			
	Check Tone Identification							e. f. g.	Check carrier frequency Check operating frequency Verify BITE Wattmeter Calibration			

10		MAINTENAN	CE ACTIVITIES			
DAILY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
1	2	3	4	5	6	7
RCSU     Check RCSU/RSU panel indicator     Check RCSU/RSU alarm indicator	3 RCSU	RCSU     Clean RCSU/RSU front panel	RCSU     a. Visual Inspection     B. RCSU Operational Check     c. Station Alarm Check	3 RCSU	3 RCSU a.	
1	2	3	4	5	6	7
4 Antenna	4 Antenna	4 Antenna	Antenna     Perform Inspection of field monitor Antenna     Clean the field monitor antenna from debris	4 Antenna	Antenna     Perform Inspection of antenna system (carrier and sideband)	

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

### LIST OF PREVENTIVE MAINTENNACE ACTIVITY AERONAUTICAL TELECOMMUNICATION /RADIO NAVIGATION FACILITIES

FACILITY: RADIO NAVIGATION AIDS EQUIPMENT: DISTANCE MEASURING EQUIPMENT (DME)

		MAINTENANCI	EACTIVITIES			
DAILY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
1	2	3	4	5	6	7
General Check the TX room temperature Check the power supply	General     Check the input power supply voltage of Main Supply or Genset	General     Clean the entire Shelter of the equipment     Check Obstacle around the	General     Clean all equipment thoroughly  b.	1 General	General     Check lightning protection and grounding system.      Check condition of supply	
voltage out of the Stabilizer and UPS	i	shelter  c. Perform physical check of shelter inside and out, for any sign of water filtration, damage, or other deterioration			cable and control cable	
Transmitter Check all indicators	Transmitter     Check meter reading on DME system	Transmitter     Perform Ground     Check/inspection as per     approved Ground Inspection     Form	Transmitter     Perform Remote DME     Certification Check	2 Transmitter a. Perform Transmitter Frequency Performance Check	Transmitter     Perform Local full Diagnostics	
Check all Monitor Indicators	b. Perform Change Over Unit	b. Check operational equipment using backup power supply	b. Reassign Mian /Standby Transmitter	b. Receiver frequency performance check		
Check Tone Identification				c. Interrogator frequency performance check  d. Transmitter pulse performance check e. Transmitter power output performance check f. Receiver and Decoder		

	761	MAINTENAN	CE ACTIVITIES	3677	8	i,
DAILY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
1	2	3	4	5	6	7
•				g. Transponder reply delay performance check h. Identification frequency performance check i Monitor Interrogation performance check j. Monitor shutdown/transfer control performance check k. Monitor alarm integrity performance check		
RCSU     Check RCSU/RSU panel indicator     Check RCSU/RSU alarm indicator	3 RCSU	RCSU     Clean RCSU/RSU front panel	3 RCSU a. Visual Inspection b. RCSU Operational Check c. Station Alarm Check	3 RCSU	3 RCSU a	
Antenna	4 Antenna	4 Antenna	4 Antenna	Antenna     Perform Inspection of Antenna     Clean the antenna from debris	4 Antenna	

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

### LIST OF PREVENTIVE MAINTENNACE ACTIVITY AERONAUTICAL TELECOMMUNICATION /RADIO NAVIGATION FACILITIES

FACILITY: SURVEILLANCE EQUIPMENT: PRIMARY SURVEILLANCE RADAR (PSR)
SECONDARY SURVEILLANCE RADAR/

MONOPULSE SECONDARY SURVEILLANCE RADAR

(SSR/MSSR)

			ACTIVITIES			
DAILY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
1	2	3	4	5	6	7
General Check the TX room temperature	General     Clean the entire Shelter of the equipment     Check the input power supply voltage of Main Supply or Genset	General     Check Obstacle around the shelter      Perform physical check of shelter inside and out, for any sign of water filtration, damage, or other deterioration	General     Clean all equipment thoroughly     Check battery function by simulating a power failure	1 General	1 General	
	Check the power supply voltage out of the Stabilizer and UPS					
Antenna	2 Antenna	Antenna     Check Oil Level and evidence of oil leaks	2 Antenna	2 Antenna a. Check for Grease antena rotation mechanism	Antenna     Check state of guides visually for oxidation of flanges	
		b. Check for abnormal noise or vibration     c. Visual inpection of Moving part			b. Check VSWR at the guide input     c. Check losses in the guide	
Transmitter  Check all indicators	Transmitter     Record meter reading based on BITE	Transmitter     Perform Ground Check /     Inspection as per approved ground inspection form	3 Transmitter	Transmitter     Calibrate all meters and indicators	3 Transmitter	

	DAILY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
_	1	2	3	4	5	6	7
Э.	Check the input voltage of some core modules contained on the panel meter	b. Perform Change Over Unit	b. Check and adjust Transmitter frequency     c. Check and Adjust Pulse Repetation Frequency     d. Check and Adjust all Pulse				
1	Receiver Check all indicators	Receiver     Record meter reading based on BITE	Shape 4 Receiver a. Perform Ground Check / Inspection as per approved ground inspection form	4 Receiver	Receiver     Calibrate all meter and indicator	4 Receiver	
).	Check the input voltage of some core modules contained on the panel meter	b. Perform Change Over Unit	b. Check RF Amplifier Gain				
	Check recovery time of receiver Check noise factor						
	Extractor & Processing	5 Extractor & Processing	5 Extractor & Processing	5 Video Extractor & Processing	5 Video Extractor & Processing	5 Video Extractor & Processing	
	Check all indicators  Check and observe all targets on the Radar viewer screen	Record meter reading based on BITE			a. Check all settings of Video Extractor		
	Radar Maintenance Display	6 Radar Maintennace Display	6 Radar Maintennace Display a. Check all light indicators	6 Radar Maintennace Display	6 Radar Maintennace Display	Radar Maintennace Display     Visual Insection and Cleaning	
			b. Check all functions of display switch/button     C. Observe the synthetic view/image (track, label, character)     d. Check the functionality of the Key board				
			Check the function of Mo- use / Trackball     Check the Brightness of the screen				
			g. Check the transponder test and observe all targets on the monitor screen				

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

#### Initial

### LIST OF PREVENTIVE MAINTENNACE ACTIVITY AERONAUTICAL TELECOMMUNICATION /RADIO NAVIGATION FACILITIES

FACILITY: AUTOMATION EQUIPMENT: ATC SYSTEM

Г					MAINTENANCE	A	CTIVITIES					
	DAILY		WEEKLY		MONTHLY	Т	QUARTERLY		SEMESTER		YEARLY	REMARK
	1		2		3		4		5		6	7
a.	. Check ATC System input status ( AFTN, AMHS, etc)	a.	Check operational of Air Situation Display (ASD) reply	a.	Clean outerpart of console and CPU of ATC System	a.	Reboot server of ATC system	a.	Update layout of ATC System	a.	clean inner part of CPU's server of ATC system	
b.	. Check Radars input status	b.	Check working light and maping light of console desk	b.	Clean outerpart of console and CPU of ATC System replay	b.	Reboot CWP's / Nodes of ATC system	b.	Update network connection of ATC system	b.	Clean inner part of CPU and keyboard of CWP's /Nodes	
C.	Check server status	C.	Clean ATC system display	C.	Change over server of ATC system	C.	reboot Server and CWP's of ATC system	C.	Update layout of ATC replay System	C.	Clean inner part of CPU and keyboard of replay's server	
d.	. Check CWP's/nodes status			d.	Restart CWP's/nodes of ATC system		malau	d.	Update network connection of ATC			
e.	Check reply status							l				
f.	Check other related system status (i.e. simulator, traces file, billing file tape recorder, etc)											

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

### LIST OF PREVENTIVE MAINTENNACE ACTIVITY AERONAUTICAL TELECOMMUNICATION /RADIO NAVIGATION FACILITIES

FACILITY: AUTOMATION EQUIPMENT: ATC SIMULATOR AND CBT

Γ			MAINTENANCE	ACTIVITIES			
Ĺ	DAILY	WEEKLY	MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
	1	2	3	4	5	6	7
	ATC SIMULATOR	ATC SIMULATOR     Check Simulator Status	ATC SIMULATOR     Clean CPU on Simulator server rack	ATC SIMULATOR     Reboot server and CWP     of Sim part	ATC SIMULATOR     Update layout of     Simulator	ATC SIMULATOR     a. clean inner part of CPU's server and keyboard of simulator	
		Check working loight nd console light	b. Clean console and CPU simulators		b. Update network connection of Simulator	b. Clean inner part of CPU and keyboard of CWP's /Nodes	
			c. Clean simulator displays			c. Clean inner part of CPU and keyboard of replay's server	
			<li>d. Restart server and CWP - Sim Part</li>				
1	CBT	2 CBT	2 CBT	2 CBT	2 CBT	2 CBT	
1		a. -	a. Clean display server and Client CBT	a	a. Update layout of CBT	a. Clean inner part of CPU's server and keyboard of CBT	
					b. Update network connection of CBT		

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

### LIST OF PREVENTIVE MAINTENNACE ACTIVITY AERONAUTICAL TELECOMMUNICATION /RADIO NAVIGATION FACILITIES

FACILITY: RADIO NAVIGATION AIDS EQUIPMENT: IINSTRUMENT LANDING SYSTEM

DAILY	WEEKLY	MAINTENANCE MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
7	10 CONTROL - CARDON	200720000000000000000000000000000000000		SEMESTER 5	YEARLY 6	7
1	2	3	4	3	0	- 1
General     Check the TX room temperature     Check the power supply voltage out of the Stabilizer and UPS	1 General - a.	General     Clean the entire Shelter of the equipment     Check Obstacle around the shelter     Perform physical check of	General     Clean all equipment thoroughly     b.	1 General a	General     Check lightning protection and grounding system.     Check condition of supply cable and control cable	
		shelter inside and out, for any sign of water filtration, damage, or other deterioration				
2 Localizer	2 Localizer	2 Localizer	2 Localizer	2 Localizer	2 Localizer	
a. Check all ndicators	Check meter reading on Localizer system	Perform Ground     Check/inspection as per     approved Ground Inspection     Form	Check Sporious     Modulation	Check unwanted     Modulation	a. Check polarization	
b. Check Monitor Indicators	b. Perform Change Over Unit	<ul> <li>b. Check operational equipment using backup power supply</li> </ul>	b. Check Coverage		<ul> <li>Check frequency synthesizer for carrier /and clearance frequency.</li> </ul>	
c. Check alarm indicator		20 1005-20	c. Check Auto Transfer		<ul> <li>c. Check transmitter signals with respect to further parameters like harmonics or spurious</li> </ul>	
d Check Tone Identification			d. Reassign Main /Standby Transmitter		d. Take a complete memory readout of all possible parameters	
	es contrato account	TORS HOUSE SOLICES		and the second of the second		Perform Phase Modulation every 3 years
3 Glide Path	3 Glide Path	3 Glide Path	3 Glide Path	3 Glide Path	3 Glide Path	37.0
a. Check all ndicators	Check meter reading on Glide path system	Perform Ground     Check/inspection as per     approved Ground Inspection     Form	Check Sporious     Modulation	Check unwanted Modulation	a. Check polarization	
b. Check Monitor Indicators	b. Perform Change Over Unit	<ul> <li>b. Check operational equipment using backup power supply</li> </ul>	b. Check Coverage		<ul> <li>Check frequency synthesizer for carrier /and clearance frequency.</li> </ul>	

DAIL			MONTHLY	QUARTERLY	SEMESTER	YEARLY	REMARK
1	2.4	2	3	4	5	6	7
Check alarm ind	icator			c. Check Auto Transfer		c. Check transmitter signals with respect to further parameters like harmonics or spurious	
				d. Reassign Main /Standby Transmitter		d. Take a complete memory readout of all possible	
RCSU	4	RCSU	4 RCSU a. Clean RCSU/RSU front	4 RCSU a. Visual Inspection	4 RCSU	4 RCSU a. UPS Battery Check	
		- All	panel	b. RCSU Operational     Check     c. Station Alarm Check			
Antenna	5	Antenna	5 Antenna	5 Antenna	5 Antenna	5 Antenna	
<b>L</b> a 650	a	L e	Perform Inspection of     Antenna     Clean the antenna from     debris				

Note: If there are measurement parameters in the equipment manual that are not included in the above measurement table, then it can be inserted into maintenance activity table.

Initial

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Initial

### Appendix 2A

#### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name	2	Brand/Type	:
Site Location		Month	
Facility	: Radio Navigation Aids	Year	1
Equipment	: VHF Omni Range (VOR)		

ACTIVITIES															[	ATE																REMARK
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Daily Maintenance																																
1 General	- 8	- 8		3				3				- 8	- 8	П				- 8	- 8			- 3	- 3	- 9	$\neg$					- 8	- 83	
Check the TX room temperature	8			3									- 13	$\neg$				8	- 13				- 3	- 8			Š.			- 13		
<ul> <li>b. Check the power supply voltage out of the Stabilizer and UPS</li> </ul>																																
2 Transmitter						· ·						200	- 2						- 275	S		100	- 00	1110								
a. Check all indicators	- 83	- 1		19		8 8	10	50		. 1	= 35	j.	100					87	-			- 3	- 1	(6)	П		d s		5 35	100	788	
b. Check all Monitor Indicators	1		%		( - )	-	- 0	%	9-	- 1	-	- 1	- 10		-	-		- 12	-33	2-		- 1		- 93		9—	3-			- 15	- 12	
c. Check Tone Identification	- 8	- 8		3				8					- 8	┪				- 8	- 8						$\neg$					- 8	18	
3 RCSU																																
a. Check RCSU/RSU panel indicator     b. Check RCSU/RSU alarm indicator											-	Ŧ	Ŧ	$\exists$						$\dashv$	$\exists$	$\exists$							F			
4 Antenna																						_								- (2)		
a																																
Weekly Maintenance																																
1 General																															100	
a. Check the input power supply voltage of Main Supply or Genset									П		П	T	T	П						П	T	Т	T	T	$\Box$			Г	Г		-	
2 Transmitter	- 20						15	0					8						0				- 9	- 13							(0)	
a. Check meter reading on VOR     system																					╛	$\Box$										
b. Perform Change Over Unit		- 12	900	.00	3		0.	30	95	0 0		0.	100				Z (4	500	455					85		95	22			- 100	138	
3 RCSU																																
a								833				- 3	- 22										- 3	- 33							- 20	
4 Antenna	11000				Ī.	1																										
a																															200	
Monthly Maintenance																																
1 General	- 20		750	400				750 7	20 0			100	000		e v				010			- 8.8	20			20 0	87 3				- 28	
Clean the entire Shelter of the equipment												П		$\neg$							П	Т	П						Г			
b. Check Obstacle around the shelter	- 33	- 07	***	:s :				10	(0			- 1	- 57		8 1				0.9	0 0	1	$\neg$			$\neg$	(0)	9 1			- 07	- 07	
Perform physical check of shelter inside and out, for any sign of water filtration, damage, or other deterioration																			-88	80	İ	1									- 8	

Initial

ACTIVITIES	1														-	DATE	Ε															REMARK
Activities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TCLIII/TT
Transmitter     Perform Ground Check/inspection as per approved Ground Check Form					8.0	25		545			<del>-</del>						***		535	. Se . Se				3		-				200		
b. Check operational equipment using backup power supply				3.			8 8		0 0		(i - 3)		a ===				: : : : : : : : : : : : : : : : : : :	8 18	0. 1	8 0				8 3				-			- 6	
3 RCSU															_																	
a. Clean RCSU/RSU front panel	г			87													57 - 5												П			
4 Antenna																																
a									8 8		6 G						65 S 82 Z			2 2				V 0				3			5 55	
Technician /Engineer				9) 9)																											£ \$3	
Chief/Supervisor											(d )		8 9																			

 	14

Airport Name		Brand/Type	
Site Location	The state of the s	Month	:
Facility	: Radio Navigation Aids	Year	1
	1/1/5 O 1 D 0/OD)		

MAINTENANCE ACTIVITY						MONTH	YEAR						REMARK
MAINTENANCE ACTIVITY		2 1	3 I	4 1	5 T	6. 1	7		- 0	10	11	12	NEMMAN
Quarterly Maintenance													
1. General	i i		91										
a. Clean all equipment thoroughly	H E	3		- 1	1							1 1	
2. Transmitter	-												
a. Check Auto Transfer		1	- 8										
b. Reassign Main /Standby Transmitter													
3. RCSU	1			100							•		
a. Visual Inspection		33	8			- 1						8	
b. RCSU Operational Check													
c. Station Alarm Check				- 1								. 8	
4 Antenna				•									
a. Do Inspection of field monitor Antenna		- 1	- 1			1		The state of the s					
b. Clean the field monitor antenna from debris	ä											- 73	
Semester Maintenance													
1. General													
a				13		3						3 8	
2. Transmitter													
a. Check Carrier output power												9	
b. Check Station Ident		- 3		31		9						i i	
c. Check Antena VSWR				ſ									
d. Check carrier frequency		- 3		- 3		3							
e. Check operating frequency													
f. Verify BITE Wattmeter Calibration		*		i i		,							
g. Verify BITE Frequency Counter Calibration	i i			- 3		9						į į	
h. Veryfy BITE VSWR Calibration													
3. RCSU	3	- 8			- 8								
a													
4 Antenna			===							- //		**	
a		- 1	- 1	- 3								ÿ	
Yearly Maintenance												``	
1 General		10	30	- 12	- 3								
Check lightning protection and grounding													
system. b. Check condition of supply cable and		-											
Check condition of supply cable and control cable		Ĩ				1							
2. Transmitter													
a. Check Audio Frequency	1			- 4	- 1			r					
Check Audio Frequency     RCSU													
a. UPS Battery Check		- 1	-		-							0 0	
4 Antenna		- 3						1					
a. Do Inspection of antenna system (Carrier	1	- 1	-			- 1							
and Sideband)													
Technician /Engineer													80
Chief/Supervisor													No.

	٠.		
n	IŤ	าล	

Airport Name		Brand/Type	2
Site Location		Month	:
Facility	: Radio Navigation Aids	Year	:
Equipment	: Distance Measuring Equipment (DME)		

ACTIVITIES	16	- 22	25	0.5	5 - A		· - 20		2 - 1	8 G	- 38		DAT		S		2 25	8	2 - 10	205	e - 5		9,6		00	580	REMARK
The second of th	1	2 3	3 4	4 5	6	7	8	9 10	11	12	13 1	4 15	16	17	18	19	20 2	1 22	23	24	25	26	27	28 2	29 30	31	5.000.000.000.000.000.000.000.000.000.0
Daily Maintenance																											
1 General								- 22										-				- 22					
Check the TX room temperature	- 0.7	12.											1														
<ul> <li>b. Check the power supply voltage out of the Stabilizer and UPS</li> </ul>	33					(33)					65				(3)					33						8	
2 Transmitter	988	- 33	737		27 50	9890	0 12	- 1	10. 1	V 20	100	2.0			5 955		9 99		24 - 57	100	50 50	140	8.8	47	80	180	
a. Check all indicators	- 31											$\top$				П		Т				$\neg$	$\neg r$	$\neg \Gamma$			
b. Check all Monitor Indicators			_					$\neg$				1				$\neg$		1				$\neg$	$\neg$	T		1	
c. Check Tone Identification	88	99.	- 12		9 9	3.50	0.	1	30 3	. 200	50		100	3	88			1	1	8.8	AX 10	1	- 1		300	48	
3 RCSU				П														п									
a. Check RCSU/RSU panel indicator	- 53		T	Т		(5)	5 (3	Т	38 5			T	18	38 33	(5)			Т	Г	- 8		T	T	Т		CC.	
b. Check RCSU/RSU alarm indicator	- 0,	-	Ť	Ť	534 534	- 0.4		Ť	- 51 - 5		1.0	Ť	1		0.			1	3	- 0.2	40 FE	T	Ť		- 00	100	
4 Antenna																											
a		- 1				- 3									- 3	$\perp$		ㅗ									
Weekly Maintenance																										100	
1 General	- 75		- 4-					- 40				-	-	4				-			-	- 4		-		S	
a. Check the input power supply voltage of Main Supply or Genset																											
2 Transmitter	- 23	7.83	10	- 7.	i i			- 500	- 1	157	- 100	- 3	178	3	7 39				. ·	- 23	S 15	- 50	- 4	- 5	187	8	
a. Check meter reading on DME system																											
b. Perform Change Over Unit	185	Vis	100	2.2	30 10	1950	n 12	210	157 - 1	5. 197	- 1	550	825	153 3	S 18			200	15 17	190	10	27.2	3.3	32	197	-10	
3 RCSU																											
a								T				T	1			П		T	T			T	T	T			
4 Antenna		-	-	,															•								
a			T		T			T				T	T	I		T		1	T			T	T	T			
Monthly Maintenance		_	_				_	_				-	-	-	_	_	_	-	-			_					
1 General																											
Clean the entire Shelter of the equipment				Т				T				T	I					T				T	T	T	T		
b. Check Obstacle around the shelter								1				Ť		2 1				T	П			$\top$	T	T			
Perform physical check of shelter inside and out, for any sign of water filtration, damage, or other deterioration	33			T		33					12			A	33			T		33	ž -   s:				3	2	

Initial

ACTIVITIES		DATE								REMARK																						
************	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	SCHOOL PROBLEMS.
2 Transmitter	00	8 0		D. 19		35 E		65 A	0.00	80	8 8		8				8. 1		35 5		85 - 1	(F)	S	80		8 - 3		0 1		St. 7	(8)	Ý
Perform Ground Check/inspection as per approved Ground Inspection Form				N 13		3	50	3		0 - 1			8				100		3 - 8		100	8	·00	0 40		8 - 8					1 58	
<ul> <li>b. Check operational equipment using backup power supply</li> </ul>				io - 0.			33		33	120 0									E Z	ć.		- 33	100	. 3							33	
3 RCSU			1	1 1		100			5 58				ali si				100		60 6							A) = 0		10	-			
a. Clean RCSU/RSU front panel	80	8 3		13 3		ai i		37 9	8 9	9. 3	16 16		8		8 33		(3 )		3 8		2		9	8 60		8		d i		(a ×	. 28	
4 Antenna																																
a	(0) (0)						- 0			00 0									8 3		30 3			2 3		6 8 5 5			₽	p s		
0190.53 (350A - 350 S 14)	-						-		-	-	-				-				*		-	_	-	-		-		-	┢		Н	
Technician /Engineer											15								-1 :					11								
Chief/Supervisor																																

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n	IŤ	าล	

Airport Name		Brand/Type	2
Site Location	:	Month	I
Facility	: Radio Navigation Aids	Year	I serveren
Fauinment	: Distance Manauring Equipment (DME)		

MAINTENANCE ACTIVITY						MONTE	/ YEAR					
(Chin Vining Chin Chen Still and A Still	1	2		4	5			8	9	10	11	
Quarterly Maintenance						*	200					
1. General												
a. Clean all equipment thoroughly												
2. Transmitter	(4)	10.00		100	5 3	3	100				× 2	
a. Perform Remote DME Certification Check												
b. Reassign Mian /Standby Transmitter												
3. RCSU		100				•			•			·
a. Visual Inspection												
b. RCSU Operational Check												
c. Station Alarm Check		**	10	i i								
4 Antenna	- 10	1000		100	•							
a												
emester Maintenance												
1. General												
a	F											
2. Transmitter												
a. Perform Transmitter Frequency Performance		T										
Check												
b. Receiver frequency performance check							j					
c. Interrogator frequency performance check	1		77	1	1	1			7		1	
d. Transmitter pulse performance check												
e. Transmitter power output performance check												
f. Receiver and Decoder performance check												
g. Transponder reply delay performance check				Ì								
h. Identification frequency performance check				İ								
i. Monitor Interrogation performance check												
j. Monitor shutdown/transfer control performance						1						
check												
k. Monitor alarm integrity performance check												
350 (200m)		***	ĺ		í							
. RCSU	40	1000		10			200	,			2 3	
a												
Antenna												
a. Perform Inspection of Antenna						3		3	3			
. Clean the antenna from debris								1	1			
arly Maintenance					•			•	•	•	•	
General												
a. Check lightning protection and grounding	F	-		4	1				1		1	
system.												
b. Check condition of supply cable and												
control cable												

Initial

MAINTENANCE ACTIVITY						MONTH	L/ YEAR					REMARK
	1	2	3	4				8		111	12	
3. RCSU		r			17	12				r:		
a										I.		
4 Antenna a			ľ	Ï							ĺ	
Technician /Engineer		è.										
Chief/Supervisor												

Initial

### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name	e e	Brand/Type	
Site Location	Supercore was a company of	Month	·
Facility	: Radio Navigation Aids	Year	
Equipment	: Instrument Landing System (ILS)		

ACTIVITIES				-5	27.		2.50	V.5		0.53		ors		DA	TE							IEM .			v				REMARK
VENERAL TRADESIA	1	2	3	4	5 6	7	8	9	10	11	12	13 1	14 1	5 1	6 17	18	19	20	21	22 23	3 24	25	26	27	28	29	30 3	31	
Daily Maintenance																													
1 General																													
Check the TX room temperature	÷	\$ - \$3	- 6	- 11	- 0	- 1			Ø - 3		( - T	- 75	-	-23	- 1	123	8 8		- 9	Ż	3 3	8	- 12			4	- 1		
<ul> <li>b. Check the power supply voltage out of the Stabilizer and UPS</li> </ul>									5 3 8 4			18		- 13		2				i i	3 3		. 19			9			
2 Localizer																													
a. Check all indicators		5 5		- 2	-	33			s - 8			7.5				2)	8 3			8	4 /		- //:				- 1		
b. Check all Monitor Indicators	·	5 X							x 3	- 2		193	1	-		14	5 - 6			- x	30 0		c 750	$\neg$		3 3		_	
c. Check Alarm Indicator									× 3			- 63		2		15				- X	30 0		. 17						
d. Check Tone Identification				- 1								- 6				1				a a	3. 0		. 100			. 4	28		
3 Glide Path																													
a. Check all indicators	i					ä	18-3						1	i)			8 8			i i									
b. Check all Monitor Indicator	÷					1		1	Q 3	-3		- 75	7	-81		13	3 - 3			Ž.		9	- 12	一		-			
c. Check Alarm Indicator	÷	\$ - \$3	-	- 12		*		1	9 3	- 35	( ) ·	- 13		73	-	100	3 8			Ť.	3 1	· ·	£ 10			2	- 4		
4 RCSU	(E) (	100	- 10		- 50	177		7	10 10	- 2	× 1	- 23	- 5	- 10.7	- 10	100	70 0		- 5	18	30 8		A 22						
a	6 3	8 8		- 67	- 8	33		Т	E - 8			- 13	T	(3)	- 100	83	8 9			(:	8 (		- 0				- 33		
5 Antenna																													
a	8 3	8 8		- 57	ii.	33		П	8 8			- 13	T			87	8 9		Т	- 6	35 (								
Weekly Maintenance		6 88	÷.	= 1	- 1	10	70	100	30 0	1000		- 17	-	100	-	10	EC 1		- 10	100	10 10		8 8	į.	1 (5)				
1 General																													
a		3 %	- 0			-3		1	S 50	- 0		- 10	T	*	- 683	-	6 8		Т	- 55	5		8 - 68	7		5 - 8			
· ·		2. 8		100	- 1	(4)			3 3	- 19 9		438		8		500	0 0			9	3	000	100				- 6		
2 Localizer					- 10	- 27				1000		- 27		100	- 7/		100		- 15	*:-	- 1			- 1			- 10		
Check meter reading on Localizer system	0 .					13			1.5 51								6 15			11.5	3. 3					5) (2)		7	
b. Perform Change Over Unit	3	8 8		83	i i	is.	0	1			1	(3)	7			8	B 10		7		3 1			$\neg$			- 13	_	
3 Glide Path	3																												
Check meter reading on Glide path system		2 10		- 5					8 5			CC.	T						T		50. 0	300				0 10			
b. Perform Change Over Unit	3 7	2 2			2				3 0			33		8						å	00 00	900	S 03						

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ACTIVITIES	9 00														[	DATE															REMARK
**************************************	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23 2	24 2	25 2	26 2	27	28	29	30 31	1.1707/E1993899000/F60
4 RCSU																															
a	S 40	- 23		2 2		12 13		3 3		9	153	(i)	359		5 - 5		2 23		8 8	- 68	- 3	- 2	- 0	(88%)		- 55		- 80 OF	- 12	- 2	1
5 Antenna																															1
a		9		8 8		8 8				3							8 8		8 3	19		(3)	333	(38.5)	6.0	- 13		0.00	- 8	33	]
Ionthly Maintenance		- 02	- 5						ii.	701	ă.	X6	8 - 07				3 3 3		100	- 12	12	122	181	70	181	-02	7.7	3550		107	
1 General		- 2								8					- 2		- 3					0		Jirgin.		283		170 040		- i	
Clean the entire Shelter of the equipment				9 8 8 5						3												3	35	28 BY		% %		7.83			
b. Check Obstacle around the shelter												(S)										7		1889	1	93		388			
<ul> <li>Perform physical check of shelter inside and out, for any sign of water filtration, damage, or other deterioration</li> </ul>																															
2 Localizer								-						-			1 318	- 2					124	10000		7.0°		0.50	-		1
Perform Ground Check/inspection     as per approved Ground Inspection     Form				3 3																											
b. Check operational equipment using backup power supply	\$ 18			8 18						÷ :		8) — i			5 - 10							- in	3	888		100	k	389			1
3 Glidepath							_		•		_											_								-	1
Perform Ground Check/inspection     as per approved Ground Inspection     Form																															
b. Check operational equipment using backup power supply						20						0									T	1		13 (0)	T	13		Ť			1
4 RCSU				3													2 7.0		0.00	93	- 66	- 100		10000		102		1000		- 22	1
a. Clean RCSU/RSU front panel     Antenna										l								I			1	_[	1	1	I		1	_1			1
a. Perform Inspection of Antenna		T		51		1		Г	T	1								T	- 1		T	T	-1	- 1	Т		T	T	1	-	1
b. Clean the antenna from debris			$\neg$	7		0 0					33		- 33			$\neg$		$\neg$	9		1	1		33 (2	十	33	1	7		-	1
			$\neg$			0 0					8 30		33					$\dashv$		7	1	1		33 (2	一	33	7	- 0		0	1
Technician /Engineer																															1
Chief/Supervisor																					Ť	Ť			1			T			1

Initial

### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name		Brand/Type	
Site Location		Month	
Facility	: Radio Navigation Aids	Year	
Equipment	: Instrument Landing System (ILS)		

						MONTE	I / YEAR					
MAINTENANCE ACTIVITY	4	2	3	1 2	T 8	8	7	- 8	9	10	1 44	12
Quarterly Maintenance		1			1	1 ×					1	1.5
1. General												
a. Clean all equipment thoroughly					1		l-		1			1
2. Localizer												
a. Check Sporious Modulation					1	1						
b. Check Coverage					3		6					
c. Check Auto Transfer		1	10			\$						
d. Reassign Main /Standby Transmitter		4				1						F
3. Glide Path				6.0	ata -	4	***					tir :
a. Check Sporious Modulation			9.									
b. Check Coverage						0.00						
c. Check Auto Transfer					T.							
d. Reassign Main /Standby Transmitter												
4 RCSU		**	37		310	**	W.		8		2	**
a. Visual Inspection			00									
b. RCSU Operational Check							ji.					
c. Station Alarm Check							Ĭ					
5 Antenna					300		Mai				·	
a							Î					
Semester Maintenance		10		- C	75 N	**	Mari		*	300		
1. General		-02-				100						
a			Ü				j					
2. Localizer		117	30	712	(4)			7.7			15	
a. Check unwanted Modulation			1				1					
3. Glide Path		100			(CO)							
a. Check unwanted Modulation			]				j .					
4 RCSU								4				
a												
5 Antenna												
a												
Yearly Maintenance												
1 General						-				0.		
Check lightning protection and grounding												
system.		l l										

Initial

MAINTENANCE ACTIVITY						MONTE	I / YEAR						REMARK
***************************************		2		4		6	7	8	9	10		12	
b. Check condition of supply cable and control cable			£	12.15						â			
2. Localizer			32					*		75			
a. Check polarization													
Check frequency synthesizer for carrier /and clearance frequency.													
<ul> <li>Check transmitter signals with respect to further parameters like harmonics or spurious</li> </ul>													
Take a complete memory readout of all possible parameters													
3. Glide Path							2			22	S.		
a. Check polarization						l. U				e.			
b. Check carrier frequency													
Take a complete memory readout of all possible parameters				-0.0						8			
4 RCSU		ž.	8	506		38		3	\$ 33	\$0.	×.		
a. UPS Battery Check			-		4					C.	ii .		
5 Antenna		*	*	5- <del>5</del> -5		*		7	7	75		Ø.	
a	i e									53	Ĭ		
8.										4			
Technician /Engineer													
Chief/Supervisor													

Initial

### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name	g g	Brand/Type	1
Site Location	4	Month	:
Facility	: Surveillance Facilities	Year	:
Equipment	: Primary Survaillance Radar, Secondary Survaillance Radar and Monopulse Secondary Survaillance Radar.		

ACTIVITIES  1 Daily Maintenance 1 General	2 3	DATE  1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30																REMARK				
		3 4	5 6	7	8 9	10	11 12	13 14	15	16 17	18	19 2	20 21	22	23 2	24 25	26	27	28 29	30	31	
1 General																						
Check the TX room temperature	e - x	35	30 - 12	72 SV - 10	x:					- 35	3:	- 60							92.0	31 - 7		
2 Antenna	1				- 10	St 10	- 10			- 8	100		- 1		100	- 8		- 12	10000	30 3		
a																						
3 Transmitter																						
a. Check all indicators					i						100								- 81			
b. Check the input voltage of some core     modules contained on the panel     meter	i X		26 3 6		Ż.		8 3	41			- (de)		ž.						33			
4 Receiver		-			•	-	-	•	-	-		-				-	•			-		
Check the input voltage of some core modules contained on the panel meter									П										T			
b. Check recovery time of receiver		- 8	0 0	09 10	8						10			10	- 9				000	81 0		
c. Check noise factor				010	- îl						100								000	30 0		
5 Extractor and Processing									700		- 100			4750				1,13			2000	
a. Check all indicators						c 5					200											
b. Check and observe all targets on the     Radar viewer screen				3368				180				53									360 36	
6 Radar Maintenance Display	- 10	- 1	2 2		- 68	(A) (1)			100	1 10		i 187	40 0		i EV			150	1000	100 0		
a				10 00	- 8				$\blacksquare$		95	5 59			- 5				30 C	90.0		
Veekly Maintenance	4 6					1	-		+ +	- 4	100		-		-	-	+ +	-	1000			
1 General																						
Clean the entire Shelter of the equipment				H	Τ				П	Т				П			П	T	T			
b. Check the input power supply voltage of Main Supply or Genset					(E)		ä 3	3	П		G .	( ) ( )		0 -					(8) (8) (6) (8)	38 (3		
c. Check the power supply voltage out     of the Stabilizer and UPS									П													
2 Antenna							-	•	•							-	•			-		

ACTIVITIES															0	ATE																REMARK
5240.0300.000	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	NOT ANY SHOP AND
3 Transmitter	-	-	-		-				- 0			- 1		170							- 20						-					
Record meter reading based on BITE	: 85	55 - 55E	- 30	- 8			N 88	2 89	133				& 183	- 89	.a 5		3		8 10		- 88	27 13	33	38		ŝ		28 5	da d	2	7	
b. Perform Change Over Unit			- 8				1 %	3 %	- 9	- /					3 3	- 3					3 %	3 74					į.	0 8				
Receiver     a. Record meter reading based on BITE			1000							91.00					100	200							000					000				
b. Perform Change Over Unit		80 - cr		- 0			( <u>     3)</u>	3 3	-	- 3		_		- 33	3 5	Ó	ं			_	C 23	3 -0	- 6	ं			ć.	\$ 5	82-0			
5 Extractor and Processing																																
a. Record meter reading based on BITE		3 3					8 3	6 6	- 0		- 30			3 (3)	8 6	- 33	- 83				3: (3)	3 8	- 3					0 0	(3) = (2)			
6 Radar Maintenance Display	- 150	20. 1,0				0 8	3 320	7 32	- 47				2 70	150	- X - X -	- 28	- 50	- /	- 10		7 150	0 00	55	- 200		2 3	8	54 N	S27 1.			
a		Sc. 2.					2 32								er 19									3.6				60 75				
onthly Maintenance																												- Tr				
1 General								8 8		- 8					8						8 8		- 3									
a. Check Obstade around the shelter												T										T									1	
Perform physical check of shelter inside and out, for any sign of water filtration, damage, or other deterioration	- //	9;—,3		- 3				3-39							\$ £	4					3-35	3-33				2		86-X	8			
2 Antenna			- 3							Š						- i							3				Š					
a. Check Oil Level and evidence of oil leaks	- 13	3(13)					3-10	(2-15)	- 12				9	- 13	(X-X)	- 3	30				3-35	2-13	- 12	- 34				86—10	8-3			
<ul> <li>b. Check for abnormal noise or vibration</li> </ul>	- (3	3 - 3)			3 - 8		8 (8	9 0	- 8					2 (2)	3 3	35	20				3:(\$)	3 - 87	- 33	39				E. E.	3) = 9			
c. Visual inpection of Moving part								8 8			1				9 0					$\Box$								0.00		$\Box$		
3 Transmitter	_		_				2 10					_	- 1	- 6		- 4							-									
Perform Ground Check / Inspection     as per approved ground inspection     form																																
b. Check and adjust Transmitter frequency		(0 3)		- 3			0 00	30 07	32						(A)						0.00	9 02						0 8	76 3			
c. Check and Adjust Pulse Repetation Frequency	33	00 198		- 0			0 33	ek (3)	- 20					33	E 24		718				E 33	F 19						(2) S	60 - N			
d. Check and Adjust all Pulse Shape		00 00						0 10 0 10							N 10													.9 %				
4 Receiver																																
Perform Ground Check / Inspection     as per approved ground inspection     form		35 - 19					2 - 63	n - 12	-						n - 2						1 7 7 1	x - 19					2.	53 - X				
b. Check RF Amplifier Gain		× 5					10 25	3 8							3 6							3 3		- 1	$\Box$			2× //			$\neg$	
5 Extractor and Processing																							-						_			
a 6 Radar Maintenance Display																				_ !												
a. Check all indicators																							1			Î					7	
b. Check all functions of display switch/button	00	10 32					0.00	.00 OT	32					. 03	, e e.				S - 2		0.00	* 0		2.0				0 60	10 0			
c. Observe the synthetic view/image (track, label, character)	. 88	80 P.					. 88	50 94 50 94	91					- 25	600 X/5		2		2		0. N.S.	0. P1		30				88 X	88 P			
d. Check the functionality of the Key board		0 0					6 03	50 O)						. 0.		Ž					o 0.						i.	.0 %	.0 0			
e. Check the function of Mo-use / Trackball							8																								$\Box$	

Initial

ACTIVITIES																DATI																REMARK
2000 tax tax tax	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21.	22	23	24	25	26	27	28	29	30	31	2-000 1500 Miles
f. Check the Brightness of the screen	6 - 30		3 3			- 18	85			, - 8,		8 8				3 - 3			. 149			85 - 1			8 8			785	0	3 35		
p. Check the transponder test and observe all targets on the monitor screen																					8 S											
Technician /Engineer												8 3				3 3									3 3							
Chief/Supervisor					8 3	- 6		-										87 - 3	- 8	-								- 10		200	8	

Airport Name		Brand/Type	:
Site Location		Month	:
Facility	SURVEILLANCE	Year	:
Equipment	: PRIMARY SURVEILLANCE RADAR (PSR)		
\$40,400	SECONDARY SURVEILLANCE RADAR/		

MONOPULSE SECONDARY SURVEILLANCE RADAR (SSR/MSSR)

	22 40	Page
MAINTENANCE ACTIVITY	MONTH/YEAR  1 2 3 4 5 6 7 8 6 50 11 12	REMARK
uarterly Maintenance		
. General		
Clean all equipment thoroughly		
Check battery function by simulating a power		
failure		
Antenna		
3		
Transmitter		
3		
Receiver		
a		
Video Extractor & Processing		
3		
Radar Maintenance Display		
a		
nester Maintenance		
General		
a		
Antenna		
Check for Grease antena rotation mechanism a.		
Transmitter		
a. Calibrate all meters and indicators		
Receiver		
Calibrate all meter and indicator		
Extractor & Processing		
a. Check all settings of Video Extractor		
Radar Maintenance Display		
a		
rly Maintenance		
General		
a		
Antenna		
a. Check state of guides visually for oxidation of flanges		
b. Check VSWR at the guide input		
c. Check losses in the guide		
Transmitter		
a		
Receiver		
Extractor & Processing		
a		
Radar Maintenance Display		
a. Visual Inpection and Cleaning		
Technician /Engineer		
Chief/Supervisor		_

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### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name		Brand/Type	:	
Site Location		Month	:	
Facility	: Automation	Year	:	
Equipment	: ATC System			

ACTIVITIES															ı	DATE																REMARK
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	į .
Daily Maintenance	H																-		-						-				-		+	
<ul> <li>a. Check ATC System Input status ( AFTN, AMHS, etc)</li> </ul>											Γ																					
b. Check Radars Input status								Г	П				П									Г								П		i
c. Check server status	П							Г	П				П									Г								П		i
d. Check CWP's/nodes status								Г					П																	П		i
e. Check reply status								Г																								i
<ol> <li>Check other related system status (i.e. simulator, traces file, billing file tape recorder, etc)</li> </ol>																																
Weekly Maintenance																																i
Check operational of Air Situation     Display (ASD) reply								Г		Π	Π											Г										
<ul> <li>b. Check working light and maping light of console desk</li> </ul>																																
c. Clean ATC system display																																i
Monthly Maintenance																																i
<ul> <li>a. Clean outerpart of console and CPU of ATC System</li> </ul>																																
<ul> <li>b. Clean outerpart of console and CPU of ATC System replay</li> </ul>																																
c. Change over server of ATC system																																
<li>d. Restart CWP's/nodes of ATC system</li>																																
Technician /Engineer																																
Chief/Supervisor																																

Initial

#### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name		Brand/Type :	
Site Location		Month :	
Facility	AUTOMATION	Year :	
Equipment	: ATC SYSTEM		

MAINTENANCE ACTIVITY						MONTH	I/YEAR						REMARK
MAINTENANCE ACTIVITY	1	2	3	4	5	6	7	8	9	10	- 11	12	KEMAKK
Quarterly Maintenance													
a. Reboot server of ATC system													
b. Reboot CWP's / Nodes of ATC system													
c. reboot Server and CWP's of ATC system													
replay													
Semester Maintenance													
<ul> <li>Update layout of ATC System</li> </ul>													
b. Update network connection of ATC system													
c. Update layout of ATC replay System													
<li>Update network connection of ATC replay system</li>													
/early Maintenance													
<ul> <li>clean inner part of CPU's server of ATC system</li> </ul>													
<ul> <li>Clean inner part of CPU and keyboard of CWP's /Nodes</li> </ul>													
<ul> <li>Clean inner part of CPU and keyboard of replay's server</li> </ul>													
Technician /Engineer													
Chief/Supervisor													

Airport Name	:	Brand/Type :	
Site Location	:	Month :	
Facility	: Communication	Year :	

ACTIVITIES																ATE														П	REMARK
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20 2	21 :	22 2	3 24	25	26	27	28	29	30	31	
Daily Maintenance																															
1 ATC Simulator																															
a																															
2 CBT (																															
a (	heck	t work	king k	olght r	nd co	nsole	light														$\Box$										
Weekly Maintenance																															
1 ATC Simulator																															
a. Check Simulator Status																					Т										
b. Check working loight nd console light																					T									$\neg$	
2 CBT																					_										
a	Ц		$oxed{oxed}$	_				ᆫ						_	Ш						_				_				Ш		
Monthly Maintenance	_																														
1 ATC Simulator																															
a. Clean CPU on Simulator server rack																															
b. Clean console and CPU simulators																		$\neg$		$\neg$	T							Г	П	$\neg$	
c. Clean simulator displays	$\vdash$	$\vdash$	$\vdash$	-	$\vdash$	-		$\vdash$	Н		$\Box$	$\neg$	$\Box$	$\neg$	М		$\Box$	$\neg$	$\neg$	$\neg$	$\neg$	$\top$	$\top$	T	-			-	ш	$\neg$	
d. Restart server and CWP - SIm Part	Г										$\Box$						$\Box$	一		$\top$	十	$\top$						Г	П	╗	
2 CBT		Ь.	-	-	_	-	_	_	ш					_	ш		—-	_		_	_	_	+	-	-	_	_	_	ш		
a. Clean display server and Client CBT	Г		Т	П	П	П		Г			П	$\Box$		$\neg$			П	$\neg$	П	Т	Т	$\top$	$\top$	Т	П			Г	П	$\neg$	
	⊢	_	-	-	$\vdash$	$\vdash$	_	$\vdash$	$\vdash \vdash$	$\vdash$	$\vdash$	$\dashv$	$\vdash$	$\dashv$	$\vdash\vdash\vdash$		$\vdash \vdash$	$\rightarrow$	$\longrightarrow$	+	+	+	+	+	-	_	$\vdash$	<b>—</b>	$\vdash \vdash$	$\dashv$	
Technician /Engineer																															
Chief/Supervisor																															

Date of Issue: 23-Nov-17 |

: ATC Simulator and CBT

Equipment

Initial

#### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name		Brand/Type	:
Site Location		Month	:
Facility	AUTOMATION	Year	:
Equipment	ATC CIMILITATOR AND CRT		

						HOUT	I / YEAR					
MAINTENANCE ACTIVITY						MONTE	IT TEAK					
	1	2	3	4	5	6	7	8	9	10	11	12
Quarterly Maintenance												
1 ATC Simulator												
<ul> <li>a. Reboot server and CWP of Simulator part</li> </ul>												
2 CBT												
a												
Semester Maintenance												
1 ATC Simulator												
a. Update layout of Simulator												
<ul> <li>Update network connection of Simulator</li> </ul>												
2 CBT												
a. Update layout of CBT												
b. Update network connection of CBT												
Yearly Maintenance												
1 ATC Simulator												
<ul> <li>a. clean inner part of CPU's server and keyboard</li> </ul>												
of simulator												
<ul> <li>b. Clean inner part of CPU and keyboard of CWP's /Nodes</li> </ul>												
c. Clean inner part of CPU and keyboard of												
replay's server												
2 CBT												
<ul> <li>Clean inner part of CPU's server and keyboard</li> </ul>												
of CBT												
Technician /Engineer				l								
Chief/Supervisor				l								
				l								

Airport Name	:	Brand/Type :
Site Location	:	Month :
Facility	: Automation	Year :
Equipment	: Automatic Message Handling Message (AMHS)	

ACTRUTUCO	Г														-	DATE															П	REMARK
ACTIVITIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	REMARK
Daily Maintenance																																
1 General	_		_					_	_	т-						_							$\neg \neg$					$\overline{}$	т			
a	$\vdash$					$\vdash$			$\vdash$	+			Н				-		Н	$\neg$			$\neg$	$\neg$			$\vdash$	$\vdash$	-		$\dashv$	
2 Supervisory		_		_	_	_	_	_	_	-					_			_									_	_	_	_		
a. Check the brightness	_		$\overline{}$	$\overline{}$				-	$\overline{}$	$\overline{}$													$\neg$	$\neg$	$\neg$		$\overline{}$	Т	-			
<ul> <li>b. Check the paper supplies in the printer</li> </ul>																																
c. Check the printer ribbon	Н								$\vdash$	+			Н				-		Н			$\Box$	$\neg$	$\neg$			$\vdash$	$\vdash$	1		$\dashv$	
3 Reject Edit																								111								
a. Check the brightness				Г						T																		Т	Г			
b. Check the paper supplies in the printer										$\top$			П																T	П	$\square$	
c. Check the printer ribbon	$\vdash$	$\vdash$		$\vdash$	$\vdash$		$\vdash$		$\vdash$	+			Н				-	Н	Н			$\vdash$	$\neg$	$\dashv$			$\vdash$	$\vdash$	-		$\dashv$	
Weekly Maintenance										_																	_		_			
1 General																																
a. Check main supply output	г		П	Г				Г	$\overline{}$	$\overline{}$													$\neg$	$\neg$	$\neg$		П	Т	т			
<ul> <li>Clean the entire room of the</li> </ul>									$\vdash$	T			ш						Ш				$\neg$	$\neg$				T	T		$\blacksquare$	
equipment	l							l					ll																ı			
2 Supervisory																																
<ul> <li>a. Check the printer display introductory function</li> </ul>																																
b. Perform Change Over Unit	Г							Г					П						П									$\Box$	Г			
3 Reject Edit																																
a. Check printer output	Г								П	Т													П	$\neg \neg$				Т	Г		$\neg$	
Monthly Maintenance																																
1 General																																
<ul> <li>a. Check the output power supply voltage of UPS / Stabilizer</li> </ul>																																
2 Supervisory																																
a. Check the keyboard function																																
3 Reject Edit																																
a. Check the keyboard function																							$\dashv$	$\exists$								
Technician /Engineer																																
Chief/Supervisor																																

Date of Issue: 23-Nov-17 | PACA – Confidence of Issue: 23-Nov-17 |

Initial

#### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name	:	Brand/Type	:
Site Location	:	Month	:
Facility	: Communication	Year	:
Equipment	: AUTOMATIC MESSAGE HANDLING SYSTEM		

						HOUT	LIVEAR					
MAINTENANCE ACTIVITY						MONTE	I / YEAR					
	1	2	3	4	5	6	7	8	9	10	11	12
Quarterly Maintenance												
1. General												
a. Inspect all connectors												
2. Supervisory												
a. Check Interconnection system												
3. Reject Edit												
<ul> <li>a. Check Interconnection system</li> </ul>												
Semester Maintenance												
1. General												
a												
2. Supervisory												
a. Check the software function												
3. Reject Edit												
Check the software function												
Yearly Maintenance												
1. General												
<ol> <li>Clean the dust on the UPS and Stabilizer</li> </ol>												
<ul> <li>Replace battery of UPS if necessary</li> </ul>												
2. Supervisory												
<ul> <li>a. Check the cooling fan function of the</li> </ul>												
rack												
3. Reject Edit												
a. clean filter cooling system CPU												
Technician /Engineer	l			I				l				
Chief/Supervisor	l			l				l				

Airport Name	:	Brand/Type	:
Site Location	:	Month	:
Facility	: Communication	Year	:
Equipment	: AUTOMATIC TERMINAL INFORMATION SERVICE		

MAINTENANCE ACTIVITY						MONTH	I / YEAR					
	1	2	3	4	5	6	7	8	9	10	11	12
Quarterly Maintenance												
1. General				_						_		
a												
2. Console												
Check the recording function												
<ul> <li>b. Check the play back function</li> </ul>												
3. Transmitter												
a. Measure DC level terminal with												
equipment condition "ON"												1
Semester Maintenance			_									
1. General												
a. Clean the dust on the UPS and Stabilizer		1	T	1						i		
												1
2. Console												
a. Clean air circulation filter (fan)												
3. Transmitter												
a. Checking the transmitter working												
frequency												
Yearly Maintenance												<u> </u>
1. General												
<ol> <li>Check Battery of UPS, do replacement if</li> </ol>												
necessary												
2. Console												
<ul> <li>a. Check system operation thoroughly</li> </ul>												
3. Transmitter				_								
a. Measurement of power output												
b. VSWR measurement												
Technician /Engineer												
Chief/Supervisor	I	1	1	I	1		1			I		

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n	IŤ	าล

Airport Name	2	Brand/Type	:
Site Location	4	Month	:
Facility	: Communication	Year	:
A A SHOW THE COMMENT AND IN	V III E ANIEL VI A O I		

Equipment : Very High Frequency (VHF) Air to Ground

Transmitter Rack No.

ACTIVITIES												D	ATE												REMAR
7-1-10 T T-10-1	1	2 3	3 4	1 5	6	7	8 9	10	11	12 13	14	15	16	17 1	19	20	21 2	2 23	24	25 2	26 2	7 28	29	30 3	ACCUPATION OF THE
Daily Maintenance																									
1 General																									-0.
a. Check the TX room temperature						Т													П		Т		П		
<ul> <li>b. Check the power supply voltage out of the Stabilizer and UPS</li> </ul>		ľ	363	100								10 00	20110	60	60			26.5							
2 Transmitter		-	-											-							-				
a. Check all indicator s						$\neg$ r						24 - 25	- 1										П	- 23	
b. Check LCD / Main Screen Display.	100	-				=	- 4				0 - 0	(C	199 90	6:	95	2 0					-	-3		- 9	3
3 Receiver Rack		Issails	HI SH			1100		STEEL STEEL						H collins						1100	annian i		(0)		
a. Check all indicator	- 100	$\neg$	18		T	T	38					0 0	200	- 125					П		T	T			
b. Check LCD / Main Screen Display.	12	ē.		- 10		1	\$ 8			- 5	9	0.0	(5)		0		-		П	. 4		33	3		70
4 Antenna		100100										SII O											i de la constante de la consta		ii e
a						П						00 00		100	100				П		T	1			
Veekly Maintenance	- 10	- 80			1 1		- 51				. 10	0 0	1000	- 0	- 20	10					-	-			
1 General	2.00						200										4.9								
Clean the entire Shelter of the equipment	3												1280											12	
2 Transmitter Rack	100	- 100	- 1		- 100 m		200	100			0. 30		154.401			166 300		100	a. a				394 3		
a. Check meter reading based on BITE												35-72				x e					3 6				
b. Check Change over switch function	- 45			- 10		7					3 - 13	%	1889	20	0	\$ - K	2		П		7	3			
3 Receiver																									
a. Check meter reading based on BITE							38			33	9 - 12		(393)	60	6	9 (2						38			30
b. Check Change over switch function														65					П		1		П		1
4 Antenna																									
a													2.				Т				T				1
Ionthly Maintenance	100	- 83	110	7.5	10 10			100	110	180	10	R1 19	100-01	183	183	30 11		- 100			550	100	44 0		
1 General																									3
a. Check Obstacle around the shelter			-8	18.			31				3 - 53	%—\S	38.60	- 0	- 0,	S - 5		18		1	76	34			3
b. Check Obstacle, around the shelter						$\exists$						10 05	07 70	66	10			13							
Perform physical check of shelter inside and out, for any sign of water filtration, damage, or other deterioration						1							0.20	10							1				

Initial

<b>ACTIVITIES</b>															E	DATE	3															REMARK
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	(00000004) 1000 900 C
2 Transmitter																																
<ul> <li>a. Perform performance check as per approved form</li> </ul>	(0)						8 8 8 8					(3)		7	60 - 1 61 - 1					8 1		0 - 3 0 - 3			(6)		i y				8 - 5 8 - 3	
<ul> <li>b. Check operational equipment using backup power supply</li> </ul>					9 3							251			26:										- 89							
3 Receiver												the s		300								15 16										
<ul> <li>a. Perform performance check as per approved form</li> </ul>																																
<ul> <li>b. Check operational equipment using backup power supply</li> </ul>												- 10																				
4 Antenna							7. ×			,		- 103				-	-				-				- 723					,		
a	- 00										5 36	- 30		3 76	5					2 150		Ĭ		37 38	- 0	35						
Technician /Engineer									12																							
Chief/Supervisor																																

	ACTIVITIES	

Airport Name	18	Brand/Type	;
Site Location		Month	ž
Facility	: Communication	Year	:
F	VERY HIGH ERFOLIENCY AIR TO CROUND		

MAINTENANCE ACTIVITY	MONTH / YEAR											
	1 2	7 3	1 4 1	3 1	- 6			1 2	10			REMARK
uarterly Maintenance												
1. General	183		200	3 2	102	it it		S .		4.5	, a 18	
a. Clean all equipment thoroughly					l li							
2. Transmitter						9 3						
a. Perform Transmitter Power calibration					i ii							
b. Check VSWR			1			10	i i			50	10	
c. Measure DC level terminal with ON									1			
equipment condition												
3. Receiver		12	310	1					10		19	
a. Measure DC level terminal with ON												
equipment condition										4.5	e 18	
4 Antenna												
a									1		. 33	
emester Maintenance			-112									
1. General		40				er				2.0		
a												
2. Transmitter									8			
a. Check the coverage range by plane					- 80	3 3					8	
3. Receiver				0.00					8		85	
a					1 13				1	T .	3 3	
4 Antenna									•			
a. Perform antenna inspection												
early Maintenance				-								
1. General			200			24					10	
a. Check lightning protection and grounding			1		11				T T	T .	f	
system.												
b. Check condition of power supply cable		- 1								1		
and control cable												
2. Transmitter		- 17					•				15	
a. Check all the external connector s are										1		
securely fitted					l l							
b. Perform frequency measurement using					,	*						
frequency counter												
c. Perform a BIT Interruptive Test												
d. Perform an AC and DC Change over					19						F 39	
check (if both supplies are connected)												
3. Receiver					(8)	9 8					0.00	
a. Check all the external connector s are											11	
securely fitted												
b. perform frequency measurement using					16						100	
frequency counter												
c. Perform a BIT Interruptive Test		- 1			(8)						§ 7	
d. Perform an AC and DC Change over			1									
check (if both supplies are connected)												
4 Antenna											11	
a									5.			
Technician /Engineer												
	577				- 18							
Chlef/Supervisor			1						I	1		
9994-00000 575 500 VB	I .	1					1	1		1		

Initial

#### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name		Brand/Type	:
Site Location		Month	:
Facility	: Communication	Year	:
Equipment	: Direct Speech		

ACTIVITIES	DATE											REMARK																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Daily Maintenance											-																					
a																																
Weekly Maintenance																																
<ul> <li>a. Check the cleanliness of IPOS and indicators</li> </ul>																																
Monthly Maintenance																																
a. Check physical equipment condition																																
Quarterly Maintenance																																
<ul> <li>a. Check the connection with the related section/unit</li> </ul>																																
Technician /Engineer																																
Chief/Supervisor																																

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#### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name	<u>:</u>	Brand/Type	:
Site Location Facility	: : Communication	Month Year	-
Equipment	: Direct Speech		

MAINTENANCE ACTIVITY		MONTH / YEAR													
III-AITI EII-AITIE AUTITITI	1	2	3	4	5	6	7	8	9	10	11	12	REMARK		
Quarterly Maintenance															
<ul> <li>a. Check the connection with the related</li> </ul>															
section/unit															
Semester Maintenance															
a															
Yearly Maintenance															
a															
Technician /Engineer															
Chief/Supervisor															

Initial

#### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name	:	Brand/Type :	
Site Location	:	Month :	
Facility	: Communication	Year :	
Equipment	: Voice Recorder		

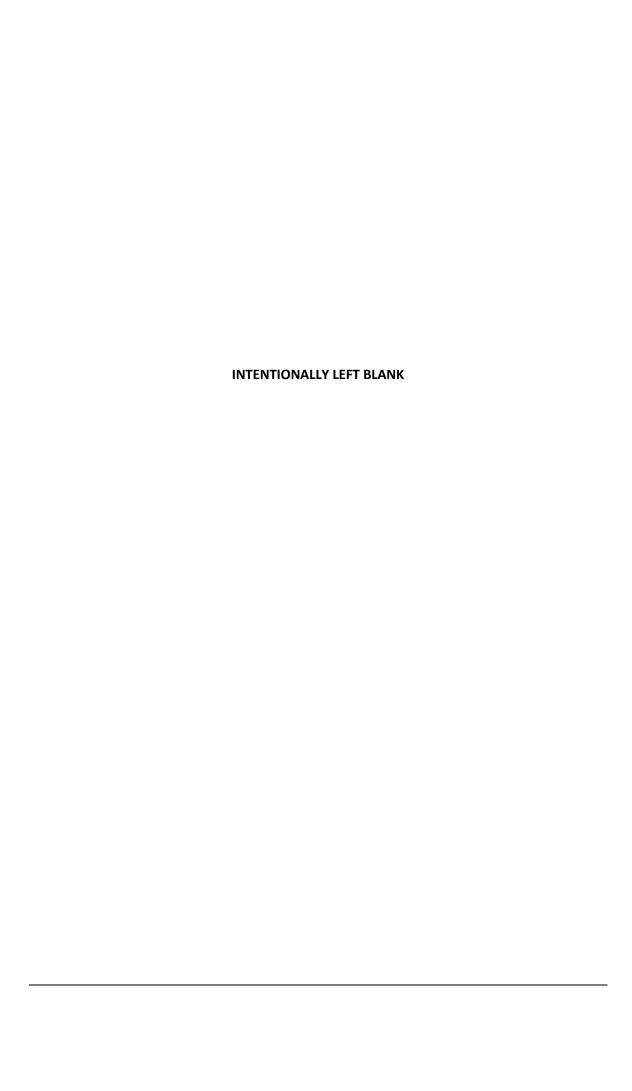
ACTIVITIES																DATE	E													П	REMARK
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21 :	22 2	3 24	25	26	27	28	29	30	31	
Daily Maintenance																															
1 General																															
a. Check the TX room temperature																															
2 Management System															_												•				
a. Check recording file													Т	П	Г						$\neg$	Т			T	Т	Т	г	П	$\neg$	
b. Check channel sttaus indicator																															
3 Work Station													$\cdots$																	+	
a. Check hardware status													Т								Т	$\neg \top$	Т	Т	Т	T	Т	$\Gamma$	ГΠ	$\neg$	
Weekly Maintenance																															
1 General																															
a. Clean the equipment room																					$\Box$	$\top$									
<ul> <li>b. Clean the equipment, unit / part of equipment or module</li> </ul>																															
c. Check main power supply												-			г		П		М	$\neg$	$\neg$	$\neg$	$\top$			T	$\top$	-	ш	$\neg$	
d. Check output UPS/backup supily												-	-		-		Н		Н	$\neg$	$\neg$	$\top$	$\top$		+	T	+	_	Н	$\neg$	
2 Management System																															
a. Check all events in the event log											Т		Т		Г					Т	Т	Т	$\top$	Т	Т	Т	Т	Г	П	$\neg$	
file											l		1		ı		ll		ll								1	ı	ΙI	- 1	
3 Work Station						-																									
<ul> <li>a. Check mouse and keyboard</li> </ul>											П		Т	П						$\neg \tau$	$\neg$	Т	$\top$	Т	Т	Т	Т	Г	П	$\neg$	
function											l		1		ı		ll		ll								1	ı	ΙI	- 1	
Monthly Maintenance													_												'	'	'	•			
1 General															_													_			
a. Check UPS's battery																				$\Box$	$\neg$	Т	T	Т		Т	Т				
2 Management System																															
a. Do hard disk data back up																					Т			T							
3 Work Station																															
a. Clean screen display													Т	П						$\Box$	$\neg$	Т	Т	T	T	T	T				
Technician /Engineer																															
Chief/Supervisor																															

Initial

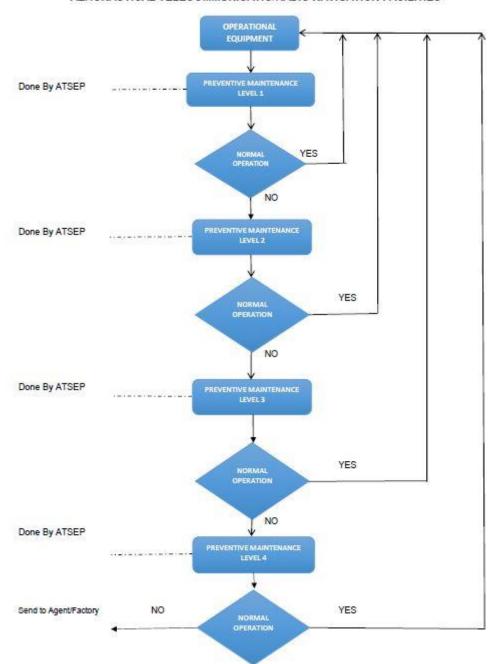
#### PREVENTIVE MAINTENANCE ACTIVITIES CHECKLIST

Airport Name	:	Brand/Type	:
Site Location	:	Month	:
Facility	: Communication	Year	:
Equipment	· VOICE BECORDER		

MAINTENANCE ACTIVITY						MONTH	I/YEAR						REM
MARTERANCE ACTION	1	2	3	4	5	6	7	8	9	10	- 11	12	
Quarterly Maintenance													
1. General													
a													
2. Management System													
<ul> <li>a. Do hard disk data cloning, if necessary</li> </ul>													
3. Work Station													
<ul> <li>a. Perform audio quality measurements of</li> </ul>													
recorded Items													
Semester Maintenance													
1. General													
a													
2. Management System													
a. Check performance of voice recorder													
software													
3. Work Station			•	•		•							
a. Check the PC function													
Yearly Maintenance			•	-									
1. General													
a													
2. Management System													
a. Check the connection from server to													
hardware													
b. Check replay function													
3. Work Station													
a. Check interconnection from server to													
hardware													
b. Perform replacement of hard disk, if													
needed													
Technician /Engineer													
•				I	l			l		I	1		
Chief/Supervisor				l				l					
-				I	l			l		I	I		



### FLOWCART PREVENTIVE MAINTENANCE AERONAUTICAL TELECOMMUNICATIO/RADIO NAVIGATION FACILITIES



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### FACILITY LOG BOOK AND ACTIVITY AERONAUTICAL TELECOMMUNICATION/RADIO NAVIGATION FACILITY

AIRPORT FACILITY EQUIPMENT MONTH

NO.	DATE &TIME	ACTIVITY/NOTE/ACTION	TECHNICIAN/ENGINEE
-0			
0)			
- 64	i s		
- 13			
- 0			
-8			
93			
- 02			
_//5			
-00			
88			*
- 115			
- 99	/8		
-%	- 1		
- 525			
- 07			
- 15			
7.2	(S		7
- 83			
99			
- 39	- 10		
-92	- 1		
03			
- 07			
10			
0.8	15		
	1		

CHIEF OF FACILITY
(Signature)
(NAME)

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#### **GUIDANCE ON EQUIPMENT EVALUATION**

#### A. Facility Reliability

Facility Reliability is the probability that the ground installation operates within the specific tolerance.

1. The following formula expresses facility reliability as a percentage:

$$R = 100 e^{-t/m}$$

#### where:

R = reliability (probability that the facility will be operative within the specified tolerances for a time t , also referred to as probability of survival, Ps );

e = base of natural logarithms;

t = time period of interest;

m = mean time between facility failures.

Reliability increases as mean time between failures (MTBF) increases. For a high degree of reliability, and for operationally significant values of  ${\bf t}$ , we must have a large MTBF; thus, MTBF is another more convenient way of expressing reliability

#### For example:

A navigation equipment has MTBF = 2000 hours, time period t = 1000 hours, then reliability R/PS of the equipment is:

R/PS = 
$$100 e^{-1000/2000} \%$$
  
=  $100 e^{-1/2} \%$   
=  $60,65 \%$ 

- 2. Factors which affect MTBF and Facility Reliability are:
  - a. Inherent equipment reliability;
  - b. Degree and type of redundancy;
  - c. Reliability of serving utilities such as power and telephone or control lines;
  - d. Degree and quality of maintenance;
  - e. Environmental factors such as temperature and humidity.

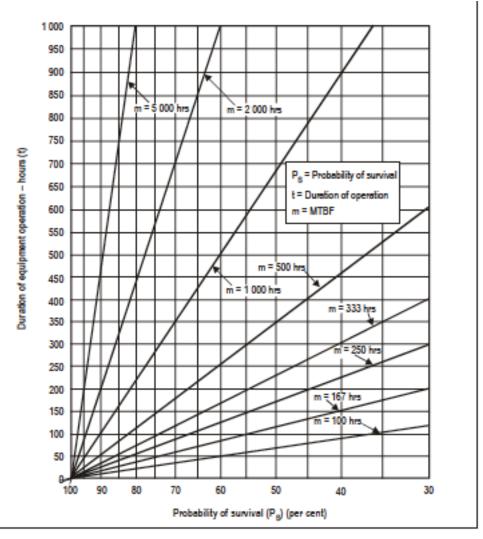


Figure - 1. Graphic Ps =  $100 e^{-t/m}$ 

#### B. Availability

1. The availability of equipment indicates the degree of readiness of an equipment or group of equipment to operate. Availability is a comparison between the actual operating time and the time of operation specified in a given period, and expressed in percent.

Expressed in the formula,

Actual operating time
$$A = \frac{\text{X 100 \%}}{\text{The specified operating time}}$$

Example: if a equipment operates normally for 700 hours from 720 hours (24 hours x 30) in a month, availability of the equipment for that month is:

$$A = \frac{700}{720} \times 100 \%$$

- 2. Factors which affect the level of equipment availability are:
  - a. facility reliability;
  - b. quick response of maintenance personnel to failure;
  - c. adequate training of maintenance personnel;
  - d. equipment design providing good component accessibility and maintainability;
  - e. efficient logistic support;
  - f. provision of adequate test equipment;
  - g. standby equipment and/or utilities
- C. Practical Aspect of reliability and availability

  The basic quantity and manner of reliability and availability measurement are indicated in Figure 2.

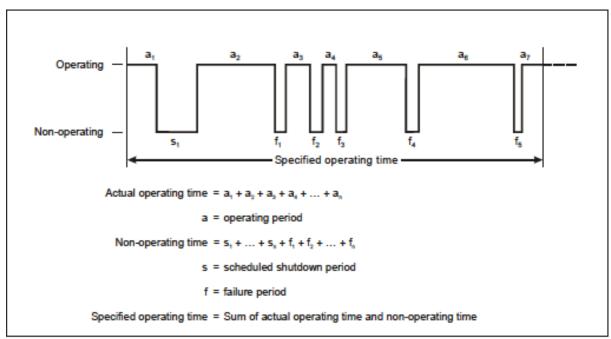


Figure 2. Evaluation of facility availability and reliability

Calculation of MTBF and Availibility
 Referred to figure 2, the calculation of the mean time between failure (MTBF) and availability (A)

#### Example:

$$= \frac{\sum_{i=1}^{7} a_i}{5}$$

$$=$$
  $\frac{5540}{5}$   $=$  1108 hours

$$\frac{\sum_{i=1}^{7} \mathbf{a}_{i} \times 100}{\sum_{i=1}^{7} \mathbf{a}_{i} + \mathbf{s}_{1} + \sum_{i=1}^{5} \mathbf{f}_{i}}$$

$$= \frac{5540}{5580} \times 100 \% = 99.3 \%$$

#### E. Calculation of Mean Time To Repair (MTTR)

MTTR = Total of time the equipment is not operating due to failure

Number of Failure

$$\begin{array}{rcl}
5 \\
\Sigma & f_i \\
i & = 1 \\
\hline
5
\end{array}$$

$$= \frac{2 \frac{1}{2} + 6 \frac{1}{4} + 3 \frac{3}{4} + 5 + 2 \frac{1}{2}}{5} = \frac{20}{5} = 4 \text{ hours}$$

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#### FACILITY PERFORMANCE MONTHLY REPORT

AIRPORT : FACILITY : MONTH/YEAR :

NO.	NO. EQUIPMENT NAME		DATE															REMARK																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	OPERATION	
3 8			-8	- 13		8—19		5-76		- 70		= %		į.	31-3		30-3	Ć.					81 8		8 - 5		8 5		8 - 33		5 %	_	5-70	į.	
0		83	- 80	32		3 83		3 0		0 07		G 07			10 1		10 8		S 0				8 8		63 - 63 0		S 0	-	3 32		S - 67		G - 67		
				-	$\dashv$			0 00 5 00		2 - 92 2 - 93		2 - 22 2 - 23			33 - 3 33 - 3		90 - 9 83 - <del>9</del>					-									2 - 92 2 - 93		2 95 2 95		
ž - 9	*		-	-,3	+	8-13	-	E-38	-	E-35	-	E-35	-3		9c=3		9.—3		61 - S		£ .	-	10-8		8-3		8-3		810	-	E-35		E-38		
9 S	8	91	8	- 13		8 - 61 8 - 61		\$ 150 5 160		\$ 88 3 72		\$ 15 5 70											10 S		8 9 8 9		8 0		8 8		\$ 100 5 100		\$ 88 \$ 76	-	
0		33	- 10	- 22	4	3 3		3 87		3 07		3 87			10 - 1		70 E				15 1	-	15 0		8 8				3 3		0.00	Н	G - 67		
-	0	- 53	-	- 53		2 0		0.00		0.00		3 93	-		10 /		50 E		03 0		100		10 N		2 3		0 0		2 9		0, 0,		0.00	1	
		3		- 85			- 5	0 - 50 11 - 10		2 30		3 30	- 3		% - :	-	© - 3	7	N - 13						E) = (%		E) = 1%				0-59 // 20	- 5	0-39	13	

Operational Color Indicator:	- Normal Operation	= 0	) /	Green Color	
	<ul> <li>Intermittent / Decrease operation</li> </ul>	= -	1	Yellow Color	
	- Failure Operation	= X	( )	Red Color	Chief of Facility
	<ul> <li>Disruption on supporting equipment</li> </ul>	= V	1	Blue Color	

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### Appendix 6A

#### LIST OF EQUIPMENT

AIRPORT : FACILITY : MONTH/YEAR :

No.	Equipment Name	Brand	Tuno	Quantity	Quantity MTBF MTTR Availability Realibility Integrity Accurac					4-0	Installation	Condition	Remark
NO.	Equipment Maine	Dialiu	Туре	Quantity	MTBF	MTTR	Availability	Realibility	Integrity	Accuracy	Year	(%)	Remark
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		8			ğ				Ž.	\$			
			2.		50 93			6		.0			2

NOTE: Condition (%) = (1-age of equipment in years/15)X100%

Chief of Facility

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### Appendix 6B

#### LIST OF CORRECTIVE MAINTENANCE ACTIVITY

AIRPORT : FACILITY : YEAR :

NO.	EQUIPMENT NAME	FAILURE CATEGORY PART NAME		ACTION	DATE/TIME	DATE/TIME	TOTAL FAILURE HOURS	REMARK
IVO.	EQUIPMENT NAME	CATEGORY	PART NAME	ACTION	FAILURE	COMPLETION	FAILURE HOURS	KEWAKK
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 30	 

CHIEF OF FACILITY

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### Appendix 6C.

#### FAILURE AND CURECTIVE ACTION REPORT

DESCRIPTION			DATA			
Date/Month/Year						
Location/Site Name			- 20 - 170			77
Facility						
Equipment Name						
Part Of Equipment Name						
Fallure Category						
Fallure Description	<del>1</del>					
Corrective Action		Ву	SITE		FACTOR	RY
Corrective Action		Ву	SITE		FACTOR	RY
Corrective Action  Cause of Failure		Ву	SITE		FACTOR	RY
		Ву	SITE	Problem Co	3000000	ev .
Cause of Fallure  Date of Fallure	nplete	By	SITE		3000000	RY
Cause of Fallure  Date of Fallure  Time of Fallure  Date of Corrective Action	nplete	By	SITE		3000000	RY
Cause of Fallure  Date of Fallure  Time of Fallure  Date of Corrective Action  Time of Corrective Action Cor	npiete	Ву	SITE		3000000	RY
Cause of Fallure  Date of Fallure  Time of Fallure  Date of Corrective Action  Time of Corrective Action Corr  Total Fallure Hours	nplete	By	SITE	Problem Co	nde .	RY
Cause of Fallure  Date of Fallure  Time of Fallure  Date of Corrective Action  Time of Corrective Action Cor  Total Fallure Hours  Problem Code	TVI	Ву	SITE	Problem Co	ode .	