STATION CNS MANUAL

KANGRA AIRPORT

01 Edition – 2024

भारतीय विमानपत्तन प्राधिकरण

AIRPORTS AUTHORITY OF INDIA

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FOREWORD

Airports Authority of India provides Aeronautical Telecommunication Services in accordance with ICAO Annex 10 to the Chicago Convention. These services include Aeronautical Fixed Services, Aeronautical Mobile Services, Aeronautical Radio Navigation Services and Aeronautical Broadcasting Services. In order to achieve the objective of Aeronautical Telecommunication Services need has been felt to specify procedures, guidance and information for uniform implementation throughout India and to ensure safety of air navigation. This manual provides station specific information related to Communication, Navigation and Surveillance Services for KANGRA AIRPORT.

The Purpose of this document is to establish procedures, provide information and guidelines which are essential for the provision of safe and efficient Aeronautical Telecommunication Services being provided by Airports Authority of India. It is published for use and guidance of CNS personnel.

The CNS in-charge, Kangra Airport will ensure that the provision of Aeronautical Telecommunication services under his jurisdiction comply with the processes, procedures and guidelines contained in this manual. Whenever there is difference between guidance, procedures and information provided by Regulatory authority and mentioned in this document, guidance and information provided by regulatory authority will prevail.

The personnel engaged in the Operation and Maintenance Management of Aeronautical Telecommunication Services at Kangra Airport are advised to comply with the standards and procedures given in this manual for ensuring safety in the airspace under their jurisdiction.

Shani Anchal
Senior Manager (CNS)
(CNS In Charge)
Kangra Airport

PREFACE

1. The Station CNS Manual is prepared and maintained by CNS In-charge, Kangra on behalf of the Airports Authority of India for the use and guidance of CNS executives and staff of Aeronautical Communication Station (ACS) Kangra. The Manual provides processes, procedures and instructions that are essential for the provision of safe and efficient Aeronautical Telecommunication services at ACS Kangra.

2. Regulatory requirement for Station CNS Manual:-

(i) As per DGCA, Air Space and Air Navigation Services Standard Advisory Circular no 03 of 2017 - Guidelines to CNS service provider for job descriptions and maintenance of training records for its technical staff, the CNS service provider shall develop a CNS Manual to demonstrate compliance with the requirements of the CAR Section 9 Series D Part I to part VI. It will also serves as a reference document with respect to the standards, conditions and level of service to be maintained for the aeronautical telecommunication services in accordance with the Civil Aviation Requirements (CARs).

(ii) As per Aircraft Rules 1937, (amended vide GSR No 31 [E] Dated 14/01/2015), Rule 122, each station shall have a Station CNS/ATM Manual prepared as per the Schedule IV, item 2 of the rules.

3. Accordingly, this Manual has been developed as a part of comprehensive documentation of the Aeronautical Telecommunication procedures, processes and facilities supporting conformance to organizational requirements and compliance with National Regulations and Standards & Recommended Practices of ICAO Annex 10, DOC 8071 and other ICAO documents relevant to the provision of Aeronautical Telecommunication Services at the station.

4. This Manual should be read in conjunction with the following: -

a) DGCA Civil Aviation Requirement [CAR] Section-9 Air Space and Air Navigation Services Standards, Series D NAVIGATION, LANDING AND COMMUNICATION AIDS, Section -5 Air Safety and other relevant CARs.

b) AAI CNS Manuals Vol. I to Vol. IX;
c) ANS Procurement Manual; Manual for Procurement of Goods and Services 2018.
d) ICAO Annex 10 (Volume I to V)-Aeronautical Telecommunication Services;
e) ICAO Annex 11 – Air Traffic Services;
f) ICAO Annex 15 – Aeronautical Information Services;
g) ICAO Annex 19 – Safety Management;
h) Doc. 8071 Vol. I - Flight Inspection Procedures for Navigation Aids;
i) Doc 8071 Vol. III - Flight Inspection Procedures for Surveillance system;
j) Doc 8126-Aeronautical Information Services Manual;
k) Doc 9683-Human Factor Training Manual;
l) Doc 9734-Safety Oversight Manual;
m) If the station is having ASMGCS operational at the station, the Doc 9830 will be applicable.

5. It is to be recognized that in the challenging aviation safety environment, necessary amendments may have to be effected in this Manual due to the following reasons:

a) Changes/ amendments to ICAO Annexes/ Documents.
b) Changes/ introduction of DGCA Civil Aviation Requirements (CARs)
c) Introduction of new CNS facilities at the station.
d) Requirements from ATS, Airlines or any other concerned agency.
e) Change in ATS, COM and MET watch hours
f) Change in details of personnel due to annual transfers or otherwise.
g) Introduction of new/revised operational instructions/CNS circular

It is intended to keep this Manual up to date. Future editions of the Manual will most likely be improved on the basis of experience gained and of comments & suggestions received from the users of this Manual. Views, comments & suggestions for improvement of this edition, may be sent to the CNS In charge, ACS Kangra.

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Record of Amendments

S.No.	Amendment Date	Incorporated on	Incorporated by

TABLE OF CONTENTS

CHAPTER: 1

Document Identification and Control

Document Identification and Control

1 Title:

1.1 This document is identified as Station Communication, Navigational and Surveillance (CNS) Manual for Kangra Airport.

2 Purposes:

2.1 Purpose of this document is to establish CNS procedures and to provide information and instructions pertaining to CNS facilities, which are essential for the provision of safe and efficient air traffic services by Airports Authority of India. It is published for use and guidance of its CNS Maintenance and operational personnel.

2.2 The CNS in-charge of the station will ensure that the processes, procedures and instructions contained in this manual for the provision of CNS facilities are strictly complied with by all concerned. It is mandatory for the CNS personal of Kangra Airport to read, familiarize and follow the provisions contained in this manual within one month after being posted at the station.

3 Responsibility for documentation, review, amendments and publication:

3.1 The Executive Director (CNS-OM) is responsible for the initial approval of station CNS-Manual.

3.2 Thereafter, CNS InCharge, AAI, ACS Kangra is responsible for development, review and amendments of Station CNS Manual. He will ensure that the provision of CNS facilities as detailed in this manual are in conformity with Standards and Recommended Practices (SARPs) given in the Annexes to Convention on International Civil Aviation and National regulations and other internal guidelines instructions issued from time to time.

He shall ensure periodic review, update the information and issue amendments, whenever, it requires due to any change in the information/procedures/instructions contained in the manual necessitating the amendment or for further development of the manual so as to make it a comprehensive reference for the station CNS personnel.

4 Effective Date:

4.1 Effective date of an instruction is indicated at the footer of the page.

4.2 New edition if any is to be indicated on the front page as well as the effective date is to be indicated in the footer appropriately. Brief details of new edition and changes must be mentioned in the Record of Amendments.

5. Change History:

5.1 This is version 1 of Station CNS Manual ACS Kangra. Changes are indicated on 'Record of Amendments' page.

5.2 Amendments – documentation being inserted in the manual must contain header and footers that are consistent with those given in this document.

6. Control of the manual:

6.1 The CNS In-charge, ACS Kangra will control this Manual.

7 Distribution of the Manual:

7.1 The CNS In-charge, ACS Kangra may produce hard copies and control the distribution of these Copies, as deemed appropriate.

8 Master Copy:

8.1 An electronic and a hard master copy of each chapter contained in the Manual will be held and maintained by the CNS In-charge, ACS Kangra.

9 Checking Currency of Manual:

9.1 A current copy of the Manual will be published on Airports Authority of India web site www.aai.aero => Emp Login => Circular & Order (Double click) =>check Manuals only =>Dept (CNS-OM)-+ check all 3 option =>search and on AAI-AIM web link. https://aim-india.aai.aero =>Documents (click)>Restricted Documents (click) =>login (with AAI email address and password-only for registered user) =>CNS Manuals (Click).

In order that instructions/guidelines pertaining to CNS/ATM facilities are implemented in a timely manner all CNS-In charges are advised to visit AAI website and AAI AIM website https://aim-india.aai.aero on regular basis to keep themselves update on policy/guidelines for smooth functioning.

10 Enquiries

10.1 Enquiries/Clarifications should be addressed to:

CNS In charge,
Airports Authority of India,
O/o Airport Director,AAI
Kangra Airport
GAGGAL,
H.P.-176209
Telephone: 01892-233430
FAX: 01892-233430
Email: cnsicvigg@aai.aero

CHAPTER: 2

GENERAL

GENERAL

1. Brief Description of Kangra

- Kangra is a city and a municipal council in Kangra district in the Indian state of Himachal Pradesh. It is also known as Nagarkot.

- According to the 2011 census Kangra district had population of 1,510,075. The district has a population density of 263 inhabitants per square kilometre (680/sq mi). Kangra district has a sex ratio of 1012 females per 1000 males and a literacy rate of 85.67%. Scheduled Castes and Scheduled Tribes made up 21.15% and 5.60% of the population respectively.

- The native people are the Kangri people and the native language is Kangri, which is very similar to Dogri. The majority of the people are Hindu, although many Tibetans and others who follow Buddhism have also settled here recently. There are also other minorities such as Sikhs, Muslims, and Christians.
- Jhamakda is a folk dance of Kangra. It is exclusively performed by women. It features percussion instruments and songs

2. TOURIST ATTRACTION

- The Kangra Fort is also a popular tourist attraction. It is one of the oldest forts in India as well as the oldest in Himachal Pradesh.
- It is the home of Masroor Rock Cut Temple built by the Pandavas, also known as Himalayan Pyramids and wonder of the world for being likely contender for the UNESCO World Heritage Site.
- Many ancient temples such as the Jawalaji, Chamunda Devi temple, Chintapurni temple, Baba Baroh and Baijnath temple are located here.
- Mcleodganj near Dharamshala is the home-in-exile to the Dalai Lama. The Bhagsunag Temple is located there. The Himachal Pradesh Cricket Association Stadium in Dharamshala is also an attraction because

of its location in front of the snow-capped mountains and is the highest altitude international cricket ground in the world.

Technical Site Data of ACS VIGG:

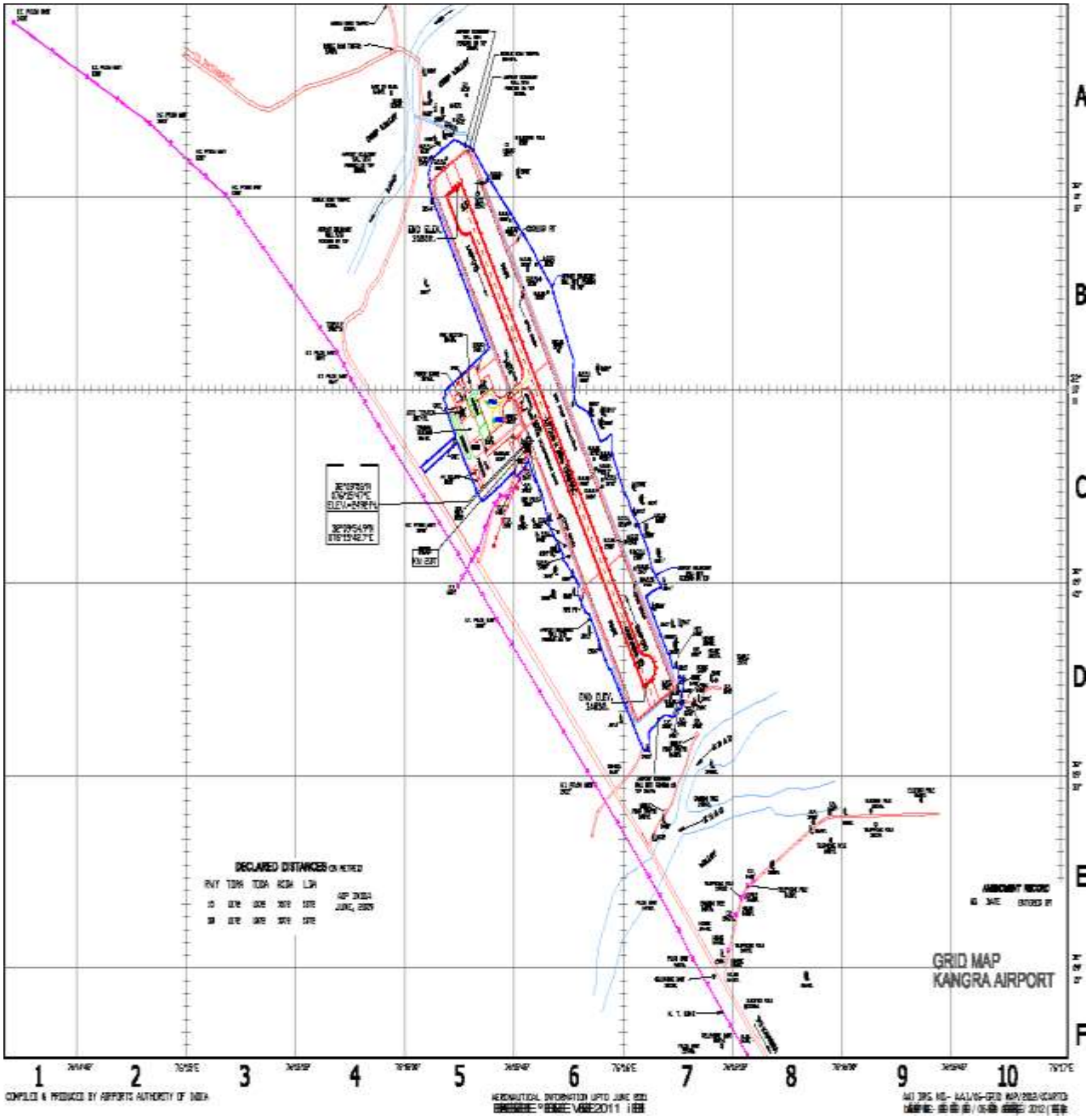
Name of Airport	Kangra Airport, Kangra (H.P) ICAO Code: - VIGG
The Location of the Aerodrome	Kangra, 14 Km SW from Dharamshala
Geographical Coordinates (WGS –84) of A.R.P.	32º 09' 53.05" N, 076º 15' 43.76"E
Aerodrome Reference Point (ARP) Elevation	760.171 M (2494 Ft)
Aerodrome Elevation	770.23M (2527 Ft)
Name of the Aerodrome Operator and the address and telephone numbers at which the aerodrome operator may be contacted at all times.	Airport Director, Airports Authority of India Kangra Airport, Kangra (H.P) – 176209 Telephone: 01892 –293840 (Office) MOBILE: 76500-02233 E-mail:- apd_kangra@aai.aero

How to get here

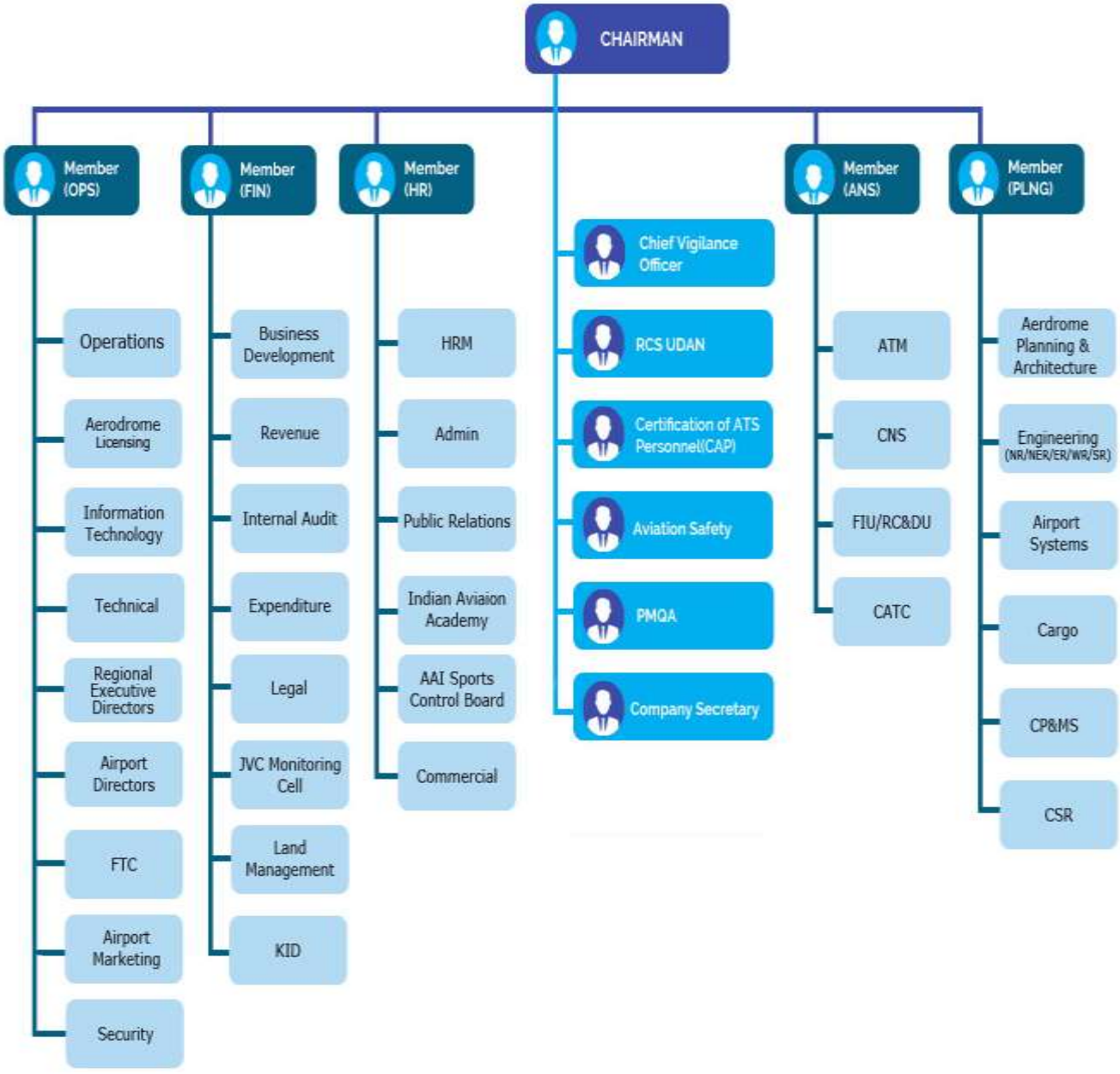
- Kangra Airport (IATA airport code DHM) is 10 km to the city's north. It is served by Kangra Valley Railway line from Pathankot 94 km away. It is connected by road with other cities in Himachal Pradesh and India. It is 450 km from Delhi, 36 km from Palampur and 15 km from Dharamshala, 220 km from Chandigarh.

- Spice jet, Alliance Air and Indigo Flights are available from New Delhi. Alliance Air Flight is also available from Shimla & Chandigarh.

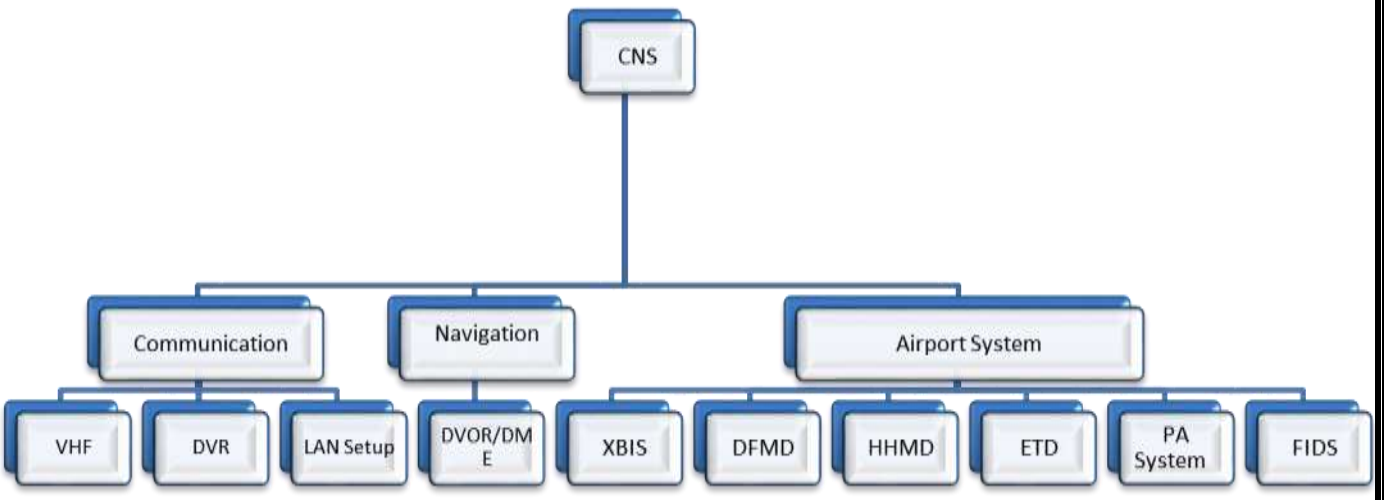
GRID MAP OF KANGRA AIRPORT



AAI ORGANISATION SET UP



CNS ORGANIZATION SET UP



CNS Circular 04 of 2018

File Reference No:- E5083/NM-18020/1/2015-CNS-O&M

Subject: Standard Operating Procedure [SOP] for "Opening" and "Closing" of Watch from CNS point of view.

1. Introduction:-

1.1 In the past, Court of Inquiry for Mangalore crash in its recommendation on "SOP on Watch Hours" has recommended that:-

Quote

"Para 4.2.1 SOP on Watch Hours

There is a need for AAI to bring out SOP on actions to be completed prior to opening the 'Watch Hours' at all Airports. The procedure should clearly bring out various activities which need to be completed prior to declaring an airfield 'operational' viz timely manning of Air Traffic Control Tower after having carried out inspection of runway, **communications** and other facilities including readiness of crash and fire tenders.

It is recommended that after completion of inspection, the ATC Tower Controller takes his position at least 30 minutes prior to opening of watch hours."

Unquote

1.2 It is therefore essential that at Airports (including Civil Enclaves) which have limited "Hours of Operations", CNS/ATM facilities are switched on and stabilised well before start of operations at the Airport. It is also required that when the "Watch" closes at such Airports, it is ensured that there is no watch extension and facilities are shutdown/switched off in an orderly manner so as to achieve maximum availability of facility.

1.3 It is therefore advised that all such airports which have limited "Hours of Operations" shall formulate a SOP on action to be completed prior to opening and closing of Watch Hours.

1.4 The "Hours of Operations" for Airports (including Civil Enclaves) are notified by suitable Notam taken in this regard. Updated information in this regard should be available with all concerned.

2. Purpose:-

2.1 The purpose of this CNS Circular is to issue guidelines and instructions for "Opening" and "Closing" of watch from CNS facility operational point of view at all Airports (including Civil Enclaves) where hours of operations are limited.

3. Scope :-

3.1 This CNS Circular is applicable to CNS units at all Airports (including Civil Enclaves) of Airports Authority of India.

4. Preparation of station level Standard Operating Procedure [SOP] for opening and closing watch.

4.1 It is required that for complying with the above recommendations on the subject a station level SOP be prepared and implemented by all the field station which has limited watch hours operation.. The SOP is to be approved by the respective GM (CNS-Region). The SOP shall be part of Station CNS Manual. The general guidelines for preparing the SOP are as given under:-

4.1.1 Opening of the Watch:-

The watch shall be opened minimum 30 minutes before the schedule time as notified in the Notam, so that all necessary actions listed below are are taken before the start of operations at the airport:-

A. Equipment Room:

(i) Check and record the status of Main and Standby Power Supply.
(ii) Check and record the status of UPS backup power supply.
(iii) Check and record status of VHF TXs/RXs including portable sets (Manpack)/ VCCS /DVTR /DATIS /RCAG /DSCN /EPBAX /Hotlines etc. for proper functioning of the available equipment/ facility.

B. Nav Aids [ILS, VOR, DME, NDB/Locators]

(i) Switch on the ILS/ VOR/ DME/ NDB/Locators by using the RCUs (Remote Control Unit). In case the RCU is not installed/not functional due to any constraint/reason, site is to be visited by duty personnel.
(ii) Check and record the status of ILS/ VOR/ DME/ NDB/ locator on RCUs. Status of all available Navaids should also be checked in Tower.
(iii) Equipment site has to be visited for general check up of equipment, power supply and air conditioning before/after opening of watch.

(iv) In the case of VOR/ DME (HP), as far as practicable, power supply system to equipment may be kept 'ON' on H- 24 basis irrespective of watch hours of station. After watch hours, R.F. radiation may be switched 'OFF' from remote and switched 'ON' minimum 30 minutes prior to commencement of watch hours to enable stabilization of radiated parameters. (Refer CNS Circular No. 7 of 2004)

C. Communication Facilities

(i) For AMSS operation check up, send LR/ LS message.
(ii) Wait for some time for the acknowledgment message of go ahead traffic and then resume the normal operation of traffic.
(iii) All the data circuits to be checked.
(v) All the Hotlines/telephone lines provided in operational area to be checked.
(vi) If any data circuit /Telephone/Hot line is down, then complaint is to be lodged with service provider.

Note : Wherever it is required that advance Meteorological information is required to be passed, AMSS can be made operational accordingly. Suitable coordination shall be made with Meteorological department in this regard.

D. ATM Automation System:-

(i) Check and record the status of Main and Standby Servers/LAN etc.
(ii) Check and record the status of UPS backup power supply.
(ii) Check and record status of Controller Working Positions.
(iii) Check and record status of Data Recording Facility.
(iv) Check that Surveillance Sensor input and other Data inputs being received and processed by the system.

E. Airports Systems:-

(i) Check and Record status of all Security Systems Viz. HHMD, DFMD and XBIS etc.
(ii) Check and Record status of S-CCTV Systems, FIDS and PA System.
(iii) Check that all the UPS and other power backup for systems are working normal

F. Facilities operational on 24 Hours Basis at limited watch hours airport:

In case at Limited watch Hour Airport, some of the CNS facilities (viz. DVOR/DME, Radar and VHF RCAG etc)are being operated on H-24 basis, the SOP may be prepared for handing/ taking over of

charge by shift personnel so that periodic health check of all equipments and facilities is further ensured at airports.

4.1.2 Closing the Watch:-

The watch shall be closed 30 minutes after the last flight schedule departure time at the airport. Before switching off/shutting down the facilities, it is to be ensured that there is no watch extension. Information regarding watch hour extension is required to be confirmed from ATC or any other station specific guidelines issued on the subject. After the schedule, facilities are to be shut down in a proper manner as prescribed in the Technical and Operations Manual of the facility.

Note : Wherever it is required that Meteorological information is required to be passed after closing of watch, AMSS can continue operational accordingly. Suitable coordination shall be made with Meteorological department in this regard.

5. Queries:-

5.1 Any queries or further guidance on the contents of this CNS Circular should be referred to:-

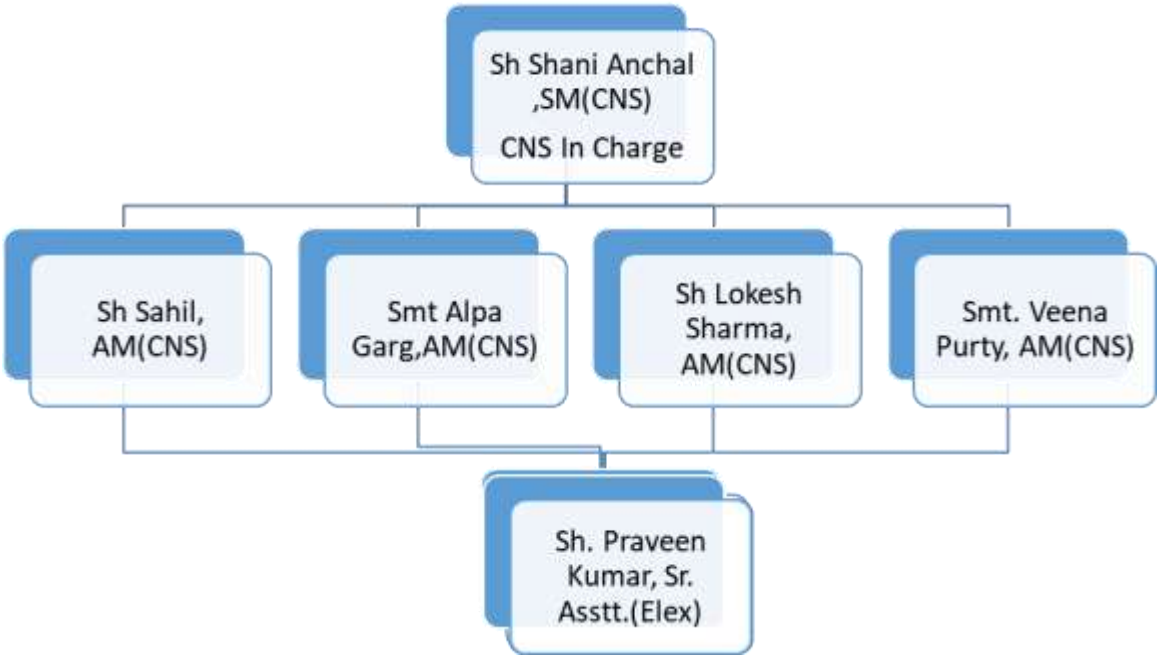
Executive Director [CNS-OM]
Airports Authority of India
Rajiv Gandhi Bhavan, Safdarjung Airport
New Delhi – 110003
Email : edcom@aai.aero

6. Validity :-

6.1 This CNS Circular shall remain in force until further notice.
6.2 This CNS Circular supersedes CNS Circular 02 of 2011.

[A K Banerjee]
Executive Director [CNS-OM]

Organizational Structure, Functions & Responsibilities



BRIEF DESCRIPTION / ROLE OF CNS DEPARTMENT

1. To provide uninterrupted VHF Communication for ATC contact on R/T with the Aircraft in flight /on Ground etc , Navigation and Surveillance (CNS) facilities viz DVOR and DME providing Direction and Distance information for operation of aircraft in accordance with ICAO standards and recommended practices.

2. To record the VHF communications and other provided channel and preserve the record for investigation and analysis as statutory requirement of DGCA/ICAO.

3. SCCTV Surveillance of Air side, Terminal Building and City side of the Airport.

4. To maintain and provide services of Security Equipment's namely X-Ray Baggage systems (XBIS), Hand Held Metal Detectors (HHMD) and Door Frame Metal Detectors (DFMD) and Explosive trace detector (ETD).

5. To provide and maintain inter-unit communication facility i.e. Electronic Private Automatic Exchange Board (EPABX), Walkie Talkie Sets.

6. To maintain the Computer systems including peripherals like printers, UPS etc. provided in various sections connected as standalone as well as on Local Area Network (LAN) and Biometric access control system.

7. To maintain the passenger facilitation systems like Public Address (PA) system & FIDS (Flight Display Information System).

8. To co-ordinate with telephone service providers (BSNL) for provision and smooth functioningof HOT LINES

Standard operating procedure to be followed in case of emergencies/abnormal situation like fire, RCF, etc.

1. TERMINAL BUILDING EMERGENCY

This emergency is for safe evacuation of the passengers/AAI staff/ Airlines and its subsidiaries staff and other personals (if any) working/present in terminal building and other working areas, in case of any exigencies leading to the threat of their safety. It also includes the safety of property/infrastructure/installations of Terminal Building and operational area.

The Airport Director, Kangra Airport has overall responsibility for establishing a plan. This plan involves dealing with all types of aircraft emergencies (other than bomb threat& hijacking) being:

Crash in the Airport and its vicinity

a. Local Standby/Full emergency.
b. Fire incident in Terminal Building/operational area
c. Maintain AHCR with all the communication facilities VIZ VHF Transceiver, walkie talkie and base station, Fax, STD telephone, hotlines with city Fire and PCR for effective communication with outside world.

AIRPORT EMERGENCY COMMITTEE

1)	Airport Director	Chief coordinator
2)	In-charge (ATM)	Member
3)	In–charge, (CNS)	Member

4)	CASO (Airport Security)	Member
5)	Airlines Representative	Member
6)	In charge of Airport fire services	Member
7)	Representative of Fortis Hospital, Kangra	Member
8)	City fire brigade/ Gaggal fire station	Member
9)	Representative from Local Police Station	Member
10)	In- Charge, Engg. (Civil)	Member
11)	In- Charge, Engg. (Elect.)	Member

Media Management is under the Airport Director only. He is the official spokesperson of Kangra Airport.

STANDARD OPERATING PROCEDURE

Airport emergencies are classified into four major categories:

1) Airport emergency due incident/accident of aircraft.
2) Emergency due radio communication failure.
3) Airport emergency due to unlawful interference or hijack of aircraft.
4) Emergency due to Airport Building Fire.

AIRPORT EMERGENCY IN CASE OF AIRCRAFT ACCIDENT

Aircraft accident may occur:

Within the airport premises, or outside the airport designated area. When an aircraft accident occur within the airport premises, the following crash action shall be taken by the DUTY OFFICER (ATC)

IMMEDIATE ACTION IN CASE OF CRASH

1. Press Crash Fire Siren for 15 Secs.

2. Press Crash Fire bell installed in Fire Station.

3. Inform Airport fire station on walkie talkie by using phraseology "AIRCRAFT ACCIDENT, AIRCRAFT CALL SIGN, TYPE OF AIRCRAFT, PLACE OF CRASH WITH GRID POSITION, PERSONS ON BOARD, ENDURANCE, PROCEED IMMEDIATELY. REPORT FROM SITE."

Followed by these actions, the duty officer shall inform:

- A forward command post shall be established with one representative from airport security/police, hospital, and fire station.
- The forward command post shall place a triage for segregating the injured persons. The
- fire-in-charge shall inform City Fire brigade.
- The officer-in-charge, CNS shall coordinate with BSNL for arranging necessary communication facilities and initiating NOTAM action pertaining to failure of Communication facilities. CNS wing shall immediately restore /provide alternate communication facility for effective rescue work.
- The airport emergency committee shall be convened with Airport Director as its headand shall interact with media.

RESPONSIBILITY OF INCHARGE (CNS):

- He shall be the chief coordinator for establishing communication facilities with different agencies during aerodrome emergency.
- He shall provide the required walkie-talkie set to the concerned agencies as a mode of communication.
- He shall coordinate with BSNL for setting up a control room for communication.

Air Traffic Incidents: - ATS units should use Air Traffic Incident form developed byICAO for recording and reporting an air traffic incident.

PRESERVATION OF TAPES, ATS MESSAGES AND DOCUMENTS:-

The following documents shall be preserved for investigation:

1. ATS Tapes of VHF and telephonic communications.
2. Log books
3. Flight messages
4. Meteorological reports and forecasts
5. Technical statements concerning the operating status of equipment.
6. CCTV footage

Tape transcript of relevant radio / intercom / telephone communication, as applicable, shall be brought on record as evidence and the tapes preserved until completion of investigation by the DGCA.

The recorded evidence relevant to the incident together with the report of preliminary investigation by CNS in-charge shall be forwarded to the GM (CNS NR) for examination of records and immediate remedial action pending further investigation by DGCA.

SOP for Radio Communication Failure:

1. In case of radio communication failure due Ground VHF TX/RX failure .The CNS shift duty officer immediately reaches ATC control tower to guide the ATCO to use the alternate available VHF Transceiver set in control tower on the designated tower

Frequency .This co-ordination with ATCO on duty may be accomplished through communication over intercom facility. The VHF Transceiver is maintained in operational condition all the time.

2. Duty officer CNS immediately in forms CNS In-Charge regarding the incident.

3. The Duty officer CNS starts fault finding exercise to restore the failed equipment.

4. If the time elapsed is more than half an hour appropriate NOTAM action may also be initiated.

5. SMU may be contacted for remedial replacement of the equipment.

BUILDING EVACUATION PLAN FOR KANGRA AIRPORT:

The objective of the plan is that, in case of any danger like fire, bomb threat etc, there shall not be panic and the passengers along with the staff working in Terminal building evacuate the building escapes the building in a systematic way. To ensure that terminal building is equipped with:

- PA system
- Illuminated exit way signage.
- Serviceable fire extinguishers at different places maintained by the Fire station.Fire sensors.

In case of fire, the affected area of the building needs to be evacuated systematically and expeditiously. Fire in the building may be extinguished by the help of extinguishers or help of fire staff using the hydrants, CFT etc. The electrical power supply in the affected area should be cut off. Use smoke extractor in case of heavy smoke. After fire is under control, assess the loss and made proper log entry in the regardand inform all concerned.

In case of bomb threat, the building needs to be evacuated systematically and expeditiously. All passengers and staff needs to be away from the building at a safe distance. The CASO, CISF along with the representative of AAI and Airline will physically search the whole area with the help of the sniffer dog of CISF, to check the presence of any reported threat. In case something suspicious is found, the BDDS shouldbe called immediately and they will take over the area, sanitize the building or do necessary action. If nothing is found, the terminal building is called safe and the use of the terminal building is started. Then make a proper log entry in the regard and informall concerned.

In Case of building fire or Bomb threat, the following are the evacuation plan at Kangra airport. The terminal building is mainly divided in two parts:

1. Operational Block
2. Administrative Block

01. Operational block is divided as follows:
   i) Departure hall
   ii) Security hold area
   iii) Arrival Hall

Entrance gate from city side: There are two main entrance gates from city side. One is available at departure hall and another at arrival hall.
Entrance gate opening towards air side:

- Between security hold and apron Between apron and the arrival hall.
- Operational gate in front of the APD office.
- Baggage's make up area.

Terminal building is inter-connected with departure hall, Arrival Hall & Security holdarea by providing glass door separating each other.

Evacuation plan for Departure Hall: In want of evacuation, passengers in the departure hall shall be transferred to city side using the departure gate which opens in the City sideor if the said gate is inaccessible, they shall be transferred to arrival hall through the gate separating Departure & Arrival hall. Then they can be sent to the city side using the gate between Arrival Area & city side area.

Evacuation plan for Arrival Hall: In want of evacuation, passengers in the arrival hall shall be transferred to city side using the arrival gate which opens in the City side or if the said gate is inaccessible, they shall be transferred to departure hall through the gate

separating Departure & Arrival hall. Then they can be sent to the city side using the gate between Departure Area & city side area.

Evacuation plan for security hold area: In case of want of evacuation in case of security hold area passengers can be taken to air side by opening main gate of security hold area.

In case of fire, they can be taken to the Arrival Hall by opening main gate available at airside & then to city side by opening arrival main gate. In case of bomb threat, they shall be kept in the apron away from the terminal building and runway. A CISF staff shall be deployed to escort them so that they don't venture in the operational area.

Administrative Block is a multi-storied block.

In want of evacuation, ATM/CNS/Electrical/Civil wing will use staircase 03 feet wide to vacate their respective premises.

In case of fire, they will use the departure gate to leave the building to city side. If the gate is inaccessible, they will use the separation glass door in front of APD office to move to air side. In case of bomb threat, they will use the separation glass door in front of APD office to move to air side.

In operational area, they shall be kept in the apron away from the terminal building and runway. A CISF staff shall be deployed to escort them so that they don't venture in the operational area.

Ground floor: Airport Director office, Admin office will use the plan as said above. They need not use the staircase as they are on ground floor.

CHAPTER: 3

REQUIREMENT OF PERSONNEL

REQUIREMENT OF PERSONNEL

3.1: Detail of CNS personnel at station and deployment

S.No	Name of Executive	Designation	EMP. No.
1.	Shani Anchal	Senior Manager(CNS)	10012880
2.	Sahil	Assistant Manager (Elex.)	10018041
3	Alpa Garg	Assistant Manager (Elex.)	10018055
4	Lokesh Sharma	Assistant Manager (Elex.)	10019743
5	Veena Purty	Assistant Manager (Elex.)	10009065
6	Praveen Kumar	Senior Assistant (Elex.)	10024342

3.2

(i) Title:- CNS in charge

(ii) Job Summary: - Supervision of preventive and break down maintenance of CNS/ATM system facilities, Airport Security equipment's and associated facilities of Aeronautical Communication Station/ Airport, timely procurement of spares, working out training requirement of CNS personnel's working under him for training at regional training center (RTC) and CATC and submission of same to Regional Headquarter, carry out associated administrative function and financial activities etc.

(iii) Duties and Responsibilities:

-Maintenance

- To ensure availability of Preventive maintenance schedules of CNS and Airport Security equipment's installed at the ACS/Airport and CNS circulars issued from time to time to the units;
- To ensure availability of relevant ICAO Annex and documents ACS/airport;
- Responsible for smooth and uninterrupted operation of CNS facilities.

- Responsible for sending various technical returns as required by RHQ/CHQ.
- Projecting requirement of spares for the equipment/systems for their respective unit for procurement action either through local purchase or through RHQ/CHQ.
- To ensure execution of prescribed preventive maintenance schedules i.e. daily, weekly, monthly, quarterly, half yearly and annual as applicable and make necessary entries in the records .
- Execution of special maintenance schedule i.e. preflight checks and pre-monsoon checks.
- Verification of logbook, maintenance schedules entries.
- Handling all correspondence related to the respective unit with internal as wellas external agencies.
- Ensuring proper environmental conditions at the site where facilities are installed. These conditions include temperature, dust free environment, humidity control, and maintenance of sensitive and critical area around the
- facility.
- Coordination with Civil / Electrical Engineering wing for maintaining proper environmental conditions and provision of Electrical Power Backup supply.
- Write off action of the obsolete and beyond economic repair equipment/ parts.
- Ensure timely payment of Telephone bills

Training:

- To nominate CNS personnel for training in CATC/RTC as per approved training calendar.

Administrative function

- Conducts interactive meeting with staff once every month and take follow up action to implement actionable points of the minutes of meeting.
- To inspect ACS /Airport as and when required and to advise/take remedialaction on the shortcomings noticed during inspection.
- Takes actions to promote harmonious relation among the employee.

- Takes administrative action to maintain discipline.

Financial Activities

- Takes actions for preparation of proposals which are beyond his powers and forward to superior authorities for obtaining expeditious approval.

- Follow vigilance guidelines and promote culture of honesty and transparency in discharging official functions.

Additional works

Carry out additional works assigned to him by superior authorities.

(iv) Accountability

He is accountable to Airport Director/Airport controller.

3.3

(i) Title :-Assistant Manager (DVOR/DME/VHF Communication system/SecurityEquipments) :-

(ii) Job Summary: - Carrying out preventive and break down maintenance of DVOR/DME, VHF Communication system**,** Security Equipments and other associated systems, keeping maintenance record, coordinating with other agencies for smooth functioning of DVOR/DME,VHF and carry out associated administrative functions and any other works assigned to him.

(iii) Duties and responsibilities:-

- Maintenance of DVOR/HPDME and VHF communication System.
- Maintenance of RCSI, SI and Status indicator of DVOR.
- Maintenance of UPS, Equipment Battery, Earthing System of DVOR and HPDME.
- Maintenance of SCCTV System ANS site CCTV system and FIDS system. CNS Store Management and AMC.
- Verification and timely billing of BSNL Telephone.

- Maintenance of DFMDs, HHMDs and Walkie Talkies
- Maintenance of EPABX and intercom telephones.

- Maintenance of CNS facilities installed at AHCR.
- Documentation like preparing CNS Manual, Road Map of CNS etc.
- Imprest Management.
- Preventive Maintenance of DVR.
- Preparation and transmission of Daily and weekly Communication report.
- PreMonsoon Check of Equipment room and EPABX Room Facilities.
- Maintenance of XBIS and PA system.
- Maintenance of CNS facilities installed at ATC tower.
- Pre Monsoon Checks of DVOR and HPDME
- Maintenance of Earthing System and Lightening Arrestor.
- IT Related Works.
- Other Assigned work by CNS InCharge whenever Required.

(iv) Accountability

- He is accountable to Unit in charge officer as the case may be.

(v) Knowledge, experience, skills and abilities:

- Possess proficiency and trained at concept level and equipment level on DVOR/DME and VHF.
- Have knowledge of all maintenance schedules and CNS circulars related to DVOR/DME and other associated systems.
- Possess knowledge about ground adjustments required during flight check of the facility.
- Possess knowledge of ICAO Annex 10 Vol. I, III, IV, Annex 11, Annex 19, DOC 8071 and related DGCA Civil aviation requirements.
- Ability to carrying out Maintenance/adjustment of DVOR/DME independently or as a part of maintenance team.
- Posses' knowledge about use of general and special purpose test equipments essential for maintenance of DVOR/DME and associated systems.
- Knowledge of remote control line lay out and electric power distribution of the facilities and in case of breakdown of the mains power supply for the long duration the alternative action to be taken.

Training and proficiency record of CNS personnel:

S.No	Name	Design.	EMP. No.	Proficiency Detail	
				Station Joining	Proficiency Held
01	Shani Anchal	SM (CNS)	10012880	28.05.2023	DVOR DME, HF/NDB ,VHF,AMSS H/W, AMSS OPS, SECURITY EQUIPMENTS
02	Sahil	AM (Elex.)	10018041	28.07.2022	VHF, AMSS OPS SECURITY EQUIPMENTS
03	Alpa Garg	AM (Elex.)	10018055	02.08.2022	VHF, HF/NDB, AMSS OPS, ILS,SECURITY EQUIPMENT
04	Lokesh sharma	AM (Elex.)	10019743	28.07.2023	Nil
05	Veena Purty	AM (Elex.)	10009065	29.07.2023	**Nil**
06	Praveen Kumar	Sr. Asst.(Elex.)	10024342	19.11.2023	**Nil**

Contact details of CNS Personnel:

S.No.	Emp. No.	Name	Designation	Contact No.	Contact No. (office)	Email Id
1.	10012880	Shani Anchal	SM(CNS)	9993696577	01892-233430	shanianchal@aai.aero
2.	10018041	Sahil	AM (Elex.)	9041911219	01892-233430	sahil@aai.aero
3.	10018055	Alpa Garg	AM (Elex.)	9456276980	01892-233430	alpa_g@aai.aero
4.	10019743	Lokesh Sharma	AM (Elex.)	9924228681	01892-233430	Lokeshsharma@aai.aero
5.	10009065	Veena Purty	AM (Elex.)	9560933194	01892-233430	veenapurty@aai.aero
6.	10024342	Praveen Kumar	Sr. Asst.(Elex.)	9643017259	01892-233430	praveen.kmr@aai.aero

CHAPTER:4

Standards of CNS/ATM facilities operational at Kangra Airport

Standards of CNS/ATM facilities operational at Kangra Airport

BRIEF DESCRIPTION / ROLE OF CNS DEPARTMENT

1. To provide uninterrupted services of Communication, Navigation and Surveillance (CNS) facilities for the smooth and safe operation of aircraft in accordance with ICAO standards and recommended practices.

2. To maintain Security Equipment's namely X-Ray Baggage systems (XBIS), HandHeld Metal Detectors (HHMD) and Door Frame Metal Detectors (DFMD).

3. To provide and maintain inter-unit communication facility i.e. Electronic Private Automatic Exchange Board (EPABX)

4. To maintain the Computer systems including peripherals like printers, UPS etc. provided in various sections connected as standalone as well as on Local Area Network (LAN) and Biometric access control system.

5. To maintain the passenger facilitation systems like Public Address (PA) system.

6. To maintain and operate Fax machine.

To co-ordinate with telephone service providers for provision and smooth functioning of HOT LINES.

4.1 CNS/ATM facilities available at different location of the Airport

Equipment Room, ATC Tower, Fire tower and Watch Tower

S. No	Name of facility	Quantity
1	VHF Transmitter (Frequency 122.3 MHZ)	Two
2	VHF Transmitter (Frequency 118.05 MHZ)	One
3	VHF Receiver (Frequency 122.3 MHZ)	Two
4	VHF Receiver (Frequency 118.05 MHZ)	One
5	VHF transceiver	Five
6	Remote Console for VHF	Three
7	Digital Voice Recorder(DVR)	Main/ St By
8	GPS Clock	Three
9	RCSI for HPDME, Status Unit of HPDME	one
10	DVOR Status Unit	One
11	UPS for VHF Tx/Rx ,DVR and other facilities	Four
12	Fax	One

Terminal Building

S. No	Name of facility	Quantity
1	X-ray Baggage Inspection system XBIS CX100100BI	One
2	X-ray Baggage Inspection systemXBIS X6040BI	One
3.	X-ray Baggage Inspection system XBIS Heimann 100100V	One
4.	X-ray Baggage Inspection system XBIS Heimann 6040I	One
5.	DFMD (METOR-200)	Two
6.	DFMD (METRO 6S)	Two
7.	SCCTV System	one
8.	ETD(Explosive test Detector)	Three
9.	PA System	One
9.	Intranet Router and Switch	One
10.	ANS Site CCTV system	One

DVOR Site

S. No	Name of facility	Quantity
1	DVOR	Main/Stdby
2	HPDME	Main/Stdby
3	UPS system for DVOR and HPDME	01
4	ANS Site CCTV system	01

EPABX ROOM

S. No	Name of facility	Quantity
1	EPABX (Matrix)	01

Details of CNS facilities:

Name of Equipment: DVOR
Make: MOPIENS MARU 220
Frequency: 117.7 MHz
Co-ordinates: 32Deg 10Min 08.991Sec N, 76Deg 15Min 47.033 Sec E,
Date of Commissioning: 08/11/2018
Date of last air calibration: 05/09/2022
Validity of air calibration: 720±60 days

VHF Transmitter

Make: OTE DT-100

SPECIFICATIONS

Power supply: AC: Nominal 110/230 V (full range: 88/265 V); 50/60 Hz
DC backup: 24 VDC (full range: 21.6 to 31.2 VDC)
Power consumption (AC): 350 W maximum (transmission state) 35 W (standby)
Power consumption (DC backup): 270 W maximum (transmission state) 35 W (standby)
Max. Current absorption (AC): • 110 V: 3.5 A• 230 V: 2.0 A• 21 V: 12.5 A
Max. Current absorption (DC backup) • 24 V: 11.0 A• 32 V: 8.5 A
Operating frequency band: 108 to 156 MHz

Frequency Stability: ±1 ppm (standard VCOs on TX), monitoring from front panel
±0.3 ppm (slaved to external clock reference)
Channel Spacing: • 25 kHz (for AM-DSB and VDL modes) • 8.33 kHz (for AM-DSB only)
AF + signaling I/O 4W E&M (-10 dBm I/O nominal on 600 ohm, E&M configurable)

RF connections: RF coaxial switch (embedded) N-type (common port);
2 x SMA-type (NO and NC ports)
Audio ancillaries
Headset/Microphone I/O on front panel
External clock reference connections Clock port 10 MHz on SMA-type
GPS/GNSS 1 pps reference pulse
Operating environmental range: Temperature range: -20 to +50°C
Relative humidity: 5 to 90%
Non-op/storage environmental range: Temperature range: -40° to +70°C
Relative humidity: 100%
Cooling System: Cooling Fan behind the TX and PS modules (accessible from rear side)
Safety class: According to EN 609506 (3rd edition + A4 + A11) and EN 602157
Protection class: Class I8
IP class: IP20
Rated Max. Output Power: 50 W CW (+47 dBm)
Output Power adjustment: Set-up selectable between +40 and +47 dBm (0.5 dB steps):
Max output power (DC backup): 12.5 W (CW +41dBm)
Nominal RF Output Impedance: 50 ohm
Transmitter Power Leakage: Transmitter in OFF state: ≤ -83 dBm
VSWR: Any feature referred to VSWR up to 2:1; unconditionally stable up to 3:1
Operation with short/open circuit without any damage.
TX/PA shut down when VSWR ≥ 3 (nominal).

Transmitter RF Output Protection: Automatic transmitter shutdown selectable for VDL-4 applications: if output power exceeds +20 dBm for more than 500 ms.

The transmitter can work in two set-up selectable modes:
Transmitter Duty Cycle: • Discontinuous mode with set-up selectable TX timeout (0 to 5 minutes)
• Continuous mode: 100% at maximum power output
Inter modulation Attenuation: Interfering signal level = -20 dBc
VHF receivers
Make: OTE DR-100
Power supply: AC Nominal 110/ 230 VAC (full range: 88 to 255 VAC); 50/60 Hz
DC backup: 24 VDC (full range: 21 to 32 VDC)
Power consumption AC & DC: 40 W (DC main)
• 800 mA (main 110 Vac input)
Max. Current absorption: • 500 mA (main 220 Vac input)
• 1.3 A (backup 32 VDC input)
• 1.7 A (backup 24 VDC input)
• 2.0 A (backup 21 VDC input)
Operating frequency band: 108 to 156 MHz
Frequency Stability: ±1 ppm (standard VCOs on RX), monitoring from front panel
±0.3 ppm (slaved to external clock reference)
Channel Spacing: • 25 kHz (for AM-DSB and VDL modes)
• 8.33 kHz (for AM-DSB only)
AF + signaling I/O (ALB-M) 4W E&M (-10 dBm I/O nominal on
600 ohm, E&M configurable)
Main signal and data connections VDL Data I/F1 RS2322
O&M to/from remote RS485 multidrop I/O
RX input port (high sensitivity) SMA-type
RF connections RX input port (low sensitivity) SMA-type
LMT / Test / IF RS232 test port
Service facility connections Radio Control Bus monitoring3 RS485 (test only)
Audio ancillaries Headset/Microphone I/O on front panel
Recorder I/F 600 ohm balanced line
External clock reference connections Clock port 10 MHz on SMA-type
GPS/GNSS 1 pps reference pulse
Operating environmental range: Temperature range: -20 to +55°C
Relative humidity: 5 to 90%
Non-op/storage environmental range: Temperature range: -40° to +70°C
Relative humidity: 100%
EMI/RFI: According to CEI-EN specifications for CE marking

According to ETSI 301 489-225 specifications
Safety class: According to EN 609506 (3rd edition + A4 + A11) and EN 602157

Technical Specifications

Protection class Class I8
Installation category II in accordance with IEC 6649
IP class IP20
•25 kHz / 8.33 kHz AM-DSB modulation: 10 dB (S+N)/N with - 107 dBm 30% AM
Sensitivity: • 25 KHz D8PSK modulation: - 98 dBm with uncorrected BER = 10-3
• 25 kHz GFSK modulation: - 98 dBm with uncorrected BER = 10-4
Nominal RF Input Impedance: 50 ohm
Image and spurious response rejection: ≥ 80 dB
Spurious emissions: According to ETSI EN 300 676
Cross modulation rejection: AM (25 & 8.33 kHz)
≥ 80 dB @ ± 1 MHz (interfering signal offset)

AGC features: D8PSK modulation
• Nominal BER performances: from – 103 dBm to – 7 dBm
• stabilization time: ≤ 238 msec (2.5 symbols @ 10.5 ksymb/sec)
6 dB degradation of sensitivity with:
• wanted signal : modulation 90% @ 1 kHz
• interference signal:
AM modulation Noise immunity: - co-channel pulsed signal
- pulse repetition: 60 Hz
- pulse width: 10 msec
- waveform: Rise and decay time ≤ 1 msec
- RF peak amplitude: 90 dBμV x msec

CHAPTER 5

TECHNICAL DESCRIPTION OF FACILITY

TECHNICAL DESRIPTION OF FACILITY

CLASSIFICATION OF CNS FACILITIES

LIST OF CNS EQUIPMENT INSTALLED AT KANGRA AIRPORT

S.No.	Name of equipment	Make & Model	Serial No.	Date of Acquisition
1.	VHF MAIN(122.3MHz) Transmitter	OTE DT100		16.03.2007
2.	VHF MAIN (122.3)MHz Receiver	OTE DR100		16.03.2007
3.	VHF STANDBY (122.3MHz) Transmitter	OTE DT100		16.03.2007
4.	VHF STANDBY(122.3MHz) Receiver	OTE DR100		16.03.2007
5.	VHF alternate Frequency(118.05MHz) Transmitter	OTE DT100	00319	30.10.2015
6.	VHF alternate Frequency(118.05MHz) Receiver	OTE DR100	00303	30.10.2015
7.	DVR (main) 32 channel DVR (Standby) 32 channel	VOXTRONICS		09.05.2018 09.05.2018
8.	DVOR	MARU 220 MOPIENS	00093	15.07.2016
9.	HP-DME	MARU 320MOPIENS	00150	15.07.2016
10.	GPS Based Standlone Synchronized digital clocks	AE Telelink	1).AEGPS2113 0043 2).AEGPS2113 0044 3).AEGPS2113 0045 4.)AEGPS2113 0046	08.04.2015
11.	LAN	**ROUTER**-CISCO –C1-43311K9 **SWITCH**-CISCO-GLC-LH-SMD	FD02224A18T	01.06.2018

LIST OF AIRPORT SYSTEM INSTALLED AT KANGRA AIRPORT

S.No.	Name of equipment	Make & Model	Serial No.	Date of Acquisition
1.	X-RAY	HEIMANN XBIS 100100v	27105	11.08.2004
2.	X-RAY	HEIMANN XBIS 6040i	26895	11.08.2004
3.	CCTV (75 Cameras)	Magnum Telesystem pvt ltd		Newly installed CCTV in April 2024.
4.	ETD	500DT SMITH	50401	31.01.2007
5.	EPABX	MATRIX		22.10.2018
6.	PA System	Space cloud pvt. Ltd.		26.04.2024
7.	Portable PA System	----------		03.03.2017
8.	DFMD	METOR 200		26.03.2002
9.	DFMD	METOR 200		12.03.2004
10.	HHMD	METOR-28 METOR-28 RELIANCE ELECTRONICS RE-AH-01 RELIANCE ELECTRONICS RE-AH-01	450154 450158 449896 455697 8890512 8900512 8910512 9350512 9360512 9370512	22.02.2007 21.08.2010 13.09.2002 13.09.2002 05.06.2012 05.06.2012 05.06.2012 06.06.2012 06.06.2012 06.06.2012

SECURITY EQUIPMENTS

XBIS SYSTEM

x-Ray baggage inspection system is used for screening the baggage of the passengers. To find out any explosive material, Arms ammunition and other dangerous material to aircraft/passengers are hidden inside the luggage. This airport is provided with two multi energy X-ray inspection system. It distinguishes between materials according to their density andclassified by color.

- X-ray machine (Heimann 6040i used for hand baggage)
- X-ray machine (Heimann100100v used for Registered Baggage.)
- Explosive Trace Detector –Smith IONSCAN500DT.

Walk Through Metal Detector (WTMD)

METOR 200 WTMD is multizone metal detector used for checking passengers before boarding the aircraft to find out any explosive or weapon or dangerous item being carried by them. WTMD gives alarmand alerts security personnel by detecting weapons or dangerous material or any metal item of more than permitted size at various heights. Two WTMDs are available at SHA.

Hand Held Metal Detector (HHMD)

This is used by security personnel posted at airport for frisking the passengers before boarding the aircraft to find out any weapon or dangerous material carried by passengers. This airport is provided with 30 HHMDs.

PA system

PA system is installed at New Terminal Building and used by Airline Operators for the information's to the travelling passengers.

5.1 Brief description of CNS/ATM facilities of Kangra Airport

1. DVOR

PURPOSES AND USE OF VOR:

1. The main purpose of the VOR is to provide the navigational signals for an aircraft receiver, which will allow the pilot to determine the bearing of the aircraft to a VOR facility.
2. In addition to this, VOR enables the Air Traffic Controllers in the Area Control Radar (ARSR) and ASR for identifying the aircraft in their scopes easily. They can monitor whether aircraft are following the radials correctly or not.
3. VOR located outside the airfield on the extended Centre line of the runway would be useful for the aircraft for making a straight VOR approach. With the help of the AUTO PILOT aircraft can be guided to approach the airport for landing.
4. VOR located en-route would be useful for air traffic 'to maintain their PDRS (PRE DETERMINED ROUTES) and are also used as reporting points.
5. VORs located at radial distance of about 40 miles in different directions around an International Airport can be used as holding VORs for regulating the aircraft for their landing in quickest time. They would be of immense help to the aircraft for holding overhead and also to the ATCO for handling the traffic conveniently.

The DVOR system provides a reference from which aircraft bearing can be determined. To do this, a carrier is radiated in the 108 to 118 MHZ band and modulated by two 30Hz signals. One amplitude modulates and the other frequency modulates (also called the reference phase and variable phase signals, respectively) the carrier signal. This is done in such a way that the phase difference of the 30 Hz signalsvaries degree for degree with the magnetic bearing around the VOR station.

The DVOR concept is based on the 360° radials, which originate from a transmitting station and on the airborne equipment, which resolves the particular radial data from the station. The resolved radial, called line-of-position (LOP) is the displacement angle between magnetic north and the aircraft, as measured from the DVOR antenna. Therefore, regardless of its heading, an aircraft which is on the 0° radial is north of the DVOR station.

The magnetic course to the station is the reciprocal of the radial. In addition, the airborne equipment also resolves to/from orientation data, relative to the DVOR station.

BLOCK DIAGRAM EXPLANATION

Here in the block diagram, the initial functioning starts from MSG (modulation signal generation) module which generates

- Modulation and antenna switching signals accordingly controlling the on aerial and standby transmitter's characteristics.
- Generates 30 Hz reference phase signal, I dent and voice interface (VOP) required by MAS (CMA) (modulation amplifier subsystem) for modulating carrier wave.
- Generates SIN and COS blending signals required by the MAS (SMA) (sideband modulation amplifiers) for modulating the sideband signals
- Time critical control signals to control sideband antenna switching
- Setting up synthesizer oscillator frequencies for CMA and SMA for time and frequency synchronization. Continuous control of carrier and sidebands amplitude for modulation
- Controls synchronously phase relationship between carrier and sideband.
- RF frequency envelope with control and synchronization is generated and maintained

Signal from MSG goes to MAS (carrier and sideband amplifiers). The modulating signals generated from the MSG are amplitude modulated here.

- CMA (carrier modulation amplifier) generates amplitude modulated carrier signal goes to PDC (power detect and change-over)
- MSG generated control signals controls the PLL frequency setting
- Reference frequency signal from CMA is supplied to both SMAs (sideband modulation amplifiers) for frequency and phase synchronization.

- Audio band blending signals generated by the MSG module is modulating the sideband signals in the SMAs.
  - Here reference signal (carrier) is generated by the temperature controlled crystal oscillator (TCXO) and frequency synthesis is generated and controlled by the PLL Frequency Synthesizer.
  - The total amplification of both CMA and SMA is categorized in three sections as frequency synthesis in the Synthesizer then Modulation process and finally the Power Amplification.

The controlling action for the whole MARU 220 is maintained by the CSU (Control and Switching Unit). This the common module maintaining the backbone of the of the two transmitters and monitors

Here redundancy for transmitters and monitors are available but CSU is single and time critical.

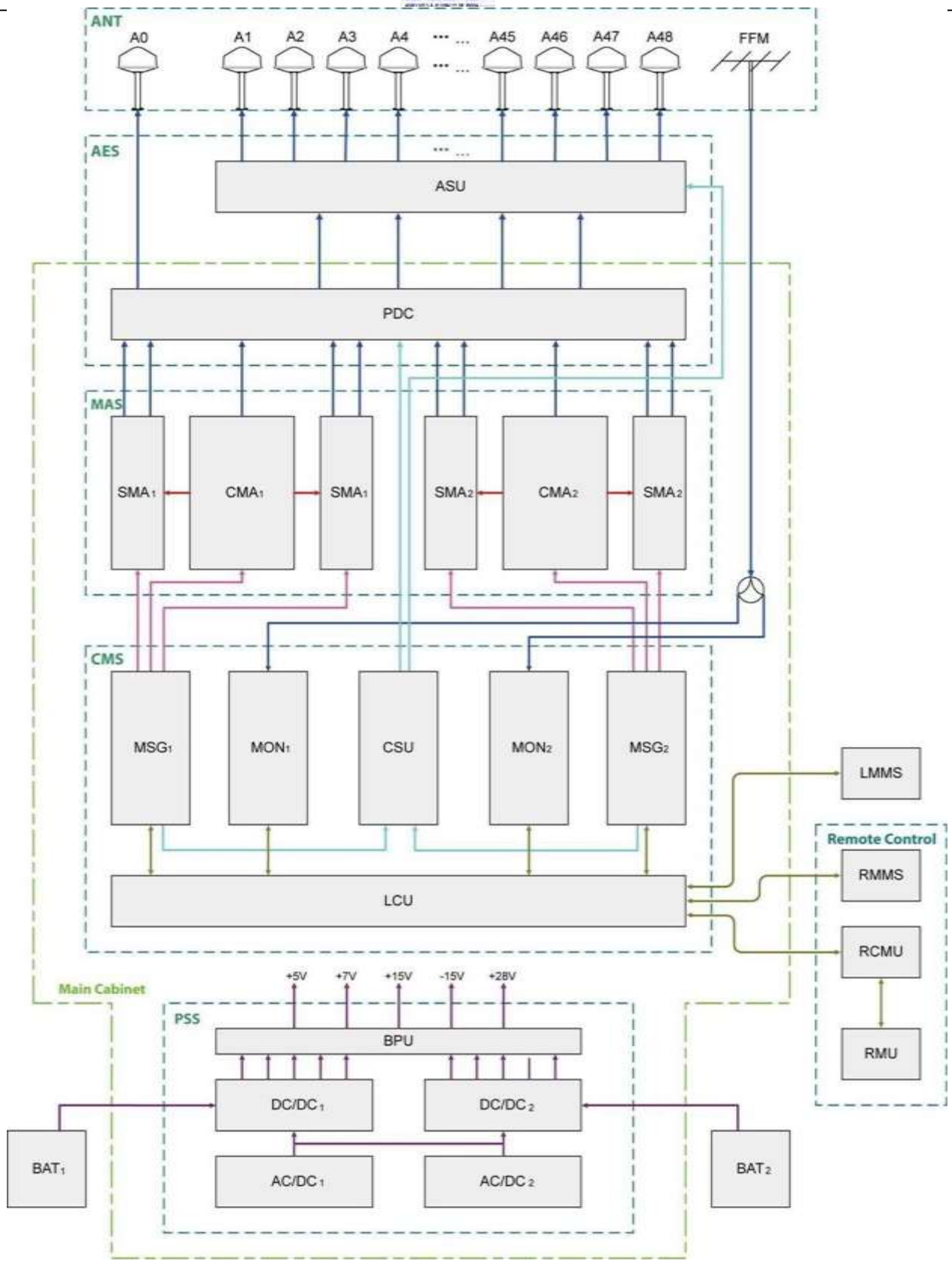
- It includes the test signal generator (TSG) for certification and monitoring both the monitors. So that the integrity and self-diagnostics can be evaluated and monitored.
- Voice processing (VOP) for utilization of voice over the VHF frequency band.
- Enabling Interface between the associated equipment like DME, TACAN etc.

The status of transmitters, monitors is displayed on the CSP located below PDU at the top of rack. CSP includes a LCD Display, seven (7) input keys, twelve 12 LEDs for indicating the status of both the transmitters and monitors. It also includes a buzzer for generating the alarm or warning status by aural sound.

The Antenna system (carrier and sideband antennas) is interfaced by PDC (Power Detectand Change-Over) and ASU (Antenna Switching Unit).

PDC plays vital role in changing-over the transmitter to the antenna and sampling the RF output level.

- It includes RF Relays, Isolators and Directional Couplers which detects the magnitude of forward and reflected RF signals.
- The PDC outputs four sideband signals to the ASU and the carrier signal directly to the carrier antenna.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A0
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LCU
LMMS
Remote Control
RMMS
RCMU
RMU
Main Cabinet
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+15V
-15V
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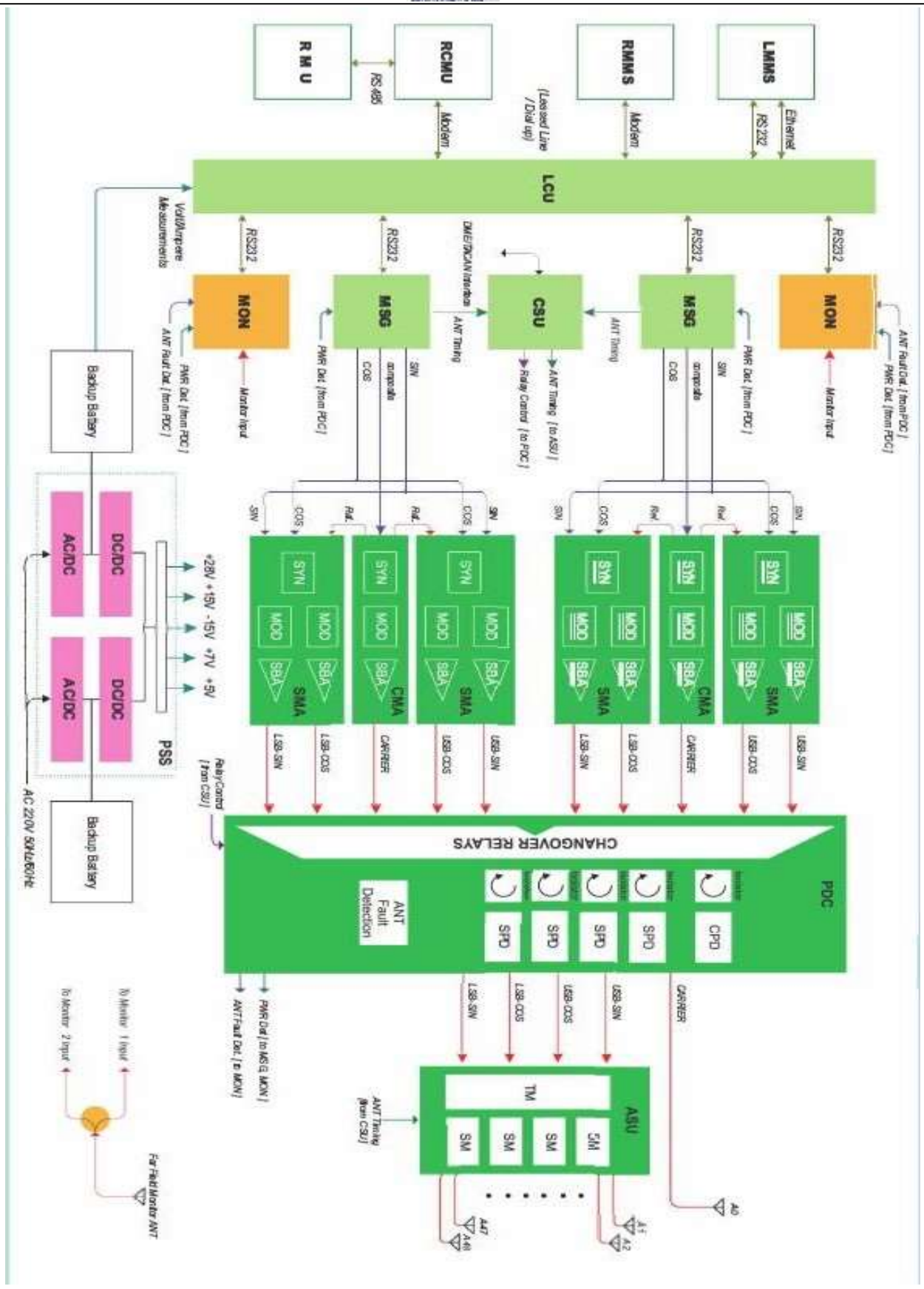

RMU
RCMU
RMMS
LMMS
RS 485
Modem
Modem
Ethernet
RS 232
(Leased Line / Dial up)
LCU
RS232
MON
MSG
CSU
MSG
MON
Monitor Input
ANT Fault Det. (from PDC)
PWR Det. (from PDC)
ANT Timing
Relay Control (to PDC)
ANT Timing (to ASU)
PWR Det. (from PDC)
ANT Fault Det. (from PDC)
Backup Battery
AC/DC
DC/DC
AC/DC
DC/DC
PSS
+28V +15V -15V +7V +5V
AC 220V 50Hz/60Hz
SYN
MOD
SBA
SMA
CMA
CHANGOVER RELAYS
PDC
ANT Fault Detection
SPD
CPD
Relay Control (from CSU)
PWR Det (to MSG MON)
ANT Fault Det. (to MON)
TM
SM
ASU
ANT Timing (from CSU)
To Monitor 1 Input
To Monitor 2 Input
Far Field Monitor ANT

DME CONCEPTS

Principles of operation of DME

The operating principle of DME systems is based on the Radar principle i.e. the time required for a radio pulse signal to travel to a given point and return. In fact it is Secondary Radar.

Principles of Secondary Radar in Secondary Radar system the targets' active participation is necessary for its detection as against Primary Radars where the targets role is passive. Secondary Radar system basically consists of two principle components namely the 'Interrogator', which is ground, based and the 'Transponder', which is carried on the targets. Each of these components consists of a set of one pulse transmitter and one receiver. The Interrogator radiates pulses which when received by a corresponding transponder on a target will initiate a reply from that transponder. These replies are received by the interrogator to extract information about the targets.

The diagram shows the main blocks of MARU 320 DME. The Components for MARU 310 DME are the same except for the HPA which is not available in 310 DME.

The interrogation signals received by the antenna are routed to the duplexer unit (DPU) through a low loss coaxial cable. 1/2" Heliax type cable with N type connectors is used for Antenna feed.

The Duplexer Unit - DPU has RF signal connections to Both TXs both Rx and one antenna. It consists of directional couplers and circulators in each TX/RX path (DPU is elaborated in coming sections)

The Antenna is connected to either Transponder 1 or Transponder 2 by the changeover DPDT switch (coaxial relay) in the DPU depending on the selection of on Air transponder. The standby transmitter gets connected to an internal dummy load of 50 Ohms.

The signals received at the antenna enter the selected transmitter (1 or2) path. A duplexer (circulator) connects Transmitter and receiver to the same antenna. The Circulator provides isolation between the transmitted and received signals, since a common antenna is used for both. Signals applied to any of the ports will experience the least insertion loss or minimum resistance when traveling to the adjacent port in a clockwise direction. Signals traveling in a counterclockwise direction will be attenuated by at least 20dB.

The received signal from the duplexer is routed to the receiver Unit (RXU) through a pre selector filter (tunable band pass filter) Using coaxial cable. The pre selector filter has band width of 4 MHz and provides more than 60 dB attenuation beyond 4MHz band. The band pass filter rejects the image frequencies and off channel frequencies.

The band pass filtered RF is fed to the input of the RXU module. The incoming interrogationfrequency signal is converted to an intermediate frequency of 63 MHz in the RXU. For the IF conversion, a CW RF signal at the transmit frequency from the RF oscillator in Transmitter module (TXU) is applied to the RXU. The resultant 63 MHz IF signal is a pulsed IF signal corresponding to the aircraft interrogation having a Gaussian shaped envelope.

The 63 MHz IF is split into two parts. One part is amplified in a chain of logarithmic amplifiers in order to compress the dynamic range of incoming interrogation signal. The output of the logarithmic amplifier remains almost constant for a wide variation of incoming signal level. A detector circuit detects the IF envelope to recover the Gaussian shaped pulses of interrogation. The detected pulse is called the Log Video signal. The other part of IF is converted to a second IF of 10.7MHz for narrow band filtering and producing “on channel” video signal.

The 63 MHz IF is converted to 10.7MHz second intermediate frequency by using a local oscillator of 52.3 MHz. A lower intermediate frequency provides better adjacent channel rejection. The 10.7 MHZ IF is passed through a narrow band pass filter of band width 400 KHz. (10.7MHz±200KHz). If the received signal is not displaced more than this band width, the filter produces an output. A comparator detector produces a pulse if the filter output has considerable amplitude. This pulse, called the on channel video is produced only if the interrogation is on the correct channel frequency and not displaced more than f ±200KHz.

The on channel video pulse is used for gating the log video pulses to the pulse processing circuits. By using this technique the log video pulses corresponding to correct on channel interrogations only is passed to the pulse processing circuits.

The RXU unit also contains a controlled attenuator, for controlling the receiver sensitivity during over interrogations. The attenuator is controlled by the TCU unit using digital signals. When the number of interrogations raises above 90% of the maximum reply rate, the sensitivity of the receiver is reduced so that the DME receives only stronger interrogations, i.e. from closer aircrafts.

The detected Log Video signal and on Channel video signal is fed to the Transmit control unit (TCU). The TCU performs several functions. TCU performs certain validation checks on the incoming pulses viz on channel validation, pulse pair validation Pulse width validation etc. The TCU also provides echo suppression, receiver dead time, system delay, station identity, generation, squitter generation and facilitates transmission of I dent, Reply and squitter pulses as per set priority.

On channel validation by using on channel video signal generated in the previous stage (RXU). The Gaussian pulses are processed further only if on channel video signal is also present at the time of the Gaussian pulses. This ensures that only interrogations at the correct channel frequency are replied.

Pulse spacing and pulse width are checked to determine if it is within the allowable limits. A reply will be generated only if the detected pulse pairs are qualified as a valid interrogation. Al the functions in TCU are performed by digital circuits. The main logic circuits are implemented using FPGA. The analog LOG VIDEO signal is converted to digital in this module. For each received pulse, a half amplitude finder circuit marks the timing of 50% amplitude of the pulse voltage. The half amplitude time markers are used for pulse width and pulse spacing validation checks.

Once the received pulse pairs are validated as a genuine aircraft interrogation by the decoder, the receiver pulse processing stages are disabled from accepting any interrogation for a specified time known as “Receiver Dead time” which is typically 60 microseconds. During this period, the transponder will not accept any interrogations and will transmit the reply for the interrogation after the system delay period. The decoder also provides echo suppression.

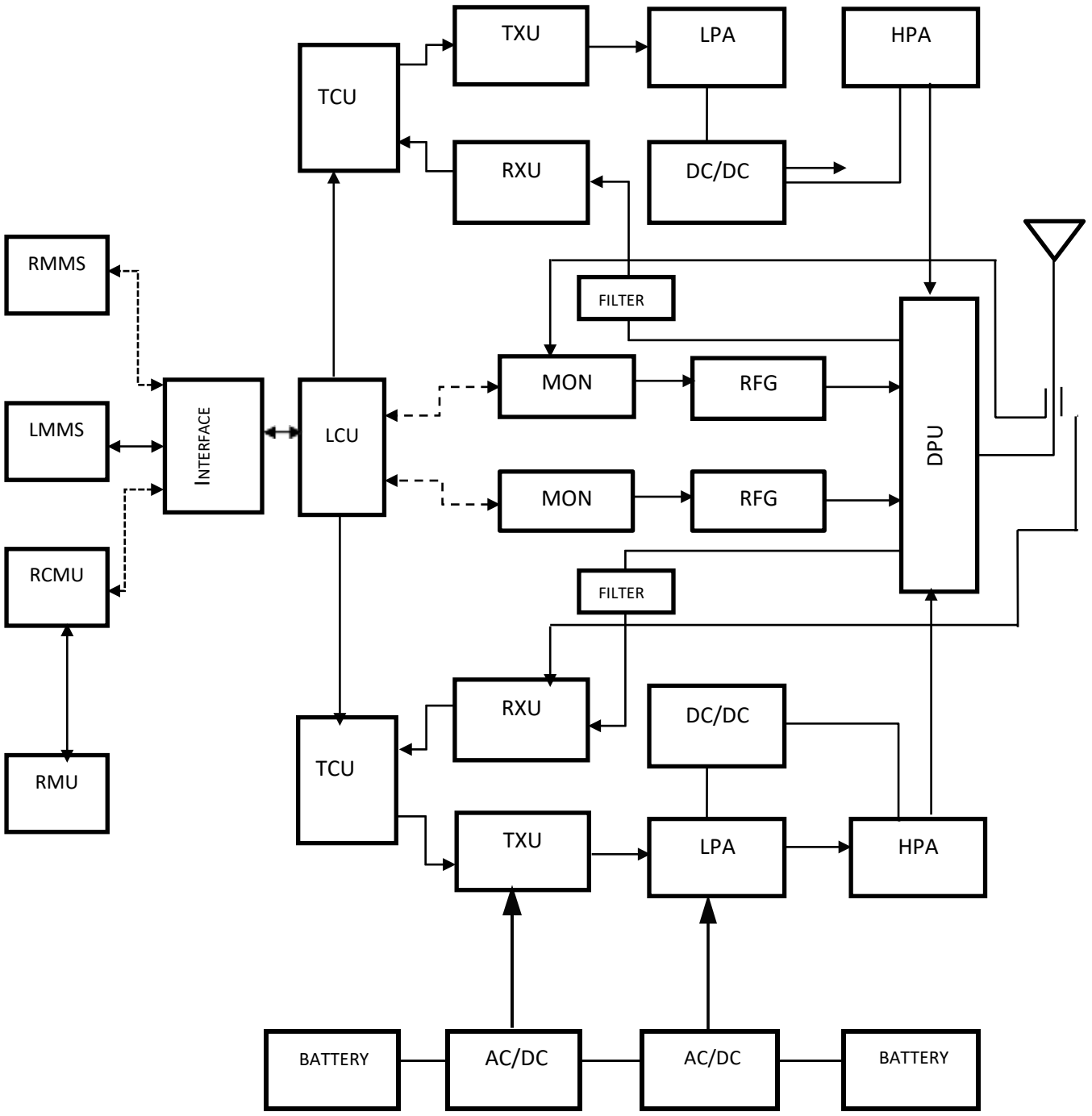


Figure 3.3

Simplified system block diagram of MARU 320 DME with dual transponder and dual monitor configuration.

VHF Communication

Introduction: Transmitter, Receiver & Channel

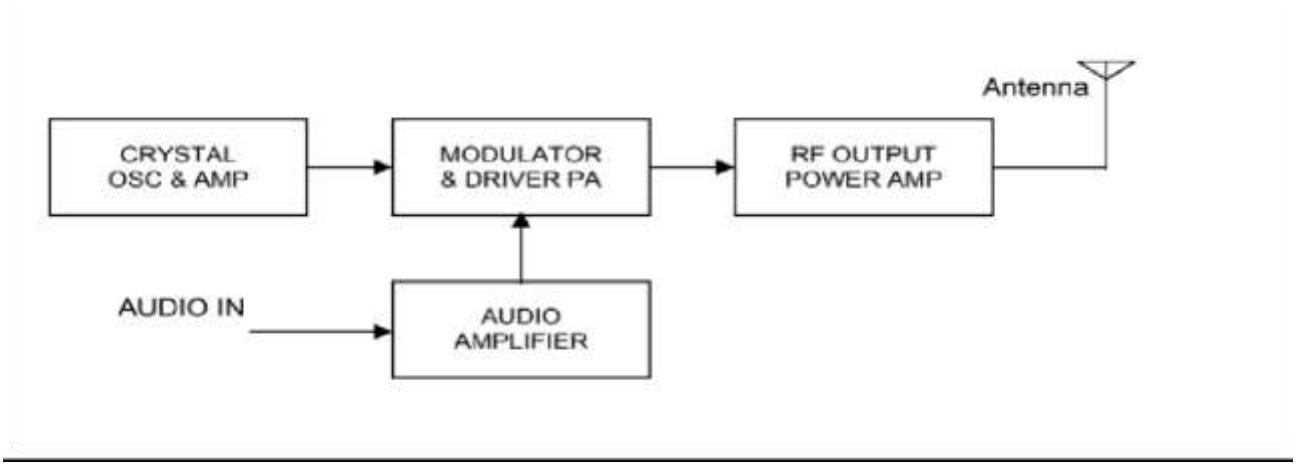
Introduction

Communication is the process of sending, receiving and processing of information by electrical means. It started with wire telegraphy in 1840 followed by wire telephony and subsequently by radio/wireless communication. The introduction of satellites and fiber optics has made communication more widespread and effective with an increasing emphasis on computer based digital data communication. In Radio communication, for transmission information/message are first converted into electrical signals then modulated with a carrier signal of high frequency, amplified up to a required level, converted into electromagnetic waves and radiated in the space, with the help of antenna. For reception these electromagnetic waves received by the antenna, converted into electrical signals, amplified, detected and reproduced in the original form of information/message with the help of speaker.

Transmitter

Unless the message arriving from the information source is electrical in nature, it will be unsuitable for immediate transmission. Even then, a lot of work must be done to make such a message suitable. This may be demonstrated in single-sideband modulation, where it is necessary to convert the incoming sound signals into electrical variations, to restrict the range of the audio frequencies and then to compress their amplitude range. All this is done before any modulation. In wire Telephony no processing may be required, but in long-distance communications, transmitter is required to process, and possibly encode, the incoming information so as tomake it suitable for transmission and subsequent reception.

Eventually, in a transmitter, the information modulates the carrier, i.e., is superimposed on a high-frequency sine wave. The actual method of modulation varies from one system to another. Modulation may be high level or low level, (in VHF we use low level modulation) and the system itself may be amplitude modulation, frequency modulation, pulse modulation or any variation or combination of these, depending on the requirements. Figure below shows a low-level amplitude- modulated transmitter type.



Block diagram of typical VHF radio Transmitter

Channel

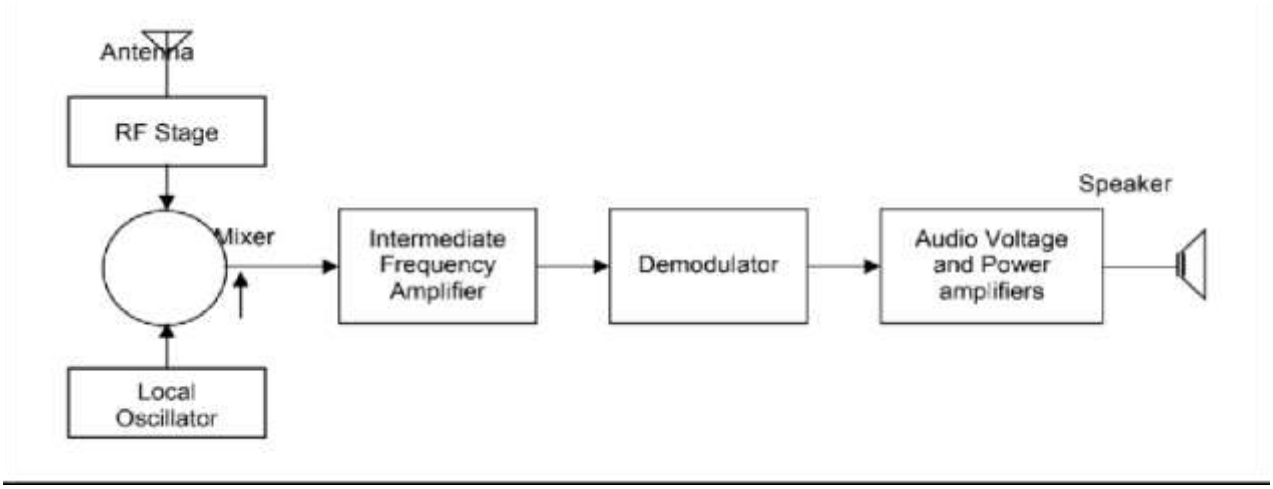
The acoustic channel (i.e., shouting!) is not used for long-distance communications and neither was the visual channel until the advent of the laser. "Communications," in this context, will be restricted to radio, wire and fiber optic channels. Also, it should be noted that the term channel is often used to refer to the frequency range allocated to a particular service or transmission, such as a television channel (the allowable carrier bandwidth with modulation). It is inevitable that the signal will deteriorate during the process of transmission and reception as a result of some distortion in the system, or because of the introduction of noise, which is unwanted energy, usually of random character, present in a transmission system, due to a variety of causes. Since noise will be received together with the signal, it places a limitation on the transmission system as a whole. When noise is severe, it may mask a given signal so much that the signal becomes unintelligible and therefore useless. Noise may interfere with signal at any point in a communications system, but it will have its greatest effect when the signal is weakest. This means that noise in the channel or at the input to the receiver is the most noticeable.

Receiver

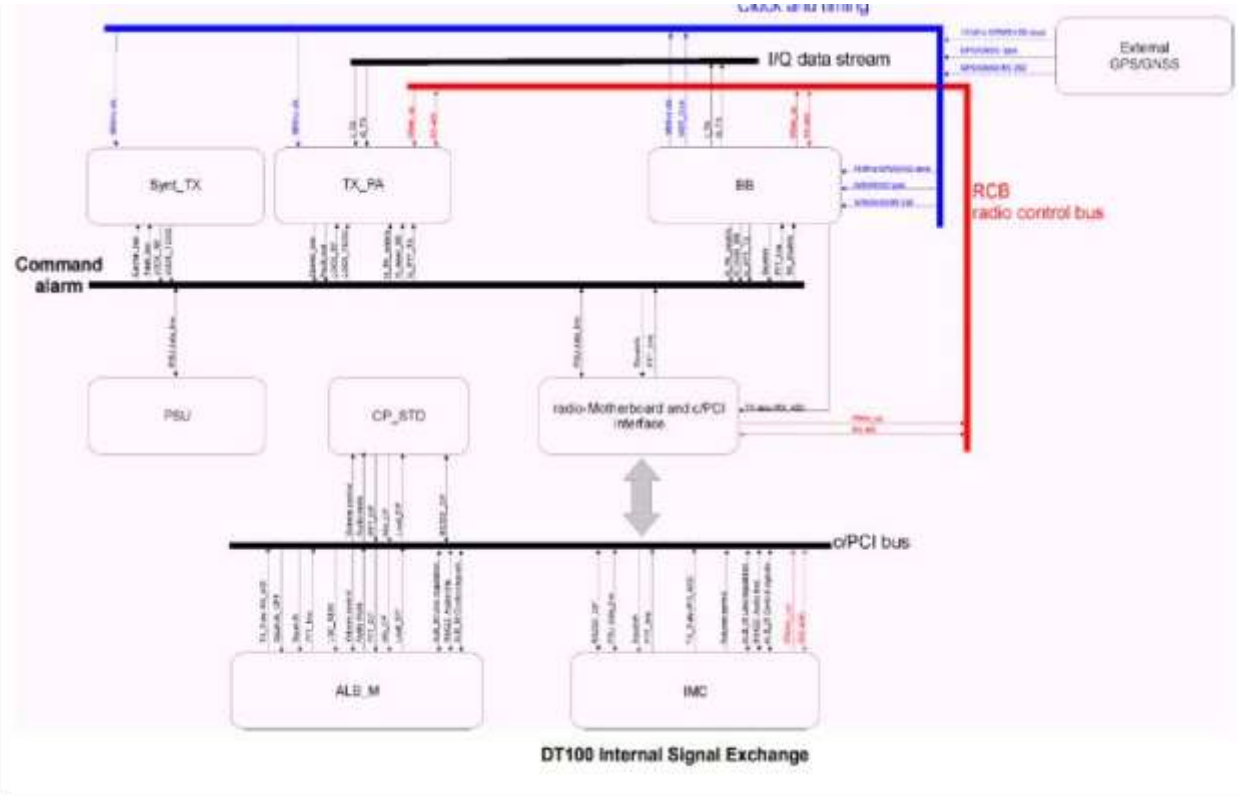
There are a great variety of receivers in communications systems, since the exact form of a particular receiver is influenced by a great many requirements. Among the more important requirements are the modulation system used, the operating frequency and its range and the type of display required, which in turn depends on the destination of the intelligence received. Most receivers do conform broadly to the super heterodyne type, as does the simple receiver whose block diagram is

Shown in Figure below:

Typical VHF receiver block diagram

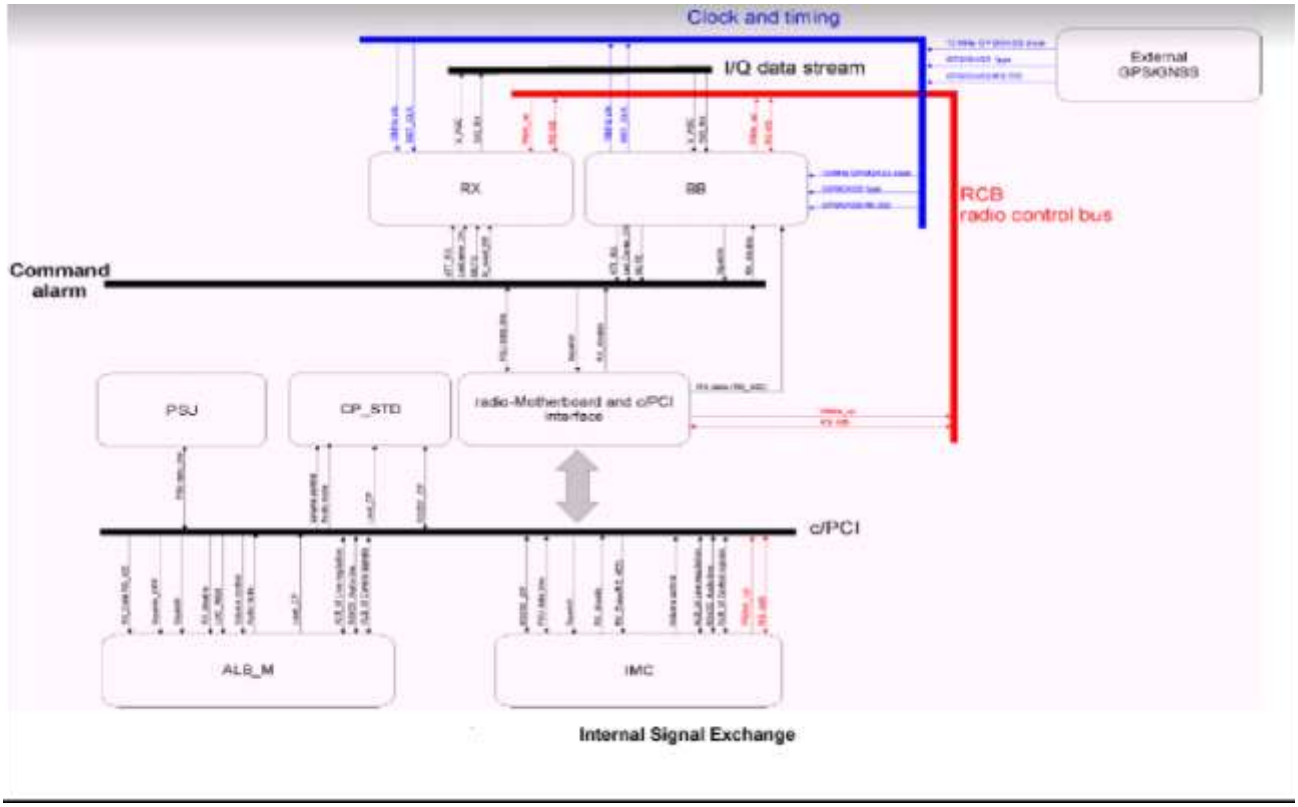


VHF transmitter OTE-DT 100

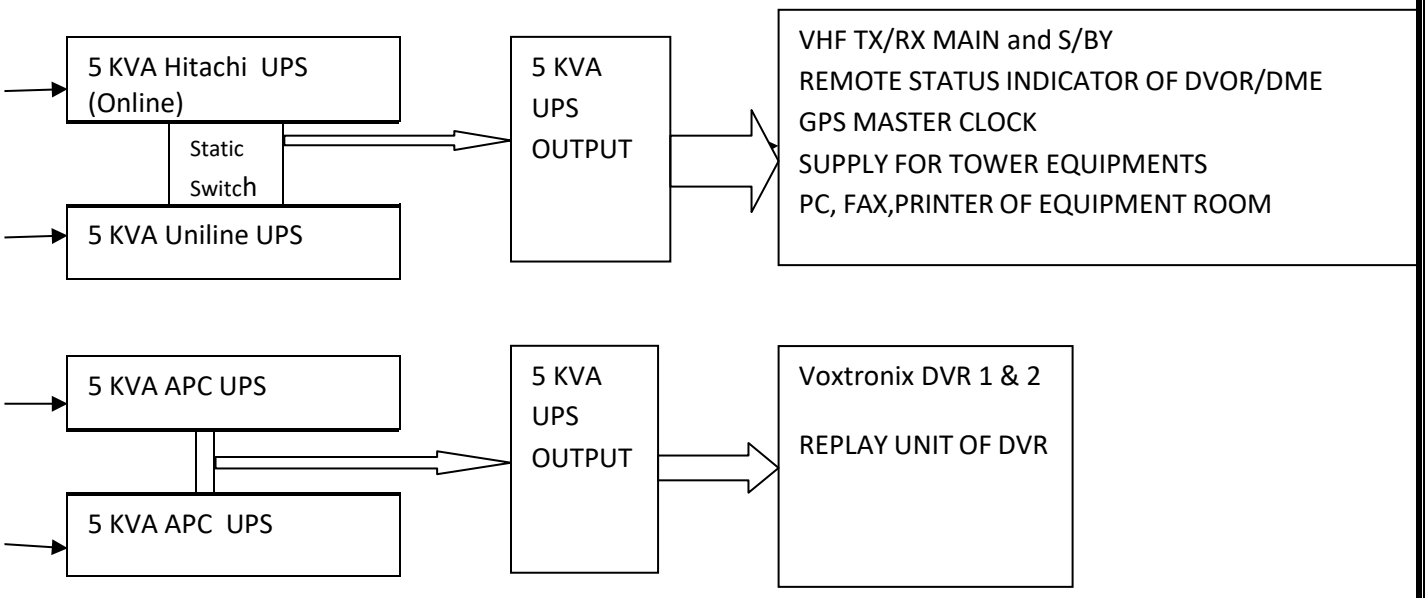


DT100 Internal Signal Exchange

VHF receiver OTE DR-100



Power supply scheme of Equipment Room:



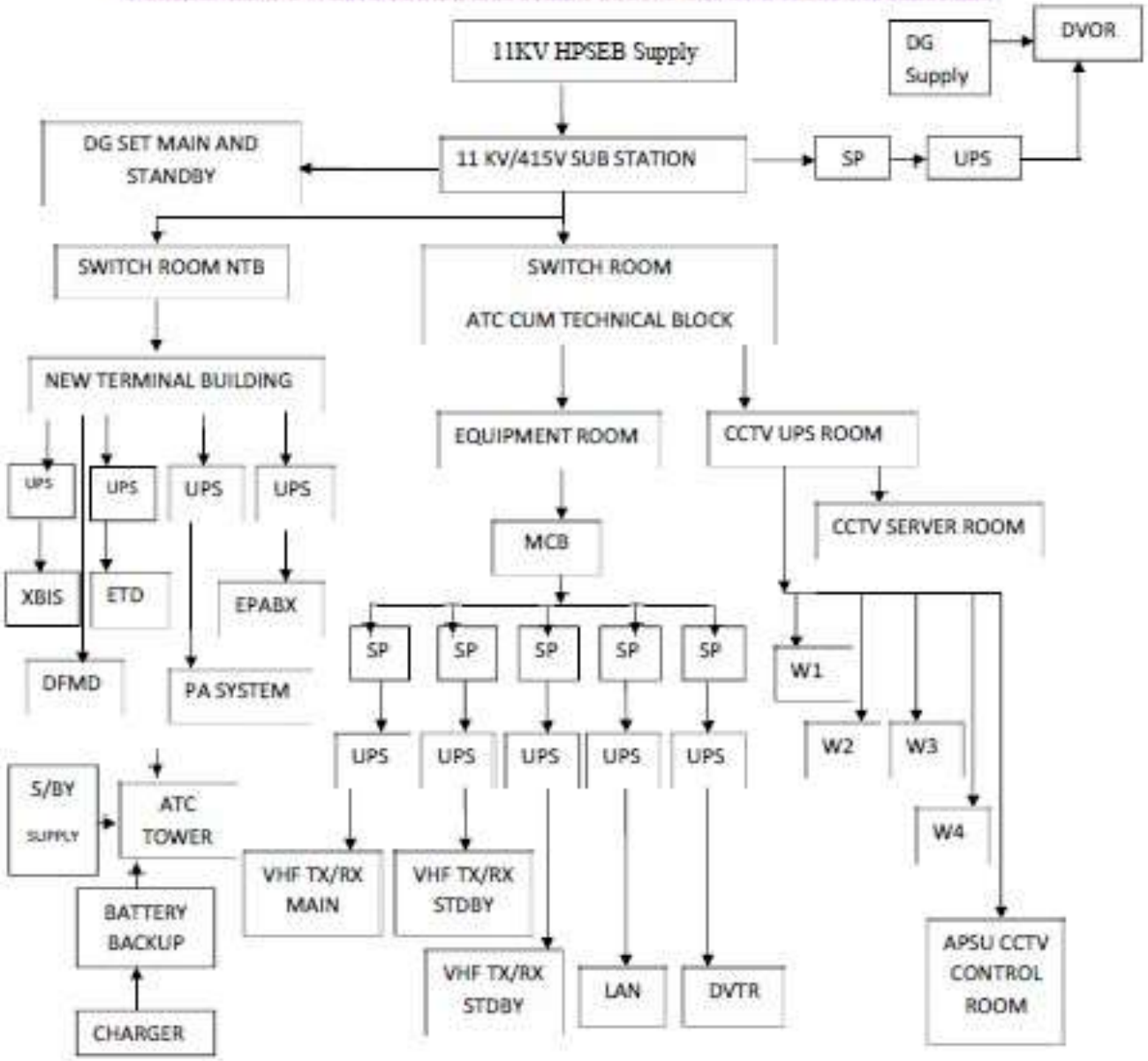
CHAPTER 6:

OPERATIONAL AND MAINTENANCE MANAGEMENT PLAN

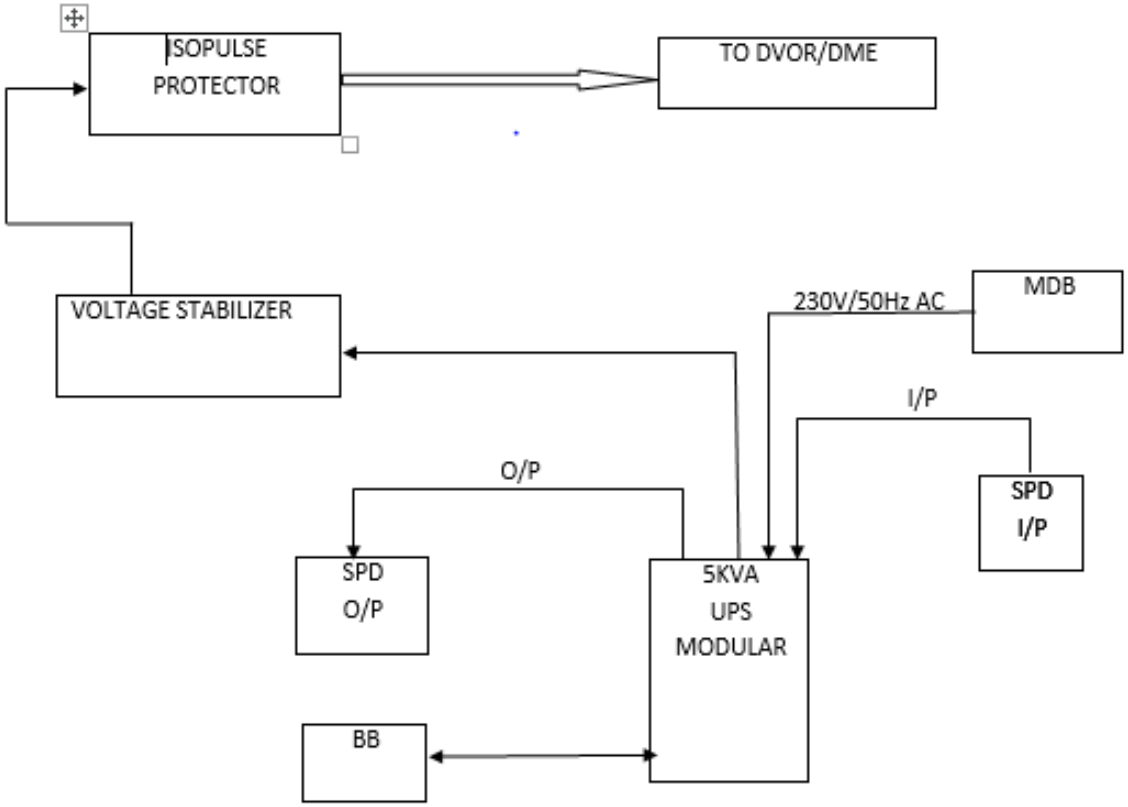
KANGRA AIRPORT Station CNS Manual VIGG

OPERATIONAL AND MAINTENANCE MANAGEMENT PLAN

COMBINED POWER SUPPLY DISTRIBUTION FOR CNS/ATM FACILITIES



POWER DISTRIBUTION DIAGRAM DVOR/DME SITE

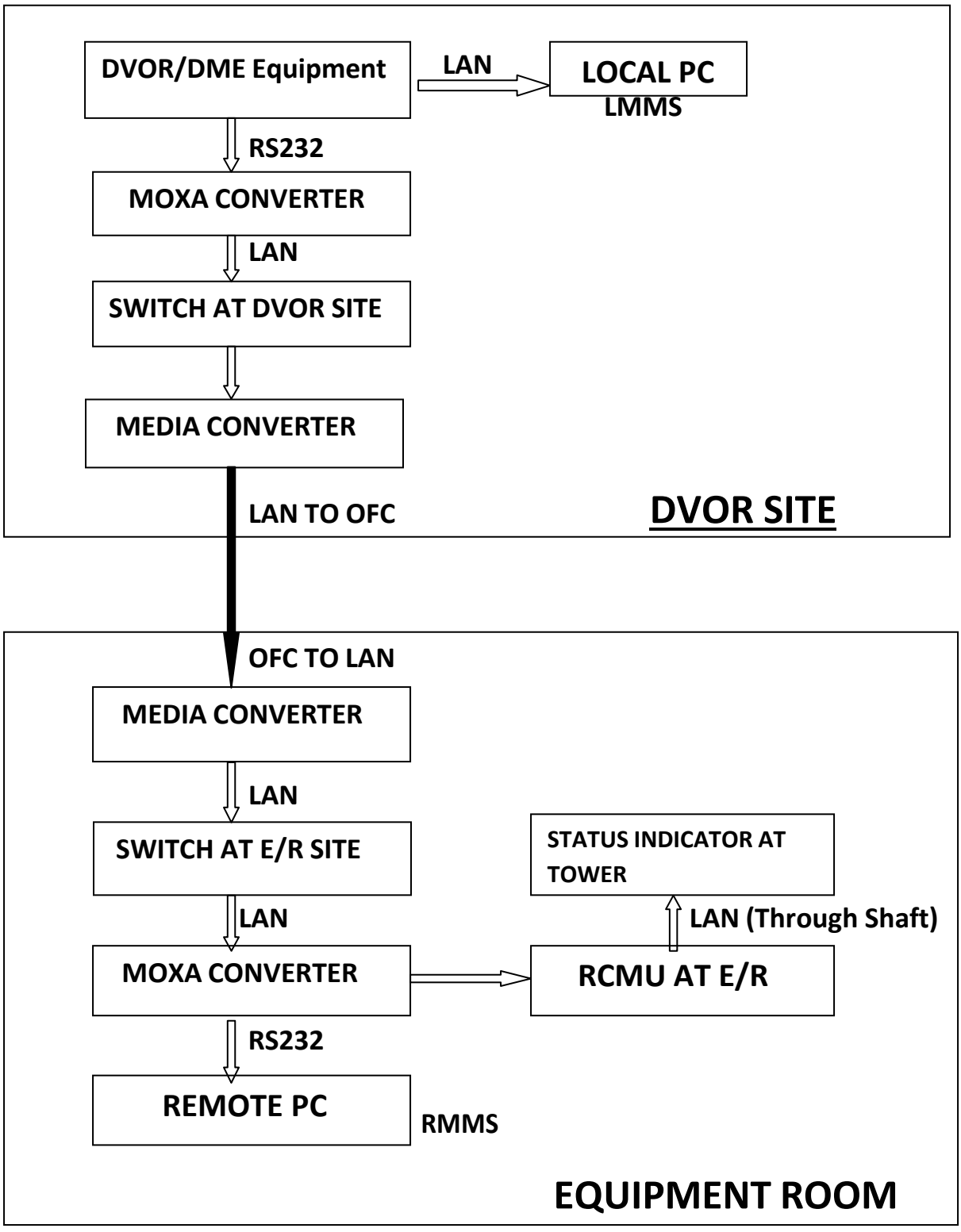


*Legends:- MDB- Main Distribution Box, SPD- Surge Protection Device, BB- Battery Bank

REMOTE CONTROL CABLES ROUTING DIAGRAMS

Remote control cable through OFC

REMOTE LINE INDICATION DIAGRAM



AIRPORTS AUTHORITY OF INDIA CNS MANUAL VOL.VII Part 2

PREVENTIVE MAINTENANCE SCHEDULE- DAILY (DVOR MARU -220)

STATION:…… REGION:……

FREQUENY:…….. IDENT:…… DATE:……

S.No.	Parameters	Nominal value/ Status & Tolerance	Observed status	
1.0	**GENERAL**			
1.1	Equipment Shelter Cleanliness	**Dust Free**		
1.2	Status of Air Conditioners	Serviceable		
1.3	Equipment Shelter Condition a) Temperature b) Humidity	22°+/-2° <60%		
1.4	Main Power Supply a) Voltage b) Frequency	220V+/-10% 50 Hz +/- 2.5%		
1.5	UPS stabilizer Output	220V +/- 5V		
1.6	Status of Monitor	OK		
1.7	Status of DVOR Remote Indications at : a) Equipment Room **b)** ATC	OK Ok		
1.8	Transmitter Active	1/2		
1.9	Any Unusual Noise/Abnormality Observed	No		
1.10	Status of Electrical Fitting(Light/Fan)	OK		
1.11	Status of Mast Light	OK		
1.12	Status of Critical/Surrounding area	No Grass and Vegetation etc.		
2.0	**Monitor(Using LMMS)**	**Active TX**	**Monitor-1**	**Monitor-2**
2.1	Azimuth Angle	Nominal +/- 1°		
2.2	9960 Hz (FM Index)	11-17		
2.3	30 HZ AM Modulation depth	30 +/- 4.5%		
2.4	9960 HZ Modulation Depth	30 +/- 4.5%		
2.5	Ident 1020 Hz Modulation depth	<10%		
2.6	Ident Code	Ok/Not Ok		

2.7	Frequency Carrier				
2.8	Frequenct-USB				
2.9	Frequency-LSB				
2.10	Output power- Carrier				
2.11	Output power -USB Sin				
2.12	Output power -USB Cos				
2.13	Output power -LSB Sin				
2.14	Output power- LSB Cos				
2.15	RF Input level				
3.0	**Status Indicator**		**Normal Indication**	**Observed Status**	
				1	**2**
3.1	PDC	Power	ON		
3.2		TX1	On/Off		
3.3		TX2	On/OFF		
3.4	CSP	Tx Fault	OFF		
3.5		Monitor Alarm	OFF		
3.6	AC/DC	DC Current			
3.7		Normal	ON		
3.8		Alarm	OFF		
3.9	DC/DC	Normal	ON		
3.10		Alarm	OFF		

4.0	**Transmitter Data**	**TX1**		**TX2**		**Remarks**
4.1	Operation frequency	Nominal Value	**Observed value**	Nominal Value	**Observed value**	
4.2	Carrier PLL Status	Normal		Normal		
4.3	USB PLL Status	Normal		Normal		
4.4	LSB PLL Status	Normal		Normal		
4.5	Temperature CPA	<45°C		<45°C		
4.6	Temperature MSG	<45°C		<45°C		

5.0 REMARKS.

( )
Signature of Duty Officer
Name…….
Designation……..

6.0 Comment /Action Taken Detail

( )
Signature of Unit Incharge
Name…….
Designation……..

AIRPORTS AUTHORITY OF INDIA CNS MANUAL VOL. VII Part 2

PREVENTIVE MAINTENANCE SCHEDULE – DAILY (DME-MARU – 310/320)

STATION: ..... Region :

FREQUENCY/ CH No: IDENT: DATE: .....

S. No.	Parameters	Nominal Value and tolerances	Observed Status	
1.0	**GENERAL**			
1.1	Equipment shelter cleanliness	Dust free		
1.2	Status of the air conditioners	Serviceable		
1.3	Equipment shelter Condition a) Temperature b) Humidity	 22° ±4° C < 70%		
1.4	Mains Power supply a) Voltage b) Frequency	 230V±10% 50 Hz ± 2.5%		
1.5	UPS/Stabilizer output	230 ±5V		
1.6	Status of Monitor	OK		
1.7	Status of DME Remote indications at: a) Equipment room b) A.T.C	 OK OK		
1.8	Transponder on air	1/2		
1.9	Any Unusual noise	No		
1.10	Status of Electrical Fittings/works	No. of lights/Fans		
1.11	Status of mast light	OK		
2.0	**Active Path Mon (Using LMMS)**	**Active XP**	**MON-1**	**MON-2**
2.1	Frequency	Fc ±0.002% MHz		
2.2	System Delay (**Annex.10 Vol 1** 3.5.4.7.2.2)	50±0.5 µsec(when used with landing aid) 50±1 µsec		
2.3	Pulse Spacing	12±0.25 µsec		
2.4	Pulse duration	3.5 ±0.5 µsec		
2.5	Reply Pulse - Rise Time	2.5±0.5 µsec		
2.6	Reply Pulse - Decay Time	Nominal 2.5 µsec and≤3.5µs		
2.7	Forward Peak Power	As set at last flight check		
2.8	Reply Efficiency	>70%		
2.9	Reply Pulse Pair Rate	>700 pps		
2.10	Effective radiated Level	As set at last flight check		
2.11	IDENT Code	Station Code		
2.12	Sensitivity	Normal		
3.0	**S/By Path Mon(Using LMMS)**	**S/by Xp**	**MON-1**	**MON-2**
3.1	Frequency	Fc ±0.002% MHz		

3.2	System Delay	50±0.5 µsec (when used with landing aid) 50±1 µsec		
3.3	Pulse Spacing (Annex.10 Vol 1 3.5.4.7.2)	12±0.25 µsec		
3.4	Pulse duration	3.5 ±0.5 µsec		
3.5	Reply Pulse - Rise Time	2.5±0.5 µsec		
3.6	Reply Pulse - Decay Time (Annex 10 Vol 1 3.5.5.1.3)	Nominal 2.5 µsec and≤3.5µs		
3.7	Forward Peak Power	---		
3.8	Reply Efficiency	>70%		
3.9	Reply Pulse Pair rate	>700 pps		
3.10	Effective radiated level	-----		
3.11	IDENT Code	------		
3.12	Sensitivity	-------		

4.0	Status Indications	Normal Indication	1	2
4.1	Fault Indications on HPA	Off		
4.2	Fault Indications on LPA	Off		
4.3	AC/DC Output	Green		
4.4	DC/DC Output	Green		
4.5	Battery (Charging/ Discharging)	Charging		
4.6	Txp Fault	Off		
4.7	Mon Alarm	Off		

5.0. REMARKS:

( )
SIGNATURE OF DUTY OFFICER
NAME : .....
DESIG. : .....

6.0. COMMENTS/ACTION TAKEN DETAILS:

( )
SIGNATURE OF UNIT INCHARGE
NAME : .....
DESIG. : .....

[MAINTENANCE SCHEDULE IS BASED ON RECOMMENDATIONS OF ICAO DOCUMENTS (ANNEX 10, DOC 8071), DGCA - CAR, SEC-9(Airspace and Air Traffic Management, Series-D, Navigation, Landing and Communication Aids) AND MANUFACTURERS TECHNICAL MANUAL.]

AIRPORTS AUTHORITY OF INDIA

Preventive Maintenance Schedule: Daily
VHF RX (OTE)

Name of Station **Region…**

Make / Model: OTE DR100 **Date:**

Rx No.		**1**	**2**	**3**	**4**
Frequency (MHz)					
Location					
Parameters	**Normal status**	**status**			
Status					
Rxn Check					
AC/DC Change over	Change Over Normal				
Active measurements					
RASSI Level (with signal)	> - 100 dbm				
Remarks:					

(Maintenance Official)
Name/Designation

(Unit In-Charge)
Name/Designation

(This maintenance schedule has been prepared as per guidelines provided in ICAO Annex 10 volume-III Aeronautical Telecommunication – Communication systems Part –II Voice Communication Systems and based on guidelines provided in manufacturer Technical Manual)

VHF TRANSMITTER Daily Maintenance

Name of Station: GAGGAL **Region: Northern**
Make/Model: OTE DT 100 **DATE:**

Tx No		1	2	3	4
Frequency (MHz)					
Location					
Parameters	Normal status	Measured/Observed status			
AC Power	Green Lamp lit				
Status	Active /Off line				
Transmission check	Transmission lamp lit				
Reception check	Test Txn Nml				
AC/DC Change over	Change over normal				
Active Measurements					
Temperature	<55 Deg C				
VSWR	1-2				
RF Output Power	25-50W				
Modulation %	30-90%				
Remarks					

Signature **Signature**
(Maintenance Officer) **(Unit –in-Charge)**

(This maintenance schedule has been prepared as per guidelines provided in ICAO Annex 10 volume- III Aeronautical Telecommunication – Communication systems Part –II Voice Communication Systems and based on guidelines provided in manufacturer Technical Manual)

Detail of UPS for CNS and AS facility available at Kangra Airport

NAME OF FACILITIES /ROOM	No. of ACs functioning	UPS		Battery back up		Remarks
		Type/Make	Rating	NO.	Rating	
Equipment room **LAN/WAN VSAT**	Two Split AC	UNILINE Hitachi APC UNILINE	5KVA 5KVA(online) 5KVA 1KVA	01 01 02 01	24V,180 AH	
ETD		NUMERIC	3 KVA	01		
XBIS 6040i		NUMERIC	3 KVA	01		
XBIS 100100v		NUMERIC	3 KVA	01		
XBIS NUTECH 6040BI		EMERSON	3 KVA	01		
XBIS NUTECH 100100BI		EMERSON	3 KVA	01		
PA SYSTEM	01 split AC	NUMERIC	3 KVA	01		
EPABX	01 split AC	NUMERIC	3 KVA	01		
DVOR/DME	05 split	APC	5KVA modular	01		

Standard and recommended practices (SARP) of DVOR and DME ICAO Annex10 Volume 1

Specification for VHF Omni directional radio range (VOR)

The VOR shall be constructed and adjusted so that similar instrumental indications in aircraft represent equal Clockwise angular deviations (bearings), degree for degree from magnetic North asmeasured from the location of the VOR.
The VOR shall radiate a radio frequency carrier with which is associated two separate 30Hz modulations.
One of these modulations shall be such that its phase is independent of the azimuth of the point of observation (reference phase). The other modulation (variable phase) shall be such that its phase at the point of observation differs from that of the reference phase by an angle equal to the bearing of the point of observation with respect tothe VOR.
The reference and variable phase modulations shall be in phase along the referencemagnetic meridian through the station.
Note. — The reference and variable phase modulations are in phase when the maximumvalue of the sum of the radio frequency carrier and the sideband energy due to the variable phase modulation occurs at the same time as the highest instantaneous frequency of the reference phase modulation.

Radio frequency

The VOR shall operate in the band 111.975 MHz to 117.975 MHz except that frequencies in the band 108 MHz to 111.975 MHz may be used when, in accordance with the provisions of Volume V, Chapter 4, 4.2.1 and 4.2.3.1, the use of such frequencies is acceptable. The highest assignable frequency shall be 117.950 MHz. The channel separation shall be in increments of 50 kHz referred to the highest assignable frequency. In areas where 100 kHz or 200 kHz channel spacing is in general use, the frequency tolerance of the radio frequency carrier shall be plus or minus 0.005 per cent.
The frequency tolerance of the radio frequency carrier of all new installations implementedafter 23 May 1974 in areas where 50 kHz channel spacing is in use shall be plus or minus 0.002 per cent.

In areas where new VOR installations are implemented and are assigned frequencies spaced at 50 kHz from existing VORs in the same area, priority shall be given to ensuring that the frequency tolerance of the radio frequency carrier of the existing VORs is reduced to plus or minus 0.002 per cent.

Polarization and pattern accuracy

The emission from the VOR shall be horizontally polarized. The vertically polarized component of the radiation shall be as small as possible.

(Doc 8071) as to flight checks that can be carried out to determine the effects of vertical polarization on the bearing accuracy.)

The ground station contribution to the error in the bearing information conveyed by the horizontally polarized radiation from the VOR for all elevation angles between 0 and 40 degrees, measured from the center of the VOR antenna system, shall be within plus or minus 2 degrees.

Coverage

The VOR shall provide signals such as to permit satisfactory operation of a typical aircraftinstallation at the levels and distances required for operational reasons, and up to an elevation angle of 40degrees.

Recommendation. — *The field strength or power density in space of VOR signals required to permit satisfactory operation of a typical aircraft installation at the minimum service level at themaximum specified service radius should be 90 microvolt per meter or minus 107 dBW/m^2.*

Modulations of navigation signals

The radio frequency carrier as observed at any point in space shall be amplitude modulatedby two signals as follows:

a) a subcarrier of 9960 Hz of constant amplitude, frequency modulated at 30 Hz:

1) for the conventional VOR, the 30 Hz component of this FM subcarrier is fixed withoutrespect to azimuth and is termed the "reference phase" and shall have a deviation ratio of 16 plus or minus 1 (i.e. 15 to 17);

2) For the Doppler VOR, the phase of the 30 Hz component varies with azimuth and is termed the "variable phase "and shall have a deviation ratio of 16 plus or minus 1 (i.e. 15 to 17) when observed at any angle of elevation up to 5 degrees, with a minimum deviation ratio of 11 when observed at any angle of elevation above 5 degrees and up to 40 degrees;

b) a 30 Hz amplitude modulation component:

1) For the conventional VOR, this component results from a rotating field pattern, the phaseof which varies with azimuth, and is termed the "variable phase";

2) For the Doppler VOR, this component, of constant phase with relation to azimuth and constant amplitude, is radiated Omni directionally and is termed the "reference phase".

The nominal depth of modulation of the radio frequency carrier due to the 30 Hz signal orthe subcarrier of 9960 Hz shall be within the limits of 28 per cent and 32 per cent.

Note. — This requirement applies to the transmitted signal observed in the absence ofmultipath.

The depth of modulation of the radio frequency carrier due to the 30 Hz signal, as

observedat any angle of elevation up to 5 degrees, shall be within the limits of 25 to 35 percent. The depth ofmodulation of the radio frequency carrier due to the 9960 Hz signal, as observed at any angle of elevation up to 5 degrees, shall be within the limits of 20 to 55

Percent on facilities without voice modulation, and within the limits of 20 to 35 per cent onfacilities with voice modulation.

Note. — When modulation is measured during flight testing under strong dynamic multipathconditions, variations in the received modulation percentages are to be expected. Short-term variations beyond these values may be acceptable. The Manual on Testing of Radio Navigation Aids *(Doc 8071) contains additional information onthe application of airborne*

Modulation Tolerances.

The variable and reference phase modulation frequencies shall be 30 Hz within plus or minus 1 per cent.

The subcarrier modulation mid-frequency shall be 9960 Hz within plus or minus 1 percent.

a) For the conventional VOR, the percentage of amplitude modulation of the 9960 Hzsubcarrier shall not exceed

b) 5 percent.

C) For the Doppler VOR, the percentage of amplitude modulation of the 9960 Hz subcarriershall not exceed 40 percent when measured at a point at least 300 m (1000 feet) from the VOR.

Where 50 kHz VOR channel spacing is implemented, the sideband level of the harmonics of the 9960 Hz component in the radiated signal shall not exceed the following levels referred to the levelof the 9 960 Hz sideband:

Subcarrier Level
9960 Hz 0 dB
reference2nd
harmonic –30 dB
3rd harmonic –50
dB
4th harmonic and above –
60 dBVoice and
identification

If the VOR provides a simultaneous communication channel ground-to-air, it shall be on the same radio frequency carrier as used for the navigational function. The radiation on this channel shall be horizontally polarized.

The peak modulation depth of the carrier on the communication channel shall not be greaterthan 30 per cent.

The audio frequency characteristics of the speech channel shall be within 3 dB

relative tothe level at 1000 Hz over the range 300 Hz to 3000 Hz.
The VOR shall provide for the simultaneous transmission of a signal of identification on the same radio frequency carrier as that used for the navigational function. The identification signalradiation shall be horizontally polarized.
The identification signal shall employ the International Morse Code and consist of two or three letters. It shall be sent at a speed corresponding to approximately 7 words per minute. The signal shall be repeated at least once every 30 seconds and the modulation tone shall be 1020 Hz within plus or minus 50 Hz.
Recommendation.— *The*

identification signal should be transmitted at least three times each 30 seconds, spaced equally within that time period. One of these identification signals may take the formof a voice identification.
Note. — Where a VOR and DME are associated in accordance with 3.5.2.5, theidentification provisions of 3.5.3.6.4 influence the VOR identification.
The depth to which the radio frequency carrier is modulated by the code identification signal shall be close to, but not in excess of 10 per cent except that, where a communication channel is not provided, it shall be permissible to increase the modulation by the code identificationsignal to a value not exceeding 20 per cent.
Recommendation. — *If the VOR provides a simultaneous communication channel ground-to-air, then modulation depth of the code identification signal should be 5 plus or minus 1 per cent in order to provide a satisfactory voice quality.*
The transmission of speech shall not interfere in any way with the basic navigational function. When speech is being radiated, the code identification shall not be suppressed.
The VOR receiving function shall permit positive identification of the wanted signal under the signal conditions encountered within the specified coverage limits, and with the modulation parameters specified at 3.3.6.5, 3.3.6.6 and 3.3.6.7.
Monitoring
Suitable equipment located in the radiation field shall provide signals for the operation ofan automatic monitor.
The monitor shall transmit a warning to a control point, and either remove the identificationand navigation components from the carrier or cause radiation to cease if any one or a combination of the following deviations from established conditions arises:
a) a change in excess of 1 degree at the monitor site of the bearing information transmittedby the VOR;
b) A reduction of 15 per cent in the modulation components of the radio frequency signals voltage level at the monitor of either the subcarrier, or 30 Hz amplitude modulation signals, or both.
Failure of the monitor itself shall transmit a warning to a control point and either:
a) remove the identification and navigation components from the carrier; or

b) Cause radiation to cease.

Specification for UHF distance measuring equipment (DME)

Definitions

Control motion noise (CMN). That portion of the guidance signal error which causes control surface, wheel and column motion and could affect aircraft attitude angle during coupled flight, but does not cause aircraft displacement from the desired course and/or glide path

DME dead time. A period immediately following the decoding of a valid interrogationduring which a received interrogation will not cause a reply to be generated.

Note. — Dead time is intended to prevent the transponder from replying to echoes

resultingfrom multipath effects.

DME/N. Distance measuring equipment, primarily serving operational needs of en-route Or TMA navigation, where the "N"stands for narrow spectrum characteristics.

DME/P. The distance measuring element of the MLS, where the "P" stands for precise distance measurement. The spectrumCharacteristics are those of DME/N.

Equivalent isotropically radiated power (EIRP). The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain).

Final approach (FA) mode. The condition of DME/P operation which supports flightoperations in the final approach and runway regions.

Initial approach (IA) mode. The condition of DME/P operation which supports those flight operations outside the final approach region and which is interoperable with DME/N.

Key down time. The time during which a dot or dash of a Morse character is beingtransmitted.

MLS approach reference datum. A point on the minimum glide path at a specified heightabove the threshold.

MLS datum point. The point on the runway center line closest to the phase center of the approach elevation antenna.

Mode W, X, Y, Z. *A method of coding the DME transmissions by time spacing pulses of apulse pair, so that each frequency can be used more than once.*

Partial rise time. The time as measured between the 5 and 30 per cent amplitude points onthe leading edge of the pulse envelope,

Path following error (PFE). That portion of the guidance signal error which could causeaircraft displacement from the desired course and/or glide path. Pulse amplitude. The maximum voltage of the pulse envelope.

Pulse decay time. The time as measured between the 90 and 10 per cent amplitude

pointson the trailing edge of the pulse Envelope

Pulse code. The method of differentiating between W, X, Y and Z modes and between FAand IA modes.

Pulse duration. The time interval between the 50 per cent amplitude point on leading andtrailing edges of the pulse envelope.

Pulse rise time. The time as measured between the 10 and 90 per cent amplitude points onthe leading edge of the pulse Envelope.

Reply efficiency. The ratio of replies transmitted by the transponder to the total of receivedvalid interrogations.

Search. The condition which exists when the DME interrogator is attempting to acquireand lock onto the response to its own Interrogations from the selected transponder.

System efficiency. The ratio of valid replies processed by the interrogator to the total of itsown interrogations.

Track. The condition which exists when the DME interrogator has locked onto replies in response to its own interrogations, and is continuously providing a distance measurement.

Transmission rate. The average number of pulse pairs transmitted from the transponderper second.

Virtual origin. The point at which the straight line through the 30 per cent and 5 per cent amplitude points on the pulse leading edge intersects the 0 per cent amplitude axis

General

The DME system shall provide for continuous and accurate indication in the cockpit of theslant range distance of an equipped aircraft from an equipped ground reference point.

The system shall comprise two basic components, one fitted in the aircraft, the otherinstalled on the ground.

The aircraft component shall be referred to as the interrogator and the ground componentas the transponder.

In operation, interrogators shall interrogate transponders which shall, in turn, transmit to the interrogator replies synchronized with the interrogations, thus providing means for accurate measurement of distance.

Associated VOR and DME facilities shall be collocated in accordance with thefollowing:

a) for those facilities used in terminal areas for approach purposes or other procedures where the highest position fixing accuracy of system capability is required, the separation of the VOR and DME antennas does not exceed 80 m (260 feet);

b) For purposes other than those indicated in a), the separation of the VOR and DME antennas does not exceed 600 m (2000 feet).

System characteristics

Performance

Range. The system shall provide a means of measurement of slant range distance from an aircraft to a selected transponder to the limit of coverage prescribed by the operational requirements for the selected transponder.

Coverage

When associated with a VOR, DME/N coverage shall be at least that of the VOR to theextent practicable.

Accuracy

System accuracy. The accuracy standards shall be met on a 95 percent probability basis.

Radio frequencies and polarization. The system shall operate with vertical polarizationin the frequency band 960 MHz to 1215 MHz. The interrogation and reply frequencies shall be assigned with 1MHz spacing between channels.

Channeling

DME operating channels shall be formed by pairing interrogation and reply frequencies and by pulse coding on the paired frequencies.

Channel pairing. When a DME transponder is intended to operate in association with asingle VHF navigation facility in the 108 MHz to 117.95 MHz frequency band

Interrogation pulse repetition frequency

Note. — If the interrogator operates on more than one channel in one second, the followingspecifications apply to the DME/N. The interrogator average pulse repetition frequency (PRF) shall not exceed 30 pairs of pulses per second, based on the assumption that at least 95 per cent of the time is occupied for tracking.

DME/N. If it is desired to decrease the time of search, the PRF may be increased duringsearch but shall not exceed 150 pairs of pulses per second.

DME/N. **Recommendation.—** *After 15 000 pairs of pulses have been transmitted without acquiring indication of distance, the PRF should not exceed 60 pairs of pulses per second thereafter, until a change in operating channel is made or successful search is completed.*

DME/N. When, after a time period of 30 seconds, tracking has not been established, thepulse pair repetition frequency shall not exceed 30 pulse pairs per second thereafter.

The aircraft handling capacity of transponders in an area shall be adequate for the peaktraffic of the area or 100 aircraft, whichever is the lesser.

Recommendation. — *Where the peak traffic in an area exceeds 100 aircraft, thetransponder should be capable of handling that peak traffic.*

Transponder identification

All transponders shall transmit an identification signal in one of the following forms:
a) an "independent" identification consisting of coded (International Morse Code) identity Pulses which can be usedwith all transponders;
b) An "associated" signal which can be used for transponders specifically associated with a VHF navigation or an MLS angle guidance facility which itself transmits an identification signal.
Both systems of identification shall use signals, which shall consist of the transmission foran appropriate period of a series of paired pulses transmitted at a repetition rate of 1350 pulse pairs pers second, and shall temporarily replace all reply pulses that would normally occur at that time .
DME/N. **Recommendation.—** *If it is desired to preserve a constant duty cycle, an equalizing pair of pulses, having the same characteristics as the identification pulse pairs, should be transmitted100 microseconds plus or minus 10 microseconds after each identity pair.*
The characteristics of the "independent" identification signal shall be as follows:
a) the identity signal shall consist of the transmission of the beacon code in the form of dots and dashes (International Morse Code) of identity pulses at least once every 40 seconds, at a rate of at least 6 words per minute; and
b) The identification code characteristic and letter rate for the DME transponder shall conform to the following to ensure that the maximum total key down time does not exceed 5 seconds per identification code group. The dots shall be a time duration of 0.1 second to 0.160 second. The dashes shall be typically 3 times the duration of the dots.
The duration between dots and/or dashes shall be equal to that of one dot plus or minus 10 per cent. The time duration between letters or numerals shall not be less than three dots. The total period fortransmission of an identification code group shall not exceed 10 seconds.
Note. — The tone identification signal is transmitted at a repetition rate of 1350 pps. This frequency may be used directly in the airborne equipment as an aural output for the pilot, or other frequenciesmay be generated at the option of the interrogator designer

Detailed technical characteristics of transponder and associated monitor
Transmitter

Frequency of operation. The transponder shall transmit on the reply frequency appropriateto the assigned DME channel.
Frequency stability. The radio frequency of operation shall not vary more than plus orminus 0.002 per cent from the assigned frequency.
Pulse shape and spectrum. The following shall apply to all radiated pulses:
a) Pulse rise time.
1) *DME/N.* Pulse rise time shall not exceed 3 microseconds.

2) *DME/P.* Pulse rise time shall not exceed 1.6 microseconds. For the FA mode, the pulse shall have a partial rise time of 0.25 plus or minus 0.05 microsecond. With respect to the FA mode and accuracy standard 1, the slope of the pulse in the partial rise time shall not vary by more than plus or minus 20 per cent. For accuracy standard 2, the slope shall not vary by more than plus or minus 10 per cent.

3) DME/P. **Recommendation. —** *Pulse rise time should not exceed 1.2 microseconds.*
b) Pulse duration shall be 3.5 microseconds plus or minus 0.5 microsecond.
c) Pulse decay time shall nominally be 2.5 microseconds but shall not exceed 3.5microseconds.
d) The instantaneous amplitude of the pulse shall not, at any instant between the point ofthe leading edge which is 95 per cent of maximum amplitude and the point of the trailing edge which is 95 per cent of the maximum amplitude, fall below a value which is 95 per cent of the maximum voltage amplitude of the pulse.
e) For DME/N and DME/P: the spectrum of the pulse modulated signal shall be such that during the pulse the EIRP contained in a 0.5 MHz band centered on frequencies 0.8 MHz above and 0.8 MHz below the nominal channel frequency in each case shall not exceed 200 mW, and the EIRP contained in a 0.5 MHz band centered on frequencies 2 MHz above and 2 MHz below the nominal channel frequency in each case shall not exceed 2 mW. The EIRP contained within any 0.5 MHz band shall decrease monotonically as the band center frequency moves away from the nominal channel frequency.

Note. — Guidance material relating to the pulse spectrum measurement is provided inDocument EUROCAE ED-57 (including Amendment No. 1).

f) To ensure proper operation of the thresholding techniques, the instantaneous magnitudeof any pulse turn-on Transients which occur in time prior to the virtual origin shall be less than one per cent of the pulse peak amplitude.
Initiation of the turn-on process shall not commence sooner than 1 microsecond prior tothe virtual origin.
Note 1. — The time "during the pulse" encompasses the total interval from the beginning of pulse transmission to its end.
For practical reasons, this interval may be measured between the 5 per cent points on the leading and trailing edges of the pulse envelope.
DME/N. The tolerance on the pulse spacing shall be plus or minus 0.25 microsecond.
DME/N. **Recommendation. —** *The tolerance on the DME/N pulse spacing should be plusor minus 0.10 microsecond.*

Peak power output
DME/N. **Recommendation. —** *The peak EIRP should not be less than that required to ensure a peak pulse power density of approximately minus 83 dBW/m^2 at the maximum specified service range and level.*

‡3.5.4.1.5.2 *DME/N.* The peak equivalent isotropic ally radiated power shall not be lessthan that required to ensure a peak pulse power density of minus 89 dBW/m^2 under all operational weather conditions at any point within coverage specified. The peak power of the constituent pulses of any pair of pulses shall not differ by morethan 1 dB.

Recommendation. — *The reply capability of the transmitter should be such that the transponder should be capable of continuous operation at a transmission rate of 2 700 plus or minus 90 pulse pairs per second (if 100 aircraft are to be served).*

The transmitter shall operate at a transmission rate, including randomly distributed pulse pairs and distance reply pulse pairs, of not less than 700 pulse pairs per second except during identity. The minimum transmission rate shall be as close as practicable to 700 pulse pairs per second.

Note.— Operating DME transponders with quiescent transmission rates close to 700 pulsepairs per second will minimize the effects of pulse interference, particularly to other aviation services such as GNSS.

Spurious radiation. During intervals between transmissions of individual pulses, the spurious power received. And measured in a receiver having the same characteristics as a transponder receiver, but tuned to any DME interrogation or reply frequency, shall be more than 50 dB below the peak pulse power received and measured in the same receiver tuned to the reply frequency in use during the transmission of the required pulses. This provision refers to all spurious transmissions, including modulator and electrical interference.

DME/N. The spurious power level shall be more than 80 dB below the peak pulse power level.

Out-of-band spurious radiation. At all frequencies from 10 to 1800 MHz, but excluding the band of frequencies from 960 to 1215 MHz, the spurious output of the DME transponder transmitter shall not exceed minus 40 dBm in any one kHz of receiver bandwidth. The equivalent isotropic ally radiated power of any CW harmonic of the carrier frequency on any DME operating channel shall not exceed minus 10 dBm.

Receiver

Frequency of operation. The receiver center frequency shall be the interrogation frequency appropriate to the assigned DME operating channel

Frequency stability. The center frequency of the receiver shall not vary more than plus orminus 0.002 percent from the assigned frequency.

Transponder sensitivity

In the absence of all interrogation pulse pairs, with the exception of those necessary toperform the sensitivity Measurement, interrogation pulse pairs with the correct spacing and nominal frequency shall trigger the transponder if the peak power density at the transponder antenna is at least:

a) minus 103 dBW/m2 for DME/N with coverage range greater than 56 km (30 NM);
b) minus 93 dBW/m2 for DME/N with coverage range not greater than 56 km (30 NM);The minimum power densities specified shall cause the transponder to reply with an efficiency of at least:
a) 70 per cent for DME/N;
b) 70 per cent for DME/P IA mode;
c) 80 per cent for DME/P FA mode.
DME/N dynamic range. The performance of the transponder shall be maintained when thepower density of the interrogation signal at the transponder antenna has any value between the minimum specified in 3.5.4.2.3.1 up to a maximum of minus 22 dBW/m^2 when installed with ILS or MLS and minus 35 dBW/m2when installed for other applications. The transponder sensitivity level shall not vary by more than 1 dB for transponder loadings between 0 and 90 per cent of its maximum transmission rate.
DME/N. When the spacing of an interrogator pulse pair varies from the nominal value byup to plus or minus 1 microsecond, the receiver sensitivity shall not be reduced by more than 1 dB.
Load limiting
DME/N. **Recommendation. —** *When transponder loading exceeds 90 per cent of the maximum transmission rate, the receiver sensitivity should be automatically reduced in order to limitthe transponder replies, so as to ensure that the maximum permissible transmission rate is not exceeded. (The available range of sensitivity reduction should be at least 50 dB.)*
Bandwidth
The minimum permissible bandwidth of the receiver shall be such that the transpondersensitivity level shall not deteriorate by more than 3 dB when the total receiver drift is added to anincoming interrogation frequency drift of plus or minus 100 kHz.
Signals greater than 900 kHz removed from the desired channel.
Signals arriving at the intermediate frequency shall be suppressed at least 80 dB. All other spurious response or signals within the 960 MHz to 1215 MHz band and image frequencies shall be suppressed at least 75dB.
Recovery time. Within 8 microseconds of the reception of a signal between 0 dB and 60 dB above minimum sensitivity level, the minimum sensitivity level of the transponder to a desired signal shall be within 3 dB of the value obtained in the absence of signals. This requirement shall be met with echo suppression circuits, if any, rendered in operative.

The 8 microseconds are to be measured between the half voltage points on the leading edges of the two signals, both of which conform in shape.

CW and echo suppression

Recommendation. — *CW and echo suppression should be adequate for the sites at which the transponders will be used.*

Recommendation. — *Protection against interference outside the DME frequency bandshould be adequate for the sites at which the transponders will be used.*

Decoding

The transponder shall include a decoding circuit such that the transponder can be triggered only by pairs of received pulses having pulse duration and pulse spacing appropriate to interrogator signals the decoding circuit performance shall not be affected by signals arriving before, between, or after, the constituent pulses of a pair of the correct spacing.

DME/N — Decoder rejection. An interrogation pulse pair with a spacing of plus or minus2 microseconds, or more, from the nominal value and with any signal level up to the value specified in 3.5.4.2.3.3 shall be rejected such that the transmission rate does not exceed the value obtained when interrogations are absent.

Time delay

When a DME is associated with an MLS angle facility, the time delay shall be the interval from the half voltage point on the leading edge of the first constituent pulse of the interrogation pair and the half voltage point on the leading edge of the first constituent pulse of the reply transmission. This delay shall be 50 microseconds for mode X channels and 56 microseconds for mode Y channels, when it is desired that aircraft interrogators are to indicate distance from the transponder site.

Recommendation.— *For the DME/N the transponder time delay should be capable of being set to an appropriate value between the nominal value of the time delay minus 15 microseconds and the nominal value of the time delay, to permit aircraft interrogators to indicate zero distance at a specific point remote from the transponder site.*

Note. — Modes not allowing for the full 15 microseconds range of adjustment in transponder time delay may only be adjustable to the limits given by the transponder circuit delay and recovery time.

DME/N. The time delay shall be the interval from the half voltage point on the leading edge of the first constituent pulse of the interrogation pair and the half voltage point on the leading edge of the first constituent pulse of the reply transmission.

DME/N. **Recommendation. —** *Transponders should be sited as near to the point at which zero indication is required as is practicable Accuracy*

DME/N. The transponder shall not contribute more than plus or minus 1 microsecond

(150m (500 feet)) to the overall system error.

DME/N. **Recommendation. —** *The contribution to the total system error due to the combination of the transponder errors, transponder location coordinate errors, propagation effects and random pulse interference effects should be not greater than plus or minus 340 m (0.183 NM) plus 1.25 per cent of distance measure.*

Note. — This error contribution limit includes errors from all causes except the airborne equipment, and assumes that the airborne equipment measures time delay based on the first constituent pulse of a pulse pair.

DME/N. The combination of the transponder errors, transponder location coordinates errors, propagation effects and random pulse interference effects shall not contribute more than plus or minus 185 m (0.1 NM) to the overall system error.

Note. — This error contribution limit includes errors from all causes except the airborne equipment, and assumes that the airborne equipment measures time delay based on the first constituent pulse of a pulsepair.

DME/N. A transponder associated with a landing aid shall not contribute more than plus orminus 0.5 microsecond (75 m (250 feet)) to the overall system error.

Efficiency

1 The transponder reply efficiency shall be at least 70 per cent for DME/N and DME/P(IA mode) and 80 percent for DME

Transponder dead time. The transponder shall be rendered inoperative for a periodnormally not to exceed 60 microseconds after a valid interrogation decode has occurred. In extreme cases when the geographical site of the transponder is such as to produce undesirable reflection problems, the dead time may be increased but only by the minimum amount necessary to allow the suppression of echoes for DME/N and DME/P IA mode.

In DME/P the IA mode dead time shall not blank the FA mode channel and vice versa.

Monitoring and control

Means shall be provided at each transponder site for the automatic monitoring and controlof the transponder in use.

DME/N monitoring action

a) a suitable indication shall be given at a control point;

b) the operating transponder shall be automatically switched off; and

c) The standby transponder, if provided, shall be automatically placed in operation.The monitor shall cause the actions if:

a) The transponder delay differs from the assigned value by 1 microsecond (150 m (500 feet))or more;

‡b) in the case of a DME/N associated with a landing aid, the transponder delay differs From the assigned value by 0.5 microsecond (75 m (250 ft)) or more.

Recommendation. — *The monitor should cause the actions specified in 3.5.4.7.2.1*

if thespacing between the first and second pulse of the transponder pulse pair differs from the nominal value by 1microsecond or more.

Recommendation. — *The monitor should also cause a suitable indication to be given at a control point if any of the following conditions arise:*

a) a fall of 3 dB or more in transponder transmitted power output;

b) a fall of 6 dB or more in the minimum transponder receiver sensitivity (provided that this is not due to the action of the receiver automatic gain reduction circuits);

c) the spacing between the first and second pulse of the transponder reply pulse pairdiffers from the normal value by 1 microsecond or more;

d) variation of the transponder receiver and transmitter frequencies beyond the control range of the reference circuits

DME/N and DME/P monitor failure. Failure of any part of the monitor itself shall automatically produce the same results as the malfunctioning of the element being monitored. Technical characteristics of interrogator

Note. — The following subparagraphs specify only those interrogator parameters whichmust be defined to ensure that the interrogator:

a) does not jeopardize the effective operation of the DME system, e.g. by increasing transponder loading abnormally; and

b) Is capable of giving accurate distance reading.

Transmitter

Frequency of operation. The interrogator shall transmit on the interrogation frequency appropriate to the assigned DME channel

Note. — This specification does not preclude the use of airborne interrogators having less than the total number of operating channels.

Frequency stability. The radio frequency of operation shall not vary more than plus or minus 100 kHz from the assigned value.

Pulse shape and spectrum. The following shall apply to all radiated pulses:

a) Pulse rise time.

1) *DME/N.* Pulse rise time shall not exceed 3 microseconds.

2) *DME/P.* Pulse rise time shall not exceed 1.6 microseconds. For the FA mode, the pulse shall have a partial rise time of 0.25 plus or minus 0.05 microsecond. With respect to the FA mode and accuracy standard 1, the slope of the pulse in the partial rise time shall not vary by more than plus or minus 20 per cent. For accuracy standard the slope shall not vary by more than plus or minus 10 per cent.

3) DME/P. **Recommendation. —** *Pulse rise time should not exceed 1.2 microseconds.*

b) Pulse duration shall be 3.5 microseconds plus or minus 0.5 microseconds.

c) Pulse decay time shall nominally be 2.5 microseconds, but shall not exceed 3.5microseconds.

d) The instantaneous amplitude of the pulse shall not, at any instant between the points of the leading edge which is 95 per cent of maximum amplitude and the point of the trailing edge which is 95 per cent of the maximum amplitude, fall

below a value which is 95 per cent of the maximum voltage amplitude of the pulse.
e) The spectrum of the pulse modulated signal shall be such that at least 90 per cent of the energy in each pulse shall be within 0.5 MHz in a band centered on the nominal channel frequency.
f) To ensure proper operation of the thresholding techniques, the instantaneous magnitude of any pulse turn-on transients which occur in time prior to the virtual origin shall be less than one per cent of the pulse peak amplitude.

Initiation of the turn-on process shall not commence sooner than 1 microsecond prior tothe virtual origin.

Pulse spacing

DME/N. The tolerance on the pulse spacing shall be plus or minus 0.5 microseconds.
DME/N. **Recommendation. —** *The tolerance on the pulse spacing should be plus or minus 0.25 microsecond.*
DME/P. The tolerance on the pulse spacing shall be plus or minus 0.25 microseconds. The pulse spacing shall be measured between the half voltage points on the leading edgesof the pulses.

Pulse repetition frequency

The variation in time between successive pairs of interrogation pulses shall be sufficient to prevent false lock-on.

Spurious radiation. During intervals between transmission of individual pulses, the spurious pulse power received and measured in a receiver having the same characteristics of a DME transponder receiver, but tuned to any DME interrogation or reply frequency, shall be more than 50 dB below the peak pulse power received and measured in the same receiver tuned to the interrogation frequency in use during the transmission of the required pulses. This provision shall apply to all spurious pulse transmissions. The spurious CW power radiated from the interrogator on any DME interrogation or reply frequency shall not exceed 20 microwatts (minus 47 dBW).

Note. — Although spurious CW radiation between pulses is limited to levels not exceeding minus 47 dBW, States are cautioned that where DME interrogators and secondary surveillance radar transponders are employed in the same aircraft, it may be necessary to provide protection to airborne SSR in the band 1015 MHz to 1045 MHz This protection may be provided by limiting conducted and radiated CW to a level of the order of minus 77 dBW. Where this level cannot be achieved, the required degree of protection may be provided in planning the relative location of the SSR and DME aircraft antennas. It is to be noted that only a few of these frequencies are utilized in the VHF/DME pairing plan.

Recommendation. — *The spurious pulse power received and measured under the conditions stated in should be 80 dB below the required peak pulse power received.*

Time delay

DME/N. The time delay shall be the interval between the time of the half voltage point onthe leading edge of the second constituent interrogation pulse and the time at which the distance circuits reach the condition corresponding to zero distance indication.

DME/N. The time delay shall be the interval between the times of the half voltage point onthe leading edge of the first constituent interrogation pulse and the time at which the distance circuits reach the condition corresponding to zero distance indication.

Receiver

Receiver sensitivity

DME/N. The airborne equipment sensitivity shall be sufficient to acquire and provide distance information to the accuracy specified.

DME/N. The performance of the interrogator shall be maintained when the power density of the transponder signal at the interrogator antenna is maximum of minus 18 dBW/m^2.

Standard Operating Procedure

VHF Facility

Switching On Procedure

1. S/ON Air Conditioner to maintain the Room Temperature (18 deg. C to 22 deg. C) of Equipment Room.
2. S/ON Both Uniline UPS (5KVA) and Check input supply to UPS and output supply from UPS.
3. S/ON AC Power of VHF Equipment (Transmitters and Receivers) main and standby (OTE/PAE), then switch on DC Power backup, installed in VHF Rack.
4. Check Indications/Active parameters of VHF Equipment's and note down daily important active parameters in approved Daily check schedules.
5. Remote control of VHF Ak100 and PAE T6M are also to be switched on in ATC Tower.

Switching off procedure

1. After closing of Watch, Switch off the DC Power backup of Transmitter /Receivers (OTE/PAE) from the Switch mounted on the Equipment's.
2. Switch off the AC Power Supply of VHF rack.
3. Remote control of VHF AK100 and PAE T6M are also to be switched off in ATC Tower.
4. Bypass the 5 KVA Uniline UPS.

Note:

Standard Operating Procedure activities are to be performed before opening of the ATC Watch Hours.

Before leaving/ closing the equipment room ensure all the Air conditioners, Light and Fans and also UPS and power supplies are switched off.

DVR

Switching On Procedure

1. S/ON Both APC (5KVA) and Check input supply to UPS and output supply from UPS.
2. S/ON DVR 1 as well as DVR 2.
3. For both the DVR i.e. DVR1 and DVR 2 upon Switching ON the login screen ask for the User id and Password. Type user Id and password as "**admin**" and press enter key.
4. Now check the status of recording of all the Channels, and administrative parameters of recording in Primary HDD, DVD HDD and other media and note down parameters in approved Daily check schedules.

Switching off Procedure

1. After closing of Watch, Log off from DVR, take a System Shutdown of DVR.
2. Wait for complete shutdown , then Switch off the SMPS from back panel of equipment
3. Switch off the UPS AC Power supply and Switch off the UPS from front panel.

Note:

Standard Operating Procedure activities are to be performed before opening of the ATC Watch Hours.

Before leaving/ closing the equipment room ensure all the Air conditioners, Light and Fans and also UPS and power supplies are switched off.

Navaids Remote Control/Status indicators switching On Procedure

S/ON RCSU of DME, check status of equipment after logging in remote PC.

S/ON remote status of DME and DVOR in ATC TOWER.

Monitor the status of DVOR & DME in equipment room.

After closing of watch switch off RCSU of DME and status indicators systematically

Note:

Standard Operating Procedure activities are to be performed before opening of the ATC Watch Hours.

Before leaving/ closing the equipment room ensure all the Air conditioners, Light and Fans and also UPS and power supplies are switched off.

NAV-AIDS Facility

Switching On Procedure

1. S/ON Air Conditioner to maintain the Room Temperature (18 deg. C to 22 deg. C) of Nav-aids site Room.
2. S/ON Both Emerson UPS (6KVA) and Check input supply to UPS and output supply from UPS.
3. S/ON AC Power of DVOR & DME Equipments, then switch on DC Power backup.
4. S/ON DVOR & DME Transmitters One by One systematically.
5. Check Front panel Indications and Active parameters of DVOR & DME.
6. Monitor the coding pattern and radiation status of transmitters on front panel.
7. Note down daily active parameter readings in approved Daily check schedules kept at site
8. Confirm from tower and E/R about status indicator of DME & DVOR.
9. Man the site until the flight movements.

Switching off procedure

1 After closing of Watch, Switch off the equipments systematically.
2 S/off the DC Power backup of DVOR as well as DME from the Switch mounted back side of equipments.
3 Switch off the AC Power Supply of DVOR as well as DME.
4 Bypass the 6 KVA Emerson UPS and S/OFF the battery room exhaust fan.
5 S/ON the one air conditioner and switch off all other air conditioners.

Note:

Standard Operating Procedure activities are to be performed before opening of the ATC Watch Hours. Before leaving/ closing the equipment room ensure all the Air conditioners, Light and Fans and also UPS and power supplies are switched off.

STATISTICS ON MTBF/ AVAILABILITY OF CHANNELS/FACILITIES

We are maintaining the statistics on MTBF/Availability of Channels/facilities by monthly sending NS113 report to MIS-NR.

System software backup and preservation of backup media is available at station.

Record Systems Related to Maintenance of Facilities

1. VHF TX/RX & (EQUIPMENT ROOM)

Records

- Daily Maintenance
- Monthly /Six Monthly Maintenance
- Fault Log Book
- VHF Monitoring Reports
- Log Book (Duty Officer)

2. SECURITY EQUIPMENT & P.A. SYSTEM

Records

- Log Book
- Daily Maintenance – Security Equipment
- Daily Status – P.A. System
- Daily Maintenance – XBIS
- Monthly Maintenance - XBIS

3 LAN/WAN/EPABX/ Computers Maintenance UNIT

Records

- LAN/WAN Fault Log Book
- EPABX Extension Fault Register
  Computer Complaints Register

PROCEDURES ADAPTED FOR REPAIR BEYOND THE SCOPE OF STATION

SMU Details:

Special Maintenance Units(SMU) are established at specified airports for component level repair of un- serviceable modules for various CNS facilities as per the details given below –

Sl. NO	EQUIPMENT FACILITY	SMU LOCATION	CONTACT No's	E-MAIL
1	DME (MARU 320)	HYDERABAD	Office & FAX-040- 27900149 Mobile-9490755489	smuvohy@aai.aero
2	DVOR(MARU 220)	HYDERABAD	Office & FAX-040- 27900149 Mobile-9490755489	smuvohy@aai.aero
3	DVOR ASII 1150	IGI , DELHI	011-25653907 011-25653052	Smu_navaids@aai.aero
4	DME ASII 1118/1119			
5	ILS ASI			
6	XBIS(ECIL)	HYDERABAD	040-27900149	smuxbishyd@yahoo.com
7	RADAR (NGSCO)	CHENNAI	044-22561515 EXT SMU	smuchennai@yahoo.com
8	ILS (NORMARC)			
9	DISPLAY MONITOR (SONY)			
10	VHF TX/RX OTE& PARK AIR			
11	DVTR(MARATHON PRO/RICHOCHET/VOXTRONICS) DATIS TERMA	MUMBAI	022-26819521 FAX 022-26829951	dvtrsmu@aai.aero
12	NDB(SAC100/400)	CMC DELHI	011-24691285 011-24620809	gmcmc@aai.aero
13	XBIS(HEIMAN)			smu_sap@aai.aero
14	INDRA AUTOMATION	AHMEDABAD	079-22861665 FAX 079-22885888	smuahm@aai.aero
15	DME GCEL 751/752/753	KOLKATA	033-25118240	smukol@aai.aero
16	OTE/ PAE- VHFTX/RX IP	HYDERABAD	Office-040-27906530 Fax-040- 27900149 Mobile-949454543	smuvohy@aai.aero

As per N&S directorate/CHQ letter no. CMC/General/02 dated 10-01-2007, all the coordination among CMC, SMUs and station for repair and return of un-serviceable/faulty modules/cards has to be made by e-mail as per the detail given below:

a) Faulty module/Card to be dispatched to the respective SMU and intimation to be given by e-mail as per Performa CMC-01 and a brief of fault report.

b) SMU on receipt of faulty Card/module shall raise Site Anomaly Report (SAR) and acknowledge receipt to the station in the Performa CMC-02.

c) After repair of card and testing by a competent officer of SMU for proper functioning the same shall be dispatched to the station and intimation given as per Performa CMC-03

d) On receipt of the card station will test in the circuit and intimate SMU in the Performa CMC -04 to close the SAR. However, if the card/module is not OK, the same will be returned to SMU with same SAR and as per the above procedure.

PERIODICAL RETURNS/ DEBRIEFING REPORTS FOR SERVICEABILITY

We are maintaining the Debriefing records by regularly taking debriefing report from Pilots & ATCOs. The format for the same is given below:-

Debriefing Report of Communication/Nav Aid Channels

Available with aeronautical communication station Civil Airport Kangra, H.P.

Directorate of CNS-OM
Standardized Debriefing Performa

Attachment "A" to CNS Circular 02 of 2018

Debriefing preforma
(Communication & Navigation Facilities)

VIGG (Kangra Airport) Date:

Region: NR Time of Debriefing/Observation (UTC):

Type of Debriefing: Routine
Special (after reporting of an Incident or adverse operation a1 performance)

Aircraft Details-
1.Airline Operator
2.Registration no.
3.Flight number
4.Time of landing (UTC)
5.Name of the Captain

SI. no	Facility	Frequency (Ident)	Range	Flight level	Radial	Performance	Remarks
1.	VHF Main	122.3 MHz					
2.	VHF S/By	118.05 MHz					
3.	DVOR	117.7 MHz					
4.	HP DME	1211/1148 MHz(124X)					

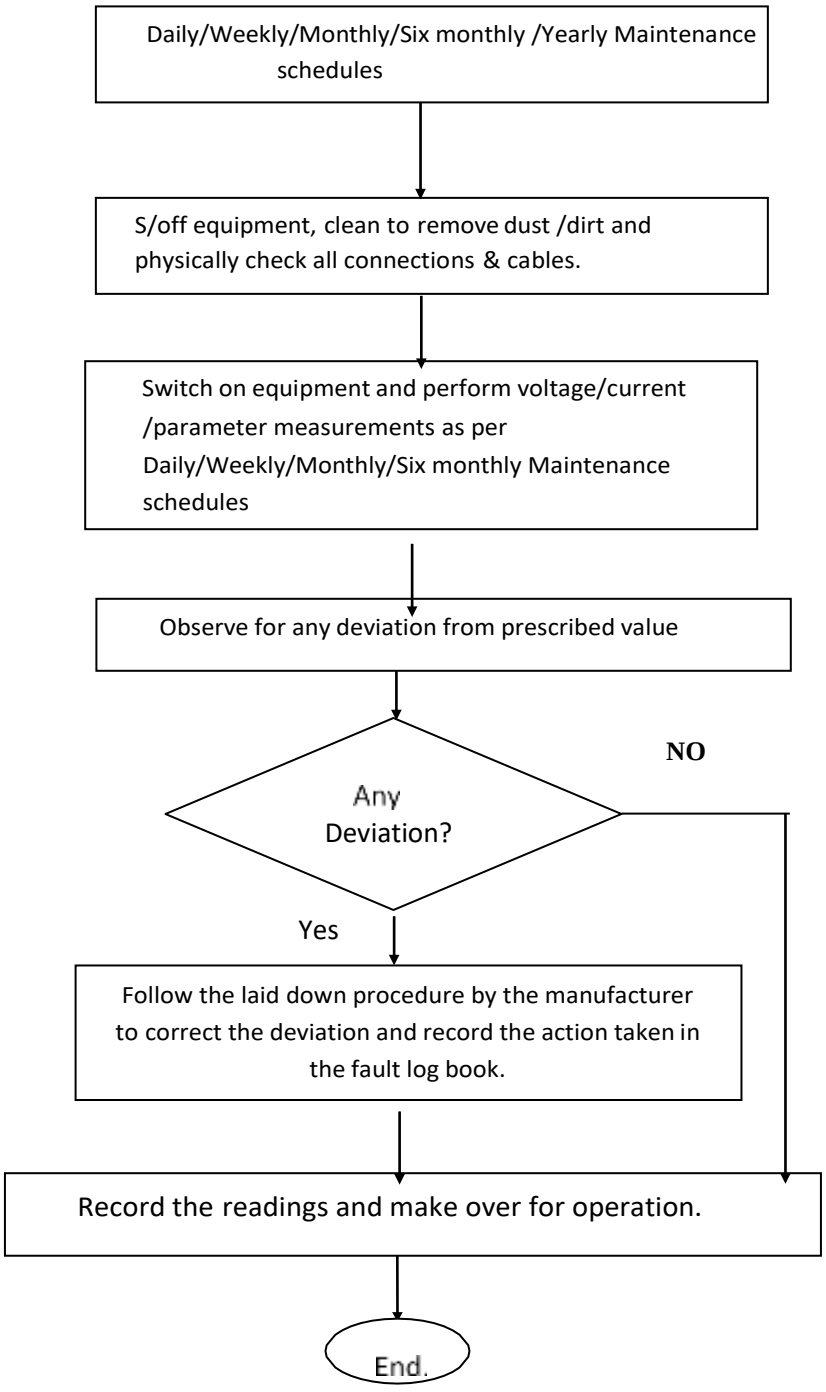
Signature of the Captain
(OR)
Signature of the Controller

Early Restoration of facilities in case of Breakdowns:

- Within 3 Hours in case of stand-by equipment or spare modules are available in the station;
- Within 2-3 days if the required spares are available for the equipment locally;
- Within 30 days if the U/S modules / PCB's are to be sent to some external agency / SMU.

PROCESS FLOWCHART

(a) Maintenance



CHAPTER 7

SAFETY MANAGEMENT SYSTEM

SAFETY MANAGEMENT SYSTEM

Safety Objectives

Airports Authority of India shall:

- Ensure that Air Navigation Service is delivered in a manner where risk of any aircraft accident/incident is reduced to and maintained at or below as Low as Reasonably Practicable irrespective of the volume of air traffic.
- Ensure that all navigational, communications and surveillance aids function as per design specifications and meet the required level of reliability and availability as defined by appropriate authority.
- Ensure that safety is maintained at appropriate level in airside operations, including cargooperations at all aerodromes and identify & manage hazards in the operational area to keep risks to aircraft operations at minimum acceptable level.
- Strive for safe apron where an accident and incidents are kept at minimum in spite of increase in traffic.
- Ensure that all visual aids are maintained as per established standards and procedures.
- Deliver accurate aeronautical data and information to all the users as and when they require.
- Maintain the environment around the aerodrome to keep it free from any birds and wildlife that may cause damage to the aircraft.
- Conduct search and rescue coordination during emergency in an efficient and effective manner.
- Provide an efficient Aerodrome Fire and Rescue response during emergencies.
- Ensure the competency level all employees are maintained by adequate and appropriate refresher training.

Safety Accountabilities, Responsibilities and Authorities of Top management of Airport

Airport Director

Safety Accountability

- The **Airport Director** is accountable to Member (Ops) through RED/ ED (Ops) for the safeaerodrome operation and to Member (ANS) through RED / ED (ATM) / ED (CNS)

- For safe Air Navigation Services, provided by Airports Authority of India at Kangra Airportto the aviation industry and the effective application of the AAI's SMS within the area of responsibility
- Taking a leadership role in safety programs and ensuring that safety is never compromisedby commercial, environmental and social pressures
- Compliance with all safety related legislation applicable to the management of airsidefacilities
- Ensuring that the annual business plan and budget is adequately resourced to achievecompliance with the SMS
- Ensuring that identified safety improvement objectives are implemented
- Ensuring that full consideration is given to safety in considering changes to organizationalstructures and business practices; and
- Management of the response to an airport

  emergency.

Safety Responsibilities

- In discharging these accountabilities, the **Airport Director** is responsible

  for:Ensuring that safety considerations are given the foremost priority
- Ensuring the application of the explicit safety management policy and procedures in accordance with AAI's safety management system within the airport
- Acceptance and overview of any residual risks or hazards, and their associated controls that are identified within the system, in accordance with the procedures contained in AAI'ssafety management manual
- Overseeing the safety and operational performance of the airport personnel and that airside facilities are provided, maintained and operated in accordance with ICAO SARPS and DGCA rules and requirements
- Ensuring that safety issues are reported in a timely manner to the directorate of aviation safety and the AAI board
- Ensuring that all airport executives and personnel are aware of, and held accountable for,their safety performance

- Ensuring that all airport executives and personnel are trained, qualified and competent todischarge their safety related obligations
- Ensuring that fitness for service, including any necessary safety assessments, has been declared and accepted by the responsible authority, in relation to the
- Development of all plans, policies, procedures, processes and systems that may affect theairport; and
- Ensuring that management of human resources is appropriate to facilitate safe operations.

HOD OF CNS

Safety Accountability

- The **HOD of CNS** is accountable to GM CNS RHQ NR and Uninterrupted Provision of CNSfacilities for safe Aerodrome operation at Kangra Airport monitoring the onsite operationsof the facilities for uninterrupted provision. Ensure the safety policy is implanted in the CNS wing in all the changes, ATS system as well as in the new projects and ensure reviewing it periodically that the policy commitment of Airport Director, Kangra Airport is carried onby all the members of his section.
- Review the requirement human resources every year & recommend the same to the Aerodrome-in-charge, Kangra Airport for necessary action.
- The cases of non-compliance or failure to discharge the safety responsibility when referredto, by the members of his discipline the same may be referred to GM CNS RHQ NR, Kangra Airport for administration action.
- Ensure that the performance targets for the CNS wing are met.
- Ensure safety assessment, risk determination, mitigation control, and monitoring of suchactivities pertaining to CNS wing.

Safety Responsibility

- In discharging these accountabilities, the **HOD OF CNS** is responsible for:

- Responsible for drawing & review safety enhancement proposal for CNS wing inconsultation with the Aerodrome-in-charge.
- Responsible for smooth & uninterrupted operation of their respective units. Responsible for sending various technical returns as required by RHQ/CHQ. Responsible for verification of Log Books, maintenance schedules/entries.
- Responsible for handling all correspondence related to the respective unit with internalas well as external agencies.
- Write off action of the obsolete & beyond economic repair equipments /parts.

- **HOD (ENGG-ELECTRICAL)**

Safety Accountability:

- He is accountable to the Airport Director, who is the accountable executive for Kangra Airport, Kangra H.P. for safe operations.

- Ensure the safety policy is implanted in the electrical wing in all the changes, ATS system as well as in the new projects and ensure reviewing it periodically that the policy commitment of Aerodrome in –charge, Kangra Airport is carried on by all the members ofhis section.
- Review the requirement every year & recommend the same to the Aerodrome in –charge,Kangra Airport for necessary action.
- The cases of non-compliance or failure to discharge the safety responsibility when referred to by the members of his discipline the same may be referred to Aerodrome-in charge, Kangra Airport for administration action.
- To seek the Aerodrome in- charge, Kangra Airport to provide legal or any other type of helpto the staff in case of an accident or disaster unless it is known case of willful negligence oran act of violence.

Safety Responsibility:

- In discharging these accountabilities, the **HOD OF Engg-Elect** is responsible for:
- He is responsible for ensuring strict compliance of all safety regulations & adherence todirections/guidelines issued by the AAI Safety Directorate from time to time.
- He shall ensure that the performance targets for the Electrical wing are met
- He shall ensure safety assessment, risk determination, mitigation control, and monitoringof such activities pertaining to the electrical wing.
- He is also responsible for drawing & review safety enhancement proposal for the electricalwing in consultation with the Aerodrome in—charge.
- To ensure execution of prescribed preventive maintenance schedules i.e., daily, weekly,quarterly, monthly, half yearly and annual as applicable
- He will ensure that visual aids like runway lights, taxi lane edge, apron lights, PAPI, are serviceable all the time and the electrical supplies to various navigational aids, equipments/ devices/instruments are in order so as to avoid hampering of safe aircraft operations.

HOD (Fire section)

Safety Accountability

- He is accountable to the Airport Director, who is the accountable executive for KangraAirport, for safe aerodrome operations. He will also be accountable to the In-charge (ATM)
- Duty Officer (ATM) for his actions.
- Ensure safety policy is implemented in the Fire wing in all changes in Fire services as well as in the introduction of new facilities/ procedures and ensure reviewing it periodically that the policy commitment of Aerodrome in-charge, Kangra Airport is carried on by all the members of his section.
- Review the requirement every year & recommend the same to the Aerodrome in –charge,Kangra Airport for necessary action.

- The cases of non-compliance or failure to discharge the safety responsibility when referred to. By the members of his discipline the same may be referred to Aerodrome in- charge, Kangra Airport for administration action.

- To seek the Aerodrome in- charge, Kangra Airport to provide legal or any other type of helpto the staff in case of an accident or disaster unless it is known case of willful negligence oran act of violence.

Safety Responsibility

- In discharging these accountabilities, the **HOD OF Fire section** is responsible for:
- He will ensure that Fire Fighting Category (CAT- IV at this station) is maintained during aircraft operations at this station.
- He shall ensure that the performance targets for the Fire wing are met.
- He shall ensure safety assessment, risk determination, mitigation control, and monitoringof such activities pertaining to the Fire wing.
- He is also responsible for drawing & review safety enhancement proposal for the Fire wingin consultation with the Aerodrome in—charge.
- He will be responsible for ensuring the serviceability of all the Rescue and Fire Fighting Vehicles all the time
- He will ensure that if the Fire Fighting Category is reduced below the specified category, he will inform the Duty Officer (ATM) by the quickest possible means citing justifications for the same.

CHAPTER 8:

TEST EQUIPMENTS

TEST EQUIPMENTS

Test Equipment:

Available Test Equipment(TE) (MAKE/MODEL)	Unit in which used /installed	Serviceability of TE	Last calibrated on	Next Cal Due Date
DIGITAL MULTIMETER, FLUKE-179EJKCJ	Equipment room	Serviceable	07.09.2022	To be Calibrate
'RADART" THRU LINE WATT METER, WITH 10W ELEMENTS.	Equipment Room	Serviceable	10/04/2019	To be Calibrate
CRO	Equipment Room	Serviceable	09.09.2022	To be Calibrate
RF Wattmeter, BIRD4391A	DVOR/DME site	Serviceable	15/05/2019	To be Calibrate
Frequency counter GFC-8131H	DVOR/DME site	Serviceable	08.09.2022	To be Calibrate
EARTH TESTER	For Earth testing	Serviceable	07.09.2022	To be Calibrate
POWERMETER KEYSIGHT P-SERIES N1911A	DVOR/DME site	Serviceable	29.06.2022	To be Calibrate
RF Signal Generator (Make-R & S Model-SMB100B)	DVOR/DME site	Serviceable	New Test eqpt	Received on 08.01.2024
NAV Analyzer (Make-R & S, Model-EVSG1000)	DVOR/DME site	Serviceable	New Test eqpt	Received on 08.01.2024
Digital Multimeter (Keysight-U1252B)	EquipmentRoom	Serviceable	New Test eqpt	Received on 18.12.2023
Digital Earth Resistance Meter(Stanlay-UT572)	For Earth testing	Serviceable	New Test eqpt	Received on 18.12.2023

Procedure for calibration of test equipment: test equipments are sent periodically to ERTL (North), Okhla industrial area Phase II New Delhi which is a Government of India notified standard laboratory for calibration and testing of the test equipments.

Special purpose test equipments if required are being requisitioned through RHQ CNS NR.

CHAPTER 9:

INTERRUPTION TO SERVICE

INTERRUPTION TO SERVICE

1. Details of the procedure to be followed when operation of CNS/ATM facility is interrupted:

Most of the CNS facilities provided are having standby unit in place which takes over in case of un-serviceability of main unit. However, in case if there is total failure of service, maintenance personnel of concerned units are immediately intimated on phone and NOTAM action is initiated by forwarding the Message Regarding NOTAM action to SSO VIDP and GM CNS-NR for taking appropriate NOTAM action.

NOTAM is either time bound, permanent or with an estimated time. If the facility is restored before expiry of estimated time, NOTAMC is taken and if the facility is estimated to be U/S beyond estimated time, NOTAMR is taken indicating revised estimated time for restoration of the facility. Unit in charge take immediate action to restore the facility. After the restoration, a fault analysis is reported in fault log register.

(a) Taking facility out of operation:

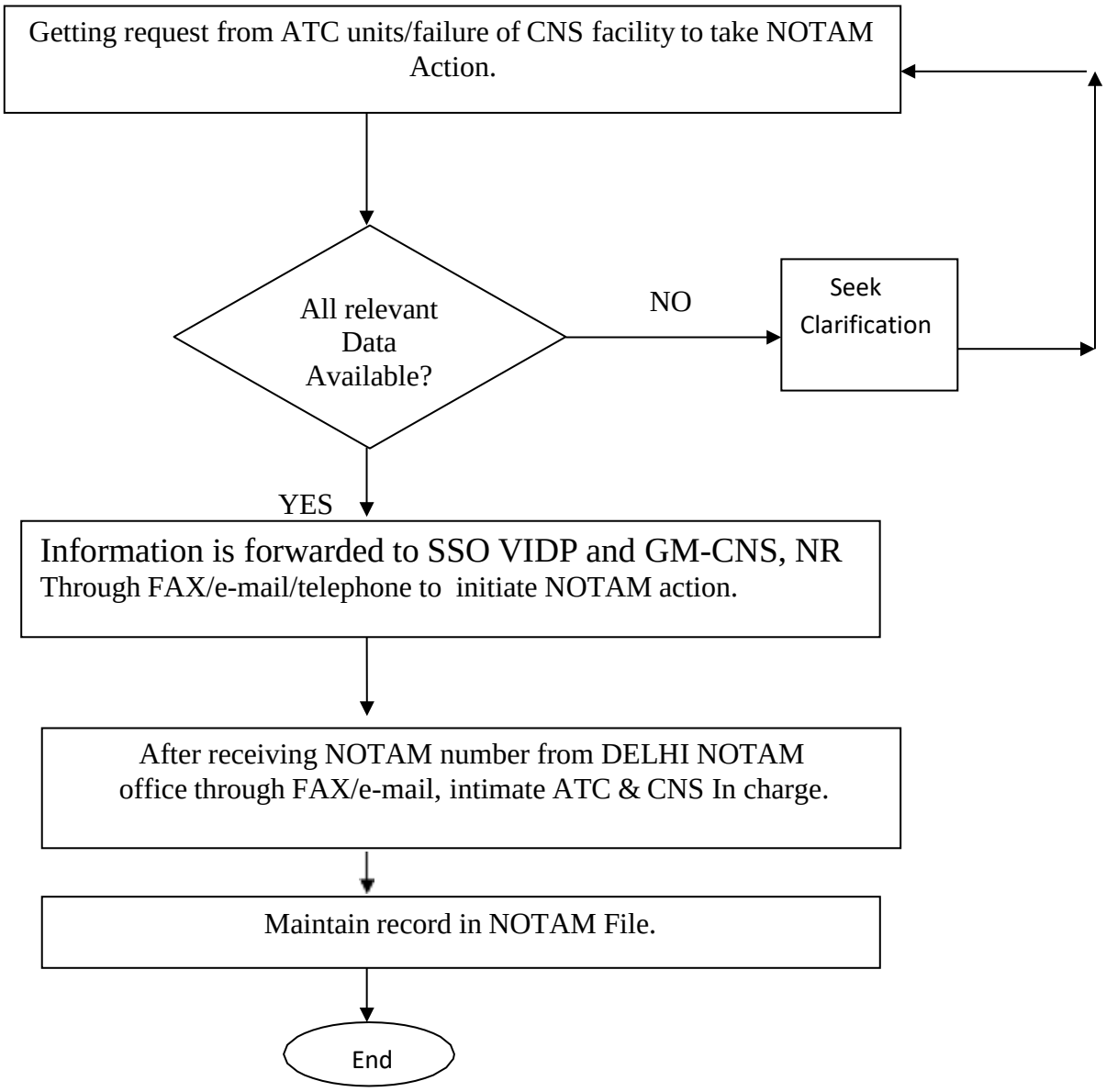
- Notam action taken due to failure of service
- Notam action during major maintenance and Air calibration.
- Information is forwarded to SSO VIDP and GM CNS,NR.

b) After restoration of facility, putting back it into operation:

Notam is withdrawn and information provided to SSO VIDP and GM(CNS-NR).

Note: RWS facility is not available at KANGRA Airport.

FLOWCHART/ PROCESS FOR TAKING NOTAM (NOTICE TO AIRMEN) ACTION



PROCEDURES FOR MAINTENANCE

All CNS facilities are continuously monitored by Shift duty officers who are monitoring the status of the facilities. In case of any abnormality the necessary corrective action is initiated immediately. In addition to it the preventive maintenance of the CNS facilities are carried out strictly by maintenance team as per the guidelines issued by CHQ and given in the CNS manual volume I to IX.

NAV AIDS

Scheduled preventive maintenance is carried out for Nav-Aid facilities. Preventive maintenance schedule are prepared and circulated by N&S Directorate at CHQ. Additionally, pre-flight calibration, post flight calibration, in flight calibration maintenance, pre-monsoon maintenance is also carried out. In maintenance work, various unscheduled maintenance work also have to be done. After getting any information of fault or any abnormality observed during preventive maintenance, corrective maintenance will be carried out.

Equipment will be operational only after rectification and observations, with proper field readings (if applicable) and conformation from Aircraft for operation. Maintenance activity is recorded at respective site logbooks as well as on site fault logbook also. Card level replacement maintenance is only carried out with the help of concerned SMUs.

Procedure for restoration to CNS facility Monitoring

1. Immediate and Standard reporting is used for status information of Nav-Aids and other CNS facilities for the facilities being monitored .The built-in monitoring system constantly monitors the health of the system and has the facility of auto switchover to Standby in case there is failure in mains sub system.
2. All the CNS facilities are continuously monitored by CNS maintenance personnel by following way:-

i. Facilities installed at Equipment room by shift maintenance CNS personnel;

ii. Nav-aids installed within and around airport through Remote control and Status of the facility installed at Equipment room shift maintenance CNS personnel;

iii. Facilities at Com Centre and Airport Systems By shift as well as General team.

3. Immediate and Standard reporting is used for status information of Nav-Aids and other CNS facilities for the facilities being monitored in this way.

In case any service is monitored to be interrupted or reported to be interrupted immediate corrective action is initiated and other CNS will also be informed regarding the Problem. In case the facility cannot be restored immediately or In case it is not possible to restore the facility within 30 minutes then NOTAM action is initiated by Shift Duty officer. If the facility remains U/S for more than 2 Hrs, CNS In charge brings this to the Notice of GM (CNS-NR).

INTIMATION OF MAJOR FAILURES OF CNS/ATM FACILITIES

In the event of occurrence of following types of major failures of CNS/ATM facilities having adverse impact on Flight operations and/or Air Traffic Services, at airport, immediate intimation shall be given to RHQ as well as CHQ as per directions mentioned herein:

a) Any failure of air-to-ground VHF/DVR channels.

b) Adverse reporting from aircraft regarding poor performance / coverage of VHF communication.

c) Incidence of jamming or heavy interference of VHF channels within or in the vicinity of operational area or airport.

d) Any failure of navigational facilities DVOR and HPDME.

In addition to the normal reporting of un-serviceability of CNS/ATM facilities to RHQ, report should also be sent to GM (CNS-NR), as well as ED (CNS-OM).

OPERATING AND MAINTANANCE INSTRUCTIONS

The shift duty positions at CNS Unit are as follows:-

Equipment Room Shift Duty Officer (Responsible for maintenance of VHF Communication systems, Digital Voice Recorders , CNS installations at ATC TOWER, airport system and other associated systems.

NAV-AIDS Shift Duty Officer (Responsible for maintenance of DVOR and HPDME, Remote Status of DVOR and HPDME)

Remote Control and Status of CNS Facilities:-

(a) Nav-Aids: Nav-aids sites are linked to the Equipment room through Remote lines, And the status of the facilities are displayed at Equipment room and ATC Tower. HP DME can be controlled from the Remote control RCSI 446 by shift duty position. The Nav-aids sites are unmanned and incase of any problem the shift duty officer proceeds to the sites for first level maintenance.

Acceptable Recovery Time:

Spares and test equipments are kept unit wise, under the operational control of the CNS In charge. In case of interruption of services, every effort is made to restore the facility immediately. All coordination in this regard is done by Duty Officer. In case of immediate requirements maximum priority is given to the primary facilities.

In case of simultaneous failure of multiple equipments the CNS In charge decides the priority of restoration.

All CNS facilities are continuously monitored by Shift duty personnel who are monitoring the status of the facilities. In case of any abnormality the necessary corrective action is initiated immediately. In addition to it the preventive maintenance of the CNS facilities are carried out strictly carried by maintenance team as per the guidelines issued by CHQ and given in the CNS manual volume I to IX.

Pre-flight calibration, post flight calibration, in flight calibration maintenance, pre-monsoon maintenance is also carried out. In maintenance work, various unscheduled maintenance work also have to be done. After getting any information of fault or any abnormality observed during preventive maintenance, corrective maintenance will be carried out.

Equipment will be operational only after rectification and observations, with proper field readings (if applicable) and conformation from Aircraft for operation. Maintenance activity is recorded at respective site logbooks as well as on site fault logbook also.

The facility is maintained as per the ICAO Annexure 10 Vol I and DOC 8071. The maintenance of equipment is carried out as per the manufacturer's guideline provided in the equipment's technical manual and Maintenance Schedules as Daily, Weekly, Monthly, Quarterly and Annual duly approved by N & S directorate at CHQ .

Flight Inspections of DVOR and HPDME.

The flight inspection for the above facilities are done as per standard and procedure prescribed in the CNS manual and ICAO DOC 8071.

The officer who takes parts in the flight inspection are deployed by the CHQ in the FIU. For ground adjustment the officers are deployed who has undergone respective training of the facility at RTC or CATC and possess proficiency on that facility.

PROCEDURE TO BE USED IN CASE OF SERVICE FAILURE/ FAULT (Equipment Room) VHF & Associated Facilities.

Any failure of equipment, facility or service is reported to the SSO VIDP. If any facility or service fails, appropriate NOTAM action is taken through SSO VIDP, along with necessary intimation to GM CNS-NR. Unit-in-Charge/CNS In charge attend the breakdown when the service is restored, NOTAM is lifted through SSO VIDP. All the details of failure of service is recorded in the concerned logbook.

NAV- AIDS

One Shift duty officer is deployed round the clock for regular site visit & checking the parameters along with health of the equipment. They keep the watch on status of all available Navaids indications & if any change in normal status is observed, they take appropriate action. When aircraft makes any complaint to Air Traffic Controller regarding malfunction of any of the Navaids, Air Traffic Controller informs the Duty Officer at Equipment Room and Duty Officer Equipment room informs to NAVAIDs Duty officer and In Charge CNS. Appropriate action for rectification of faults should be taken by NAVAIDs Duty Officer and In charge CNS.

Procedure to be followed for notifying Aeronautical Information services for non - availability and availability of the facility: Information provided to NOF VIDP for appropriate action.

Procedure to be followed for reporting/notifying any blocking or interference: Complaint lodged with WPC Government of India with intimation to SSOVIDP in case of any frequency blocking or interference.

CHAPTER10:

PROCEDURES

PROCEDURES

Procedure for handling the operational complaints

Aim: Aim of this procedure is to handle the complaints originated by ATC Tower or Aircraft in respect of CNS facilities like VHF, DVOR and DME etc.

Responsibility: Shift Duty Officer and CNS In-Charge.

All operational related complaints of CNS facilities are to be brought to the notice of concerned Shift Duty officer and CNS In charge depending upon the severity of the complaint.

All shift and maintenance team immediately respond to attend the complaint in shortest possible time by checking the facility under the guidance and instructions of CNS In- charge as required to bringing up the facility to normal operating conditions.

All concerned such as ATC TOWER is to be informed about the non- availability of the facility and availability of facility after the restoration of facility.

In case the particular complaint is not resolved within the reasonable time, i.e. within 30 min from the start of complaint, the Duty officer of respective unit initiate necessary NOTAM action regarding un serviceability of facility especially NAVAIDS for a duration in consultation with In-Charge(CNS).

All shift and maintenance team are there to attend the complaint in shortest possible time.

In case of prolonged un-serviceability, same is to be intimated to GM (CNS-NR) and GM (N&S) along with a brief note of problem.

CNS InCharge is to speed up the process of obtaining spares/ modules if required for early restoration of the facility.

Proper log entry and fault book log entry to be made with regard to sequence of actions regarding the unserviceability and the fault findings.

Procedure for handling Electrical, Civil and other complaints.

Aim: Aim of this procedure is to handle all types of civil, electrical and any other complaints originated by the shift and maintenance personnel of operational units.

Responsibility: Electrical and Civil Wing are responsible for attending the complaints in shortest possible period.

- All types of civil, electrical and other miscellaneous complaints are lodged withthe respective wing depending upon its nature.
- Apart from above Shift/General duty officer of the concerned unit can directly lodge a complaint to the concerned unit to alert them for immediate action
- If the complaint persists more than the required and reasonable time, then it is the shift Duty/ general duty officer of the concerned unit to bring it to the notice to Airport Director Kangra.
- All shift officers are to keep track of the complaint if it is in progress and properbriefing is to be made to the CNS InCharge to monitor the complaint further.
- Shift officer is to communicate the completion report of complaint andserviceability of same to CNS In-charge.
- Proper log entry to be made with regard to sequence of actions during and alongthe complaint period till its rectification.

Procedure for handling Interruption to Service

Aim: Intimation to RHQ and CHQ in the event of occurrence of major failure of CNS facilities.

Purpose: This procedure is useful in timely dissemination of the information to the all concerned.

Responsibilty: In-charge (CNS).

References: CNS circular 2 of 2006 intimation of Major failure of CNS facilities, to be used if the acceptable recovery time of a service is exceeded.

- Immediate intimation shall be given to GM (CNS-NR) in the event of occurrenceof major failure of Communication, Navigation facilities through Email / Telephone / FAX
- Shift Officer is responsible to keep the track of NOTAM of the facility during itscomplete unserviceability
- Serviceability of facility to be informed to all concerned once the facility is put into operation and necessary debriefing report also to be taken.

Procedure for purchase of Major/Minor items related to CNS.

Purpose: This procedure is useful in raising the demand, obtaining approval etc. either from local authorities or from RHQ/CHQ.

Responsibility: CNS In-charge and Duty Officers of respective Unit.

Reference: Delegation of Powers Distribution: CNS In-Charge, APD Kangra. AAI-287 (Fixed Assets), AAI-289 (Consumables) registers are to be maintained by the CNS Stores

- It is the responsibility of the stores officer to maintain centralized stores inward / outward register apart from the maintaining the separate register by the respective unit in charges.
- Duty officer of respective unit have to raise the demand along with the proper justification in writing to the CNS In charge.
- CNS In charge is responsible for obtaining the approval of purchase of Item from APD Kangra.
- After approval from APD Officers are responsible for local purchase of item. Items / spares which have reflected in the budget scheme needs to be procured through call of quotation/tenders after financial concurrence and due approval ofAirport Director Kangra.
- Items which are not reflected in budget scheme and required to be

procured dueto urgent operational requirement and cost of such item is more than APD/DGM(Level) DOP, sanction is to be obtained either from RHQ or from CHQ depending upon requirement.

- Demand of CNS equipments and test equipments are ordered by CNS(Planning) Directorate and supplied through CRSD.
- Dispatch of stores either to CRSD/ SMU/ OEM or to any other station should bein properly packed and insured.

Procedure for handling VVIP Flights

Aim: Aim of this procedure is to follow the instruction laid down for smooth handling of VVIP flights at Kangra Airport.

Purpose: This procedure is useful for handling the VVIP Flight movements

Responsibility: In-Charge (CNS) and Duty officers

References: As per CHQ letter No. ED/ATM/2010/V1.01-VVIP-SOP
CNS officers of respective units shall check all Navigational Aids and records to this effect shall be maintained by CNS in-charge (As per the check list)

- CNS department shall keep a record of the status of various CNS facilities half an hour before the ETA/ETD of the VVIP flight.
- Shift Duty Officer Equipment Room shall report the serviceability of all CNS facilities to the Duty Officer ATC Tower at least half an hour before the ETA/ETD of VVIP flight
- CNS in-charge shall ensure that all critical navigational facilities are kept underwatch for any failure and immediate rectification of the equipment during VVIP movement.
- Movement of VVIP aircraft shall be monitored by CNS In-Charge from departure to arrival to ensure that all facilities such as landing aids, navigational aids are serviceable. The CNS InCharge shall ensure that officers are present to ensure that all facilities are serviceable when VVIP flight is in the airspace.

- Duty Officer shall ensure that all facilities such as Navigational aids are Serviceable.

SAFE OPERATION

System efficiency and reliability depends upon the system maintenance, environment and climatic conditions by adopting following systematic methods and proven techniques. This would enhance the life of system and continue to function with optimum efficiency and maximum reliability. This maintenance is classified ascorrective maintenance, periodic maintenance and trouble shooting.

A. CORRECTIVE MAINTENANCE

There are many corrective steps taken at regular intervals to avoid any deterioration of a system. The first step in corrective maintenance is inspection of the equipment with power off. The main elements of inspection are:

1) Cleanliness of equipment.
2) Building condition, leakage etc.
3) Electrical Connections (Cables & plug in modules)
4) Mechanical joints and linkages including switches.
5) Wiring condition, water vapor, heat or extremecold can affect internal and external wiring. Look for frayed, broken or damaged wiring.
6) Recent modifications.
7) Corrosion, broken, burnt or missing parts.
8) Buildup of dirt, moisture, insects etc.
9) Improper lubrication of moving parts.

After finding and correcting the trouble, appropriate adjustment procedures are followed. Maintenance records are to be kept and as much data as possible recorded to assist in future repairs. List of normal indications and what was done to correct the fault. Records are maintained to include actual measurements taken before and after the repair to accumulate work history. Any malfunctioning noted during maintenance is corrected and if required components replaced.

PERIODIC MAINTENANCE

System efficiency and performance is monitored by checking significant signals and voltages at various levels in the system.
The purpose of daily and weekly recordings of signal parameters and voltages is done so as to compare these two previous records in order to reduce the parameter deviation from normal or other irregularities of the system performance.

The purpose of monthly and quarterly inspection is to

- Ensure that transmitters and associated systems are calibrated and optimally aligned.
- Ensure that monitors are calibrated and alarm limits are correct and operating as per specifications.
- To check warning and alarm systems are working properly as per ICAO specifications.

PERFORMANCE CHECKS:

Check operational status. In most cases, the information available at the test jacks (signals and voltages) is sufficient to determine if a module is functioning correctly.

- Check manual/automatic shut down and restart.
- Voltage and current checks.

Voltages and currents are checked to verify that transmitters and associated equipment are operating properly. Low voltage readings can cause premature failures as well as changes in transmitter frequency and power output. Higher than normal voltage can also cause rapid equipment failures. High current readings indicate areas that require immediate action.

PERIODIC MAINTANANCE:

i) Check transfer system A to B and B to A (Main to Stand By & ViceVersa)

ii) Verify monitor alarm points. Monitor alarm points are set initially during installation. This check is to verify that the initial alarm limits have not changed.

iii) Measure and record all modulation percentages and observer side band and carrier wave forms.

iv) Check field monitor levels.

v) Measure and record system operating frequency.

vi) Check RF amplifier output power and gain.

vii) Measure and record antenna feed cable VSWR

viii) Perform check and calibration of built in test equipment

ix) Transmission line insulation resistance.

TROUBLE SHOOTING

General guidelines to locate and trouble shoot a fault is given below:-

i) Check for signs of excessive heat.

ii) Verify that all integrated circuits are seated firmly in their sockets and that there are no bent pins.

iii) Check that printed circuit board edge connectors are clean and seatedfully.

iv) Check the ribbon cable connectors.

v) Check the power supplies. Power supplies are a very common source of problems. Low voltage/excessive ripple make it appear that an IC is bad.

a) Measure the power supply voltages and verify that theyare within specifications.

b) Using an oscilloscope verifies that the power supply output are not excessively noisy.

vi) Using an oscilloscope and other test equipments verify that clock signals, input signals and control signals are present and correct in shape and level. By doing these procedures isolate the faulty units, sub unit and come to pin point the fault to the component level.

CORRECTIVE & PREVENTIVE MAINTANENCE

EQUIPMENT ROOM

- VHF Transmitters
- VHF Receivers,
- Walkie Talkie Sets
- LAN/WAN
- DVR
- Inspection/Maintenance of various equipments and register maintained.
- Daily/Weekly/Monthly/Half-yearly and yearly maintenance check for each equipment.
- Fault log book for each equipment is maintained Battery backup checks

Security Equipments

- X-Ray Baggage Inspection System
- Hand Held Metal Detectors
- Door Framed Metal Detectors
- Explosive Trace Detector –Smith IONSCAN500DT
- Walkie Talkie sets

CHAPTER 11:

PROCEDURE FOR CHANGE

PROCEDURE FOR CHANGE

Procedure for change of facility:

Facility is changed if its life span is completed or new and effective technology available. The following procedure is followed for change of the facility

i) Experts will check the life span & serviceability of the equipment

ii) CHQ approval needed for the change of facility in consultation with RHQ for which station makes SCARS.

Procedure for change of operation:

Every CNS facility has redundancy of equipment for its safe operation. Transmitters are provided in operation alternatively on daily basis. Change over procedure of transmitter/receivers /Transponders are checked regularly.

Procedure for change of Maintenance:

Maintenance schedules are approved and issued by CHQ. The maintenance schedules available at Kangra Airport described in Chapter 6. Change of maintenance schedules are done as per CHQ guidelines.

Facility is changed when the life span of equipment is completed or new and effective technology available. Whenever there is a scope for the change in the state of facility the prevailing Guidelines and requirements will be made, informing and in accordance to the higher authorities (CHQ/RHQ) for necessary action.

Generally changes made due to the fact of service life span completion, Technological advancement of facility, trans installation of facility due change or decommissioning of a facility due new available techniques and standardization.

Changes should be made Ensuring adherence of ICAO SARPS and performing SCARS. SCARS used to determine the safety magnitude of the change by using SCARS Form.

Where a proposed change will not result in any change to the items mentioned

above, or the change is of a routine maintenance or administrative nature, the normal routine change process may be used in lieu of the SCARS form.

Where the SCARS form indicates a Minor change a Safety Statement must be recorded in the SCARS form where the SCARS form indicates a Moderate change, a Safety Statement must be recorded in the SCARS form and a HAZLOG Register must be developed. Where the SCARS form indicates a Major change a Safety Plan and a Safety Case must be prepared and a HAZLOG Register for this change must be developed. The lifecycle of the Project/Change has four distinct following phases.

1. Change Initiation, Concept, & Design– covering the task associated with a new project or change to existing Projects/Changes and includes concept development, requirements specification and project/task initiation.

2. Project Implementation & transition – covering the tasks associated with transitioning a new system/facility or changes to an existing Project/Change while maintaining operational integrity and standards applicable to the existing Project/Change.

3. Operations and Support – which are all tasks needed to operate the system, facility or service to the agreed performance and functional standards.

4. Withdrawal / Decommissioning – activities associated with withdrawal of facilities systems or services. These activities must include requisite safety consultation and transitioning activities.

Safety Document Review:

1. All Safety Plans and Safety Cases must be reviewed by Directorate of Aviation Safety in coordination with the regulator (DGCA).

2. Where recommendations from the review(s) are not included in the final documentation, justification for this must be provided to the reviewer.

3. Where the Safety Plan forms part of the Project Plan, the review must demonstrate the above requirements have been met.

4. Safety Plans and Safety Cases must be presented for review to Directorate of

Aviation Safety sufficiently in advance to allow changes to be made to the document where required from the review.

Post Implementation Review (PIR):

1. A Post Implementation Review of the safety aspects of a change detailed in a safety case must be completed and documented.

2. The Post Implementation Review must be conducted in accordance with the timeline specified in the Safety Case and no later than twelve months after the change becoming operational.

3. The Post Implementation Review must include:

a) The review of the HAZLOG Register(s) relating to the change
b) The arrangements for the ongoing management of hazards / controls
c) Details of any new safety issues identified resulting from the change; and
d) Details of any safety lessons learnt.

Procedure for commissioning of New Infrastructure

a) Inspection of new project or facility by a team of concerned executives of project and/or user department to ensure that the design, functional, operational and technical specifications have been met for the project or facility.
b) Ensure compliance with national regulatory requirements for the new project or facility and document deficiencies, if any and complete the relevant CAR compliance check list and action plan to remove those deficiencies.
c) Carry out "All-Phases Safety Assessment", if not carried out earlier or "Implementation phase safety assessment"
d) Develop a transition plan considering the complexity of the project or facility taking in accounts the transitioning risk and mitigating them. Also ensure that the integrity of the system is not compromised during transition, while maintaining the current standard. Document the role and responsibility of all stake holders in the transition plan.
e) Conduct trial operation under the supervision of key officials. Both

normal and abnormal mode of operations should be tested during the trial operations.

f) Submit all relevant documents about the new project or facility to DGCA for their approval for commissioning of the facility or project.
g) The project or facility is notified in AIP India, after DGCA's approval and necessary changes are also made in the Aerodrome Manual.
h) The project or facility is commissioned and is monitored by the key officials for the first 48 hours for teething troubles, if any.
i) After 48 hours, the facility or project should be specially monitored by the user department for a period of 90 days for any new hazard and the functioning and efficacy of existing controls. Suitable risk control should be implemented of any identified hazard.
j) Conduct post implementation review after six months, but not later than 12 months, to provide assurance that the safety requirements continued to be met in the operation.
k) Project or facility is put into the use for normal operations and routine monitoring and maintenance procedures shall be followed.

Facility Operation and Maintenance Plan

The operation and maintenance phase starts after the users have accepted the new system these phase can be divided into two activities.

1) Ongoing operation and support
2) Maintenance.

Unlike the others steps in the lifecycle these steps continues throughout the systems useful life. Ongoing operation and support is the process of ensuring that the technical system components continue to operate correctly and that the users use it effectively these responsibility is with technical staff taking care of machine and computer operation and a Member of the user organization ensuring that the users understand the system and the use it effectively.

Procedure for change of facility:

Facility is changed if its life span is completed or new and effective technology

available. The following procedure is followed for change of the facility

i) Experts will check the life span & serviceability of the equipment

ii) CHQ approval needed for the change of facility in consultation with RHQ for which station makes SCARS.

Procedure for change of operation:

Every CNS facility has redundancy of equipment for its safe operation. Transmitters are provided in operation alternatively on daily basis. Change over procedure of transmitter/receivers /Transponders are checked regularly.

Procedure for change of Maintenance:

Maintenance schedules are approved and issued by CHQ. The maintenance schedules available at Kangra Airport described in Chapter 6. Change of maintenance schedules are done as per CHQ guidelines

Change Management Requirements

1. The Safety Requirements for "Change Management" are applicable to all:

- Services and products provided by AAI that may affect operational safety
- Organizational changes
- All AAI employees; and
- Contractors working for or on behalf of AAI, who undertake activities, which may directly or indirectly affect the safe operations of air navigation services or airport systems.

2. These Safety Requirements define the minimum requirements for Change Management and outline the processes to be used to conduct safety assessments required for change management.

3. All changes to ATM, CNS and airside operations of airport:

- Service levels,
- Procedures,
- Equipments

- or organizational structure

will affect the performance function or technical specification of a system or service; or facility; or organizational changes affecting safety accountabilities must be assessed to determine the safety magnitude of the change by using SCARS Form (AAI-SAF-103) Where a proposed change will not result in any change to the items mentioned above, or the change is of a routine maintenance or administrative nature, the normal routine change process may be used in lieu of the SCARS form.

4. Where the SCARS from indicates a Minor change a Safety Statement must be recorded in the SCARS form.

5. Where the SCARS from indicates a Moderate change, a Safety Statement must be recorded in the SCARS form and a HAZLOG Register must be developed.

6. Where the SCARS from indicates a Major change a Safety Plan and a Safety Case must be prepared and a HAZLOG Register for this change must be developed.

7. It is a requirement that all safety activities are formally documented and that the documentation is kept for a period as defined by the Corporate Document Management System.

An official file must be maintained:

- For all SCARS forms
- To record activities associated with HAZLOG registers; and
- To record all Safety Plans and Safety Cases prepared and associated correspondence.

8. All Safety Plans and Safety Cases must be sent to and reviewed by Aviation Safety Directorate, CHQ prior to implementation of any change.

9. The lifecycle of the Project/Change has four distinct phases. These lifecycle phases are:

- **Change Initiation, Concept, & Design**– covering the task associated with a new project or change to existing Projects/Changes and includes concept

development, requirements specification and project/task initiation.

- **Project Implementation & transition** – covering the tasks associated with transitioning a new system/facility or changes to an existing Project/Change while maintaining operational integrity and standards applicable to the existing Project/Change.

- **Operations and Support** – which are all tasks needed to operate the system, facility or service to the agreed performance and functional standards.

- **Withdrawal / Decommissioning** – activities associated with withdrawal of facilities systems or services. These activities must include requisite safety consultation and transitioning activities. Safety assessment shall be carried out for each lifecycle phase of the Project/Change as per the change management process given in this chapter and the attachments to this manual.

Safety assessment shall be carried out for each lifecycle phase of the Project/Change as per the change management process given in this chapter and the attachments to this manual.

Design Requirements

1. The design of airports, facilities, systems, software, airspace, maps and procedures used in the delivery of services or maintenance of equipment, must be consistent with all relevant industry standards, and should aim to reduce the potential for error and risk.
2. A Statement of Requirement or Specifications shall be produced when systems are being developed, reviewed, or when a system is modified.

3. The Statement of Requirement shall be approved and signed-off by the stakeholders.

4. Designs must be duly authorized / approved by the relevant authority against a clearly defined operational and/or functional specification. Design can include:

- Facilities
- Procedures and Practices

Data and Documentation

Support; and

- Work stations.

5. Functional, operational, performance and technical specifications must be:

- Defined and known
- Developed in consideration of safety objectives
- formally coordinated agreed by all stakeholders; and
- Documented, and maintained in a manner that meets legislative, regulatory and other statutory requirements. The above mentioned requirements also apply to procurement policy in developing tender specifications, and in selecting the lowest compliant tender.

ROLE OF VARIOUS DIRECTORATES, AIRPORTS OR STATIONS

1. Role of Airports/Stations

Projects are often initiated at Corporate Headquarters level; however a critical element of any Safety Management System is the ability of the, field operators and managers to assess the possible impact on safety BEFORE the change becomes operational. Consequently, the SMS is designed so that all small and medium changes are assessed and accepted at the Unit/Local level, and all major changes are accepted at the CHQ level. The appropriate "Service Delivery Manager" or Project Manager is responsible for:

- Compliance with the safety requirements
- The integrity and quality of safety documents
- Ensuring that the required approvals are obtained prior to any implementation
- Ensuring that the risk controls detailed in the documentation are appropriate and in place, and that the risks identified are reviewed and updated following the project/change implementation.

2. Role of Service/Operational Directorates It is the role of the applicable service delivery Directorates (ATM, CNS, Aerodrome Operations, Engg. and Planning etc.) to resource, conduct the necessary safety assessments, and approve the changes.

3. Role of Aviation Safety Directorate It is the role of the Aviation Safety Directorate to assist other Directorates by the provision of safety subject matter expertise (SME) and to review the safety processes conducted. The ED (Aviation Safety) is responsible for:

- Reviewing Safety Plans and Safety Cases; and
- Endorsing Safety Plans and Safety Cases following satisfactoryreview .

Safety Assessment Process

1. The SCARS form is used to determine the safety magnitude of the change by assessing the likely impact of the change in terms of size and safety outcome of the change.

2. If the safety magnitude is **Minor**:

A Safety Statement is completed in the SCARS form by the initiator of the change and it is accepted (signed off) by the Manager having the safety accountability for that area, e.g.:

- GM (Aerodrome) / ATS-in-Charge / Airport Director for an ATS change
- GM(CNS) / CNS-in-Charge / Airport Director for a CNS equipment change
- GM (Operations) / GFS-in-Charge / Airport Director for changes in airside operations of the airport.

3. If the safety magnitude is assessed as **Moderate**:

A Safety Statement is completed in the SCARS form by the initiator of the change and it is accepted (signed off) by the Manager having the safety accountability for that area and The HAZLOG Register is also completed and the report from HAZLOG is attached to the SCARS form for sign-off by relevant Manager.

4. If the safety magnitude is assessed as **Major**:
5. A Safety Plan and a Safety Case must be prepared and a HAZLOG Register for this change must be developed. These documents are accepted by Managers at CHQ level.

SCARS Form

1. The SCARS form must be used for changes to service levels, procedures or equipment, airport infrastructure / operations which will affect the performance, functional or technical specification of a system or service; and organizational changes affecting safety accountabilities.

2. Where the proposed change will not result in any of the items mentioned above or the change is of a routine maintenance or administrative nature, the applicable change process may be used in lieu of the SCARS.

3. Where a change process is used in lieu of the SCARS, a Safety Statement must be prepared. The Safety Statement must provide AAI management with sufficient information to demonstrate that safety has been considered, and the change presents minimal or no safety issues.

4. The SCARS form is designed to assist users to evaluate the change proposal, in order to determine what type of safety assessment and reporting is required.

5. The SCARS form must be completed at the start of a change process, to ensure that the safety assessment requirements of the change are identified and the relevant documents are prepared.

SCARS Outcome

1. Where the outcome of the SCARS from indicates a Minor change, a Safety Statement must be included in the SCARS form.

- The Safety Statement or justification included in the SCARS must provide AAI management with sufficient information to demonstratethat safety has been considered, and the change presents minimal or no safety issues.
- The appropriate Manager may direct a Safety Case to be developedeven though the outcome of the SCARS indicates a Minor Change.

2. Where the SCARS indicate a Moderate change, a HAZLOG Register for this change must be developed.

3. Where the SCARS indicate a Major change, the HAZLOG Register for this change must be developed and a Safety Case should also be prepared.

Safety Plan

1. Where the outcome of the SCARS indicates that a Safety Case is required, a Safety Plan must first be prepared.

2. Safety Plan preparation must commence early in the project/change life cycle, and be updated as appropriate during the course of the project/change implementation.

3. A Safety Plan may be a stand-alone document or incorporated into a Project Plan.

4. The Safety Plan (or Project Plan if Safety Plan is incorporated) must detail the:

- Scope of the change in operational and organizational context.
- Assumptions, constraints and dependencies influencing the safety outcome of the project/change.
- Responsibilities, titles and names of the people managing the project/change
- consultation and communication arrangements for the project/change
- Safety management activities to provide the safety assurance of the project/change
- Timelines and milestones
- resources and facilities required
- Training and education
- requirements review process; and
- Approval authorities and requirements for the resultant safety documentation.

Safety Case

1. Officials preparing Safety Cases should have completed AAI‟s Safety Management Training course, or an equivalent safety management training course, or be approved by the ED (Aviation Safety).

2. Safety Cases must provide AAI management and the regulator, when required, with the safety management arrangements necessary to assure the safety of the change.

3. Safety Cases must be updated during the course of the project/proposal implementation.

4. Safety Cases must detail the:

- Scope of the change in operational and organizational context
- Validation of any assumptions, constraints and dependencies affecting the safe outcome of the project/change
- Responsibilities, titles and names of the people managing the project/change
- consultation and communication arrangements for the project/change; and
- outcomes of the safety management activities prescribed in the Safety Plan including the: hazard identification and risk management activities, tools, procedures and standards used to provide safety assurance, for normal and abnormal modes of operation

> HAZLOG Register Report detailing the identified hazards and risk controls/safety requirements, including their status

> acceptance by the appropriate level of management of the various levels of risk associated with each hazard

> Arrangements for any training and education requirements.

> Timelines and milestones for the ongoing safety management of the change pre and post implementation

> Argument that, when implemented with the identified controls, the proposed change will be adequately safe; and

> Arrangements and timing for the Post Implementation Review (PIR) of the change following implementation.

Safety Document Review

1. All Safety Plans and Safety Cases must be reviewed by Directorate of Aviation Safety in coordination with the regulator (DGCA).
2. Where recommendations from the review(s) are not included in the final documentation, justification for this must be provided to the reviewer.
3. Where the Safety Plan forms part of the Project Plan, the review must demonstrate the above requirements have been met.
4. Safety Plans and Safety Cases must be presented for review to Directorate of Aviation Safety sufficiently in advance to allow changes to be made to the document where required from the review.

Post Implementation Review (PIR)

1. A Post Implementation Review of the safety aspects of a change detailed in a Safety Case must be completed and documented.

2. The Post Implementation Review must be conducted in accordance with the timeline specified in the Safety Case and no later than twelve months after the change becoming operational.

3. The Post Implementation Review must include:

- The review of the HAZLOG Register(s) relating to the change.
- The arrangements for the ongoing management of hazards / controls
- Details of any new safety issues identified resulting from the change;
- Details of any safety lessons learnt.

Document Management

Safety Plans and Safety Cases must be managed as controlled documents and organizational records.

Control of Contracted Activities

1. To ensure that the level of safety of Airports Authority of India is not eroded or

compromised by the products, inputs and supplies provided by external agencies or contractors including sub-contractors, the Airports Authority of India shall:

- Establish SMS requirement for contractors or sub-contractors
- Establish a procedure to write SMS requirement into the contracting process
- Establish SMS requirement in the bidding documentation; and
- If necessary, write requirements on hazard identification and risk management processes into bid documentation and notify contractors and sub- contractors in writing.

2. The above requirement shall also be included in the contract agreement and tender specifications. Using ISO Certification ensures that organization supplier or contractors have appropriate quality management system in place.

3. Contractor or external workers undertaking activities which may impact on operational integrity or safety shall prior to commencement of work, be provided with induction training which at minimum identifies the safety related considerations of the work, and/or their safety accountabilities.

Change Management at Licensed Airports

1. Rule 83 (2) of Aircraft Rules 1937 requires that while an aerodrome license is in force, no alteration to the landing area or to the building or to the other structure of the aerodrome, which may affect the safety of aircraft operation shall be undertaken without prior approval of the regulator (DGCA).

2. The following information and documents are required to be submitted to DGCA to obtain prior approval of the project or change:

- Brief description of Project or ChangeA copy of Aerodrome License
- Project/Change initiator or originator
- Civil Aviation Requirements affected by the project or change
- Duration of the project and effect on the operations
- Construction agencies details
- Relevant project designs/drawings
- Relevant CAR compliance check list
- Safety Assessment Report

- Certificate from Engineering Directorate to ensure that building does not: o generate wind shear across runway

> Create anomalies in radiated signal; or

> Create light distractions to pilots and air traffic controllers

Management at Unlicensed Airports

All process and procedures for Change Management as detailed in this chapter shall be followed and all documents shall be kept for a period as defined by the Document Management System; however there is no need for seeking prior approval from DGCA before making a change. These documents should be available for examination and records if the aerodrome at a later date decides to obtain Aerodrome License.

Procedure for commissioning of New Infrastructure

- Inspection of new project or facility by a team of concerned executives of project and/or user department to ensure that the design, functional, operational and technical specifications have been met for the project or facility.

- Ensure compliance with national regulatory requirements for the new project or facility and document deficiencies, if any and complete the relevant CAR compliance check list and action plan to remove those deficiencies.

- Carry out "All-Phases Safety Assessment", if not carried out earlier or "Implementation phase safety assessment" using the attachments and following the guidelines contained in the Corporate Safety Management System Manual and transfer all residual risk duly accepted by the relevant authority in the Operational Risk Assessment (ORA).

- Develop a transition plan considering the complexity of the project or facility taking in accounts the transitioning risk and mitigating them. Also ensure that the integrity of the system is not compromised during transition, while maintaining the current standard. Document the role and responsibility of all stake holders in the transition plan.

- Conduct trial operation under the supervision of key officials. Both normal and

abnormal mode of operations should be tested during the trial operations.

- Submit all relevant documents about the new project or facility to DGCA for their approval (For Licensed Aerodromes only) for commissioning of the facility or project.

- The project or facility is notified in AIP India, after DGCA's approval and necessary changes are also made in the Aerodrome Manual.

- The project or facility is commissioned and is monitored by the key officials for the first 48 hours for teething troubles, if any.
- After 48 hours, the facility or project should be specially monitored by the user

- Department for a period of 90 days for any new hazard and the functioning and efficacy of existing controls. Suitable risk control should be implemented of any identified hazard.

- Conduct post implementation review after six months, but not later than 12 months, to provide assurance that the safety requirements continued to be met in the operation.

- Project or facility is put into the use for normal operations and routine monitoring and maintenance procedures shall be followed.

CHAPTER 12:

DOCUMENT CONTROL

DOCUMENT CONTROL

FOLLOWING AAI DOCUMENTS ARE USED BY CNS IN KANGRA AIRPORT:

1. CNS Manual :Vol I to IX
2. AIP,INDIA-Sixth Edition, VOL-I to III
3. AERADIO –Fourth Edition
4. AFS Manual
5. Material management Manual
6. Relevant technical manuals.
7. Other operational documents.

The documents enlisted in ANNEX are available at KANGRA Airport are under the control of in-charge CNS. The STATION CNS MANUAL are updated every periodically as per guidelines and instructions of CHQ/RHQ CNS NR. All documentation is held as computer based records in soft copies.

CHAPTER13:

QUALITY CONTROL

QUALITY CONTROL

Maintaining the acceptable levels of safety requires standardization and quality assurance in every sub system of Aeronautical Telecommunication System at one end and maintaining Harmony with the ICAO standards and recommended practices at the other.

To ensure high Level of availability, reliability and integrity in operation of the CNS systems quality.

Maintenance by proficient, trained skilled personal is required. KANGRA Airport ensures that each maintenance personnel is competent and holds the qualifications consistent with those Specified by AAI Corporate Headquarters and the requirement of the Station by sending the Nomination to RHQ/CHQ.

Appropriately trained and Assessed as proficient, through a Proficiency examination, to maintain a particular model of CNS System is actively participated by the station in the previously held open proficiency examinations.

Lower MTBF signifies the degree and quality of maintenance.
KANGRA Airport keeps the record of kinds of facility or facilities for which the technical personnel is authorized to perform those functions and upon attaining the proficiency the personnel is deployed to the unit concerning to the attained training.

Flight Inspection of Radio and Visual 'Navigation Aids' involves flight evaluation and certification of the signal-in-space. The evaluation process utilizes specially equipped instrumented aircraft which carries out specific flight maneuvers. Data acquired thus on the quality of signal in space shall be analyzed to arrive at the specific performance Parameters. These parameters, in turn, shall determine the certification of facility status for which Flight Inspection is mandatory as per International Civil Aviation Organization (ICAO).

Quality Policy of Kangra Airport:

Progress though Excellence & Customer Satisfaction shall continue to be our mission. We shall remain committed to:

- Provide world class Communication, Navigation & Surveillance services and Passenger amenities.

- Continual improvement in our operations & services through Value Addition, Up gradation in systems and Procedure for Safe and Secure Services and total customer satisfaction through commitments, measurements and review of processes.

ISO Certification available at Kangra Airport:

- ISO 9001:2015- Quality Management System: Expire on 25.07.2024.
- ISO 14001:2015 -Environment Management System: Expire on 25.07.2024.
- ISO 45001:2018- Occupation Health & Safety Management System: Expire on 25.07.2024.

Certificate of Registration

ISO 14001:2015

This is to Certify that
Environmental Management System of

AIRPORTS AUTHORITY OF INDIA
KANGRA AIRPORT

KANGRA , HIMACHAL PRADESH - 176209, INDIA

has been assessed and found to conform to the requirements of

ISO 14001:2015

for the following scope :

MANAGING THE AIRPORT AND PROVIDING PASSENGER SERVICES THROUGH TERMINAL MANAGEMENT, AIR SIDE MANAGEMENT, AERO & NON AERO REVENUE AND EXPENDITURE MANAGEMENT, NAVIGATIONAL MANAGEMENT, AIRPORT SYSTEMS MANAGEMENT, SECURITY & SAFETY MANAGEMENT WITH SUPPORT OF ENGINEERING AND HUMAN RESOURCES

Certificate No	: 21IEHQ42		
Initial Registration Date	: 26/07/2021	Issuance Date	: 26/07/2021
Date of Expiry	: 25/07/2024		
1st Surve. Due	: 26/06/2022	2nd Surve. Due	: 26/06/2023

Director

IAS ACCREDITED Management Systems Certification Body MSCB-119

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

AQC MIDDLE EAST LLC

Head Office: Office No. 02, Ground Floor, Sharjah Media City, Sharjah, UAE. e-mail: info@aqcworld.com.

Key Location: A-60, Sector - 2, Noida, Uttar Pradesh, 201301, India

Validity of the Certificate is subject to successful completion of surveillance audit on or before of due date. In case surveillance audit is not allowed to be conducted, this certificate shall be suspended/withdrawn.

Certificate Verification: Please Re-check the validity of certificate at http://www.aqcworld.com/certificate.aspx or www.aqcworld.com in future (Terms

Certificate is the property of AQC Middle East LLC and shall be returned immediately when demanded

Certificate of Registration

This is to Certify that
Occupational Health & Safety Management System of

AIRPORTS AUTHORITY OF INDIA
KANGRA AIRPORT

KANGRA , HIMACHAL PRADESH - 176209, INDIA

has been assessed and found to conform to the requirements of

ISO 45001:2018

for the following scope :

MANAGING THE AIRPORT AND PROVIDING PASSENGER SERVICES THROUGH TERMINAL MANAGEMENT, AIR SIDE MANAGEMENT, AERO & NON AERO REVENUE AND EXPENDITURE MANAGEMENT, NAVIGATIONAL MANAGEMENT, AIRPORT SYSTEMS MANAGEMENT, SECURITY & SAFETY MANAGEMENT WITH SUPPORT OF ENGINEERING AND HUMAN RESOURCES

Certificate No	: 211OHV37		
Initial Registration Date	: 26/07/2021	Issuance Date	: 26/07/2021
Date of Expiry	: 25/07/2024		
1st Surve. Due	: 26/06/2022	2nd Surve. Due	: 26/06/2023

Director

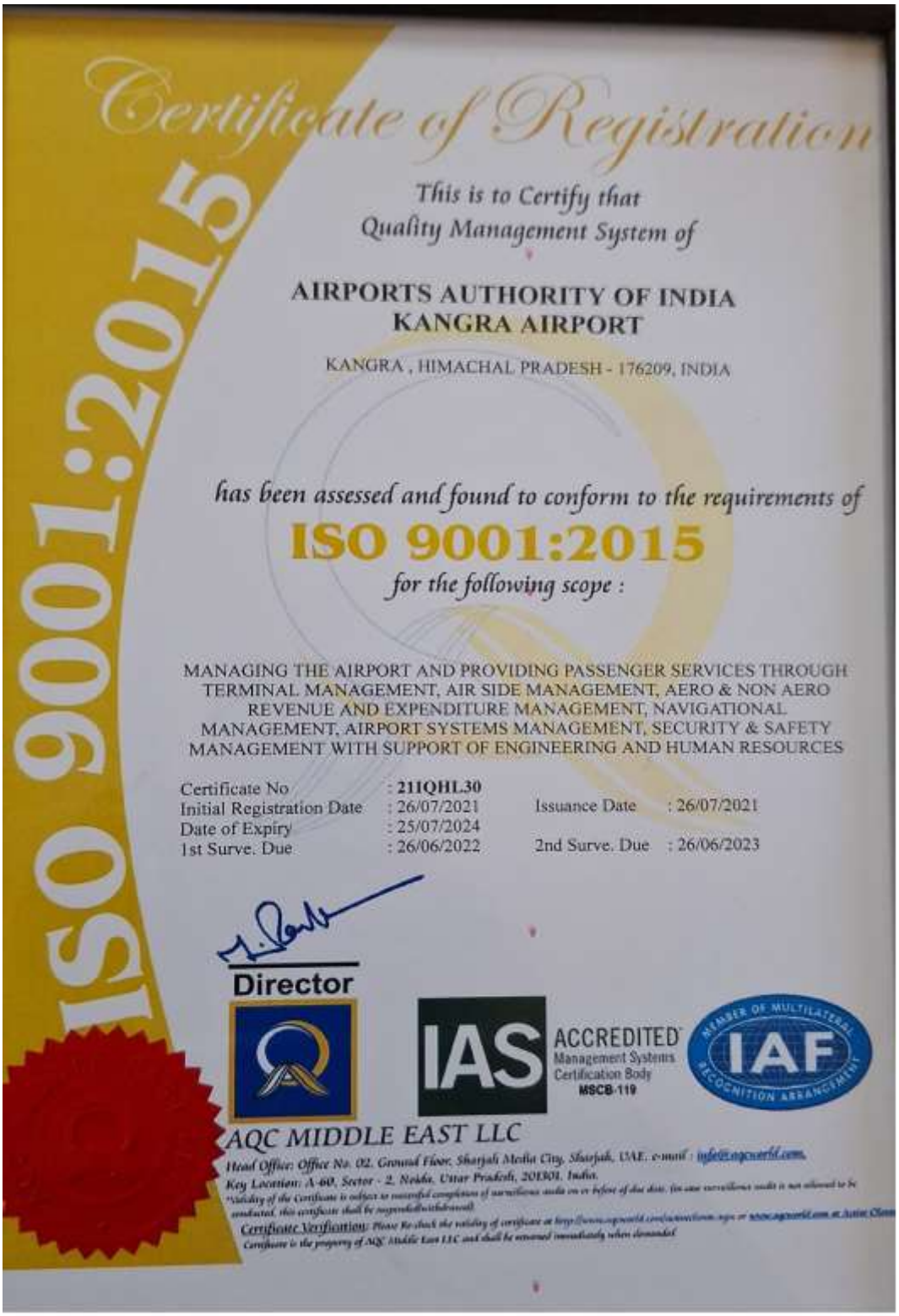
ISO 45001:2018

IAS ACCREDITED Management Systems Certification Body MSCB-119

MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT IAF

AQC MIDDLE EAST LLC

Head Office: Office No. 02, Ground Floor, Sharjah Media City, Sharjah, UAE. e-mail: info@aqcworld.com,
Key Location: A-60, Sector - 2, Noida, Uttar Pradesh, 201301, India.
Validity of the Certificate is subject to successful completion of surveillance audit on or before of due date. (in case surveillance audit is not allowed to be conducted, this certificate shall be suspended/withdrawn).
Certificate Verification: Please Re-check the validity of certificate at http://www.aqcworld.com/activecheck.aspx or www.aqcworld.com or Active Cli
Certificate is the property of AQC Middle East LLC and shall be returned immediately when demanded



Certificate of Registration

ISO 9001:2015

This is to Certify that
Quality Management System of

AIRPORTS AUTHORITY OF INDIA
KANGRA AIRPORT

KANGRA , HIMACHAL PRADESH - 176209, INDIA

has been assessed and found to conform to the requirements of

ISO 9001:2015

for the following scope :

MANAGING THE AIRPORT AND PROVIDING PASSENGER SERVICES THROUGH TERMINAL MANAGEMENT, AIR SIDE MANAGEMENT, AERO & NON AERO REVENUE AND EXPENDITURE MANAGEMENT, NAVIGATIONAL MANAGEMENT, AIRPORT SYSTEMS MANAGEMENT, SECURITY & SAFETY MANAGEMENT WITH SUPPORT OF ENGINEERING AND HUMAN RESOURCES

Certificate No	: 211QHL30		
Initial Registration Date	: 26/07/2021	Issuance Date	: 26/07/2021
Date of Expiry	: 25/07/2024		
1st Surve. Due	: 26/06/2022	2nd Surve. Due	: 26/06/2023

Director

IAS ACCREDITED Management Systems Certification Body MSCB 119

IAF MEMBER OF MULTILATERAL RECOGNITION ARRANGEMENT

AQC MIDDLE EAST LLC

Head Office: Office No. 02, Ground Floor, Sharjah Media City, Sharjah, UAE. e-mail : info@aqcworld.com.

Key Location: A-60, Sector - 2, Noida, Uttar Pradesh, 201301, India.

Validity of the Certificate is subject to successful completion of surveillance audit on or before of due date. In case surveillance audit is not allowed to be conducted, this certificate shall be suspended/withdrawn.

Certificate Verification: Please Re-check the validity of certificate at http://www.aqcworld.com/certificate.aspx or www.aqcworld.com at Active Client

Certificate is the property of AQC Middle East LLC and shall be returned immediately when demanded.

CHAPTER 14:

SECURITY

SECURITY

LIST OF SECURITY EQUIPMENT INSTALLED AT KANGRA AIRPORT

S.No.	Name of equipment	Make & Model	Serial No.	Date of Acquisition
1.	X-RAY	HEIMANN XBIS 100100v	27105	11.08.2004
2.	X-RAY	HEIMANN XBIS 6040i	26895	11.08.2004
3.	CCTV (75 Cameras)	 Magnum Telesystem pvt ltd		Newly installed CCTV in April 2024.
4.	ETD	500DT SMITH	50401	31.01.2007
5.	EPABX	MATRIX		22.10.2018
6.	PA System	Space cloud pvt. Ltd.		26.04.2024
7.	Portable PA System			03.03.2017
8.	DFMD	METOR 200		26.03.2002
9.	DFMD	METOR 200		12.03.2004
10.	HHMD	METOR-28 METOR-28 RELIANCE ELECTRONICS RE-AH-01 RELIANCE ELECTRONICS RE-AH-01	450154 450158 449896 455697 8890512 8900512 8910512 9350512 9360512 9370512	22.02.2007 21.08.2010 13.09.2002 13.09.2002 05.06.2012 05.06.2012 05.06.2012 06.06.2012 06.06.2012 06.06.2012

List of CNS- AS Circulars Issued by CHQ
(As on 01.01.2024)

S.N.	Circular No.	Subject	Month of Issue
1.	01 of 2021	Guidelines regarding recommended lifespan of Airport Systems Equipment and Facilities	Dec 21
2.	01 of 2022	Tentative Life span of Airport System Equipment/Facility and continuing their operation beyond such Life span	Jan 22
3.	02 of 2022	Airport Systems Preventive Maintenance Schedule (XBIS,ETD,CCTV)	Jan 22
4.	03 of 2022	Precautions in Tendering & Management of AMC/CAMCs	July 22

1) Entire terminal building, Air side area and city side area of the airport are covered under SCCTV surveillance comprising 28 SCCTV cameras.

2) ANS site, passage leading to ATC tower, entry to the equipment room and SCCTV server room is under Surveillance of CCTV camera.

3) Security to the Airport is under H.P. Police.

Annexures

1) DGCA CAR

Directorate General of Civil Aviation is an attached office of the Ministry of Civil Aviation. The Directorate General of Civil Aviation is the regulatory body in the field of Civil Aviation primarily dealing with safety issues. It is responsible for regulation of air transport services to/from/within India and for enforcement of civil air regulations, air safety and airworthiness standards. It also co-ordinates all regulatory functions with International Civil Aviation Organization. The regulations are in the forms of the Aircraft Act, 1934, the Aircraft Rules, the Civil Aviation Requirements, the Aeronautical Information Circulars. The Advisory and guidance material is in the form of circulars.

CIVIL AVIATION REQUIREMENTS (CAR)

For CNS facilities the regulations are stipulated for standards and practices popularly known as CAR.

In Section 9 (Air Space & Air Traffic Management), Series D (Part i to VI) it has specified the various standards and recommended practices to be adhered for different CNS facilities

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DGCA CAR Section 9 – Air Space and Air Traffic Management
Series D: NAVIGATION, LANDING AND COMMUNICATION AIDS

Part I: Requirements for maintenance/ inspections of communication/ Navigation, landing and other equipment's installed at airports and enroute.
Part II: Aeronautical Telecommunications – Radio Navigation Aids
Part III: Aeronautical Telecommunications – Communication Procedures
Part IV: Aeronautical Telecommunications – Digital Data Communication and Voice Communication System.
Part V: Aeronautical Telecommunications – Secondary Surveillance Radar
Part VI: Aeronautical Telecommunications – Aeronautical Radio Frequency Spectrum Utilization.

2) CNS CIRCULARS

भारतीय विमानपत्तन प्राधिकरण
Airports Authority of India

Check list of CNS Manuals and Circulars as on 01st January 2024

CNS CIRCULAR 01/2024

भारतीय विमानपत्तन प्राधिकरण
Airports Authority of India

संचार, दिक्चालन एवम निगरानी-प्रचालन एवं अनुरक्षण निदेशालय

Directorate of CNS-OM
Rajiv Gandhi Bhavan
Safdarjung Airport New Delhi – 110003

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भारतीय विमानपत्तन प्राधिकरण Airports Authority of India	Check list of CNS Manuals and Circulars as on 01st January 2024

CNS Circular 01 of 2024

Sub: Check list of CNS Manuals and Circular as on 01st January 2024.

1. Introduction:

1.1 CNS Manuals and Circulars are issued by the Directorate of Communication, Navigation and Surveillance (CNS) for the purpose of establishing guidance, processes and procedures for implementation of DGCA CARs, DGCA Circulars and other regulatory requirements related to operation and maintenance management of CNS/ATM facilities by ATSEP.

1.2 CNS Manuals are updated to include new guidance material, process and procedures due to change in DGCA CARs, DGCA Circulars/other regulatory requirements, introduction of new make/model of equipment's and technology etc.

1.3 A CNS Circular is cancelled when the contents of CNS Circular either have been included in CNS Manual/DGCA CAR, superseded by another CNS Circular or cancelled due to any other reasons.

1.4 A CNS Technical Advisory Circular serves the purpose of guidance catering to certain specific technical requirements of CNS/ ATM facilities.

1.5 Standard Operating Procedures (SOPs) are issued in order to carry out operations correctly and always in the same manner.

1.6 This checklist circular contains details of CNS Manuals, Circulars, Advisory Circulars and SOPs which have been issued by Directorate of CNS-OM and are valid from the start of calendar year 2024.

2. Purpose:

2.1 Purpose of this CNS Circular is to provide updated information to all the ATSEPs about the currency of CNS Manuals, Circulars, Advisory Circulars and SOPs as on 1st January 2024.

3. Availability of CNS Manuals and Circulars:

3.1 Electronic copies of CNS Manuals, Circulars, Advisory Circulars and SOPs issued by Directorate of CNS-OM are available at following links: -

(a) At aai.aero website: - https://www.aai.aero/en/employee-corner/documents; and

(b) at aim-india website: - https://aim-india.aai.aero/ais-document under the heading "Restricted Documents".

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CNS Manuals, Circulars and SOPs can be accessed on www.aai.aero as follows:
www.aai.aero => Emp Login => Circulars & Orders (Double click) => Check Manuals only => Department type (CNS-OM) + check all 3 options => Search

and on AAI-AIM link as follows: -
https://aim-india.aai.aero => Documents (Click) => Restricted Document (Click) => Login (with AAI email address and password – only for registered users) => Restricted Document (Click Again) => AAI Documents => CNS Directorate (Click) => CNS Manuals (Click).

3.2 In order that instructions/ guidelines pertaining to CNS/ ATM facilities are implemented in a timely manner all CNS In-charges and ATSEPs are advised to visit AAI website and AAI-AIM website https://aim-india.aai.aero on a regular basis to keep themselves updated on policy/ guidelines for smooth functioning. No separate instructions/guidelines will be issued for implementation purposes.

3.3 A hard copy of CNS Manuals, Circulars, Advisory Circulars and SOPs are kept in the Directorate of CNS-OM for checking the currency. Stations are also advised to keep required number of soft/hard copies to meet regulatory requirements.

4. Details of currency of CNS Manuals and Circulars:

4.1 A list of CNS Manuals which are active as on 01st January 2024 is enclosed as Annexure-I to this circular.

4.2 A list of CNS Circulars which are active as on 01st January 2024 is enclosed as Annexure-II to this circular.

4.3 A list of CNS Technical Advisory Circulars which are active as on 01st January 2024 is enclosed as Annexure-III to this circular.

4.4 A list of SOPs which are active as on 01st January 2024 is enclosed as Annexure-IV to this circular.

5. Queries: - Any queries on the content of this CNS circular should be addressed to: -

Executive Director [CNS-OM],
Airports Authority of India,
Rajiv Gandhi Bhavan,
Safdarjung Airport, New Delhi – 110003
E mail: **edcnsom@aai.aero** or **gmcnsqa@aai.aero.**

6. Validity: - This CNS Circular shall be in force until further notice. This CNS Circular supersedes CNS Circular 01 of 2023.

01-01-2024

[S. K. MALLICK]
Executive Director [CNS-OM]

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Check list of CNS Manuals and Circulars as on 01st January 2024

Annexure – I

List of current CNS Manuals as on 01.01.2024

S. No	CNS Manual No.	Subject	Current Version	Month of issue
1	Volume I	Maintenance Management and Operation of CNS Facilities	Amendment 2 - Ver 3.0	Jun 2022
2	Volume II	Aeronautical Telecommunication - Communication Procedures	Amendment 2 - Ver 3.0	Oct 2018
3	Volume III	Siting Criteria of CNS Facilities	Version 2.0	Nov 2015
4	Volume IV	Flight Inspection of CNS Facilities	Version 2.0	Nov 2015
5	Volume V	Lightning, Surge Protection, equi-potentialisation and Earthing System for CNS Installations	Amendment 1 – Ver 3.0	Sep 2021
6	Volume VI	Technical Specifications	Version 1.0	Aug 2006
7	Volume VII	CNS Facilities Maintenance Schedules		
	Part-I	Communication Manual	Amendment 5 - Ver 3.0	June 2023
	Part-II	Navigation Manual	Amendment 4 - Ver 3.0	Sep 2023
	Part-III	Surveillance Manual	Amendment 8- Ver 2.0	May 2023
	Part- IV	Automation Manual	Amendment 4 - Ver 2.0	Jul 2021
8	Volume VIII	Document Management Manual	Amendment 3 - Ver 1.0	Jul 2019
9	Volume IX	Handbook on Aeronautical Frequency Spectrum Management	Version 2.0	Jul 2019
10	Training Manual	Training Procedure Manual for Control Rooms of AAI	First Version	Oct 2020
11	Training Manual	Training & Procedure Manual – Aeronautical Station Operator (ASO)	Version V 1.03	Jul 2022
12	Training Manual	Certificate / Authorization & Training Manual – Aeronautical Station Operator (ASO)	Version v 1.02	Jul 2022
13	Training Manual	AERONAUTICAL STATION OPERATOR TRAINING CENTER QUALITY ASSURANCE MANUAL	Version v 1.02	Jul 2022
14	Training Manual	TRAINING & PROCEDURES MANUAL- Department of CNS Training	Amendment 17 - Ver 2.0	May 2023
15	Training Manual	Training & Procedure Manual – Aeronautical Information Services (AIS)	Version V 1.00	Jun 2023

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Check list of CNS Manuals and Circulars as on 01st January 2024

Annexure – II

List of current CNS Circulars as on 01.01.2024

S. N.	CIRCULAR NO.	SUBJECT	DATE OF ISSUE	REMARKS
1.	~~01 of 2003~~	~~Lightening Arrestor for CNS facilities~~	~~May 2003~~	Cancelled. Guidelines included in CNS Manual Vol V, Ver-3.0
2.	~~02 of 2003~~	~~VOR Aerodrome Check Points~~	~~Sep 2003~~	Cancelled. Guidelines included in para 5.4.4 in DGCA CAR Section-4, Series-B, Part-I issued on 26/08/2015
3.	~~03 of 2003~~	~~Provision of Information on the Operational Status of Navigational Aids~~	~~Sep 2003~~	Cancelled. Guidelines included in para 7.3 in DGCA CAR Section-9, Series-E, Part-I, Issue-III issued on 12/09/2022
4.	~~04 of 2003~~	~~Time in Air Traffic Services~~	~~Sep 2003~~	Cancelled. Guidelines included in para 2.26 in DGCA CAR Section-9, Series-E, Part-I, Issue-III issued on 12/09/2022
5.	~~05 of 2003~~	~~Use of Standard Language for communication in ATS~~	~~Dec 2003~~	Cancelled. Guidelines included in para 2.31 in DGCA CAR Section-9, Series-E, Part-I, Issue-III issued on 12/09/2022
6.	06 of 2003	Air Traffic Services Requirements for Communication - Back up capabilities thereof	Dec 2003	
7.	07 of 2003	Radar Systems – Backup Capabilities	Dec 2003	
8.	~~01 of 2004~~	~~Automatic recording of Surveillance Data~~	~~Jan 2004~~	Cancelled. Guidelines included in para 6.41 in DGCA CAR Section-9, Series-E, Part-I, Issue-III issued on 12/09/2022
9.	~~02 of 2004~~	~~VOLMET Broadcasts service~~	~~Jan 2004~~	Cancelled. Guidelines included in para 4.4 in DGCA CAR Section-9, Series-E, Part-I, Issue-III issued on 12/09/2022
10.	~~03 of 2004~~	~~Aeronautical Fixed Service (ground-ground communications)~~	~~Jan 2004~~	Cancelled. Guidelines included in para 6.2 in DGCA CAR Section-9, Series-E, Part-I, Issue-III issued on 12/09/2022
11.	04 of 2004	Disposal of Old/Dismantled Equipments	Mar 2004	
12.	~~05 of 2004~~	~~NORMARC ILS General Maintenance Workshop held at Chennai on 4-5th July 2002~~	~~Aug 2004~~	Cancelled. This ILS has been decommissioned at all airports.
13.	~~06 of 2004~~	~~Identification signal of ILS Localizer~~	~~Aug 2004~~	Cancelled. Guidelines included in para 3.1.3.9 in DGCA CAR Section-9, Series-D, Part-II, Issue-IV issued on 20/09/2022
14.	07 of 2004	Operation of DVOR/DME(HP)	Aug 2004	
15.	~~01 of 2006~~	~~Documentation and preservation of maintenance records of CNS facilities~~	~~Jan 2006~~	Superseded by 09/2019
16.	~~02 of 2006~~	~~Intimation of major failures of CNS facilities~~	~~Jan 2006~~	Superseded by 03/2014
17.	~~01 of 2007~~	~~Field Reading of ILS~~	~~July 2007~~	Superseded by 02/2014
18.	~~01 of 2008~~	~~Maintenance of Navigational Aids Site~~	~~Jan 2008~~	Superseded by 08/2019
19.	~~02 of 2008~~	~~Guidelines for provision of Power supply systems to CNS and ATM facilities~~	~~May 2008~~	Superseded by 01/2011
20.	01 of 2009	Procurement of Spares and Equipment	Feb 2009	
21.	02 of 2009	Pre-monsoon checks of CNS facilities	Apr 2009	
22.	~~01 of 2010~~	~~Updation of CNS Manual~~	~~Dec 2010~~	Superseded by 03/2018
23.	~~01 of 2011~~	~~Guidelines for provision of Power Supply~~	~~Jan 2011~~	Superseded by 03/2021

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		~~Systems to CNS/ATM Automation Facilities/System~~		
~~24.~~	~~02 of 2011~~	~~SOP for Opening the Watch CNS Point of view~~	~~July 2011~~	Superseded by 04/2018
~~25.~~	~~01 of 2012~~	~~Maintenance & Calibration of Test Equipment~~	~~Jan 2012~~	Superseded by 06/2019
~~26.~~	~~02 of 2012~~	~~SOP for Inspection/Safety Oversight Audit of CNS/ATM Automation Facilities by DGCA~~	~~Feb 2012~~	Superseded by 05/2018
~~27.~~	~~03 of 2012~~	~~Alternate Means for Provision of information on the operational status of Radio Navigation Aids~~	~~Mar 2012~~	Superseded by 02/2013
~~28.~~	~~04 of 2012~~	~~Empanelment of OJT Instructors~~	~~Sep 2012~~	Superseded by 08/2023
~~29.~~	~~05 of 2012~~	~~Provision of Fire Detection and Fire alarm System in CNS Facilities~~	~~Nov 2012~~	Superseded by 03/2023
30.	06 of 2012	Electrostatic Discharge (ESD) Control – Use of Anti –Static Devices in Handling of Electronic PCB/Modules of CNS/ATM Systems	Dec 2012	
31.	01 of 2013	Management of CNS Stores	Apr 2013	
32.	02 of 2013	Alternate Means for Provision of information on the operational status of Radio Navigation Aids	Jun 2013	
~~33.~~	~~03 of 2013~~	~~Installation & Periodic Maintenance of bird control spikes on CNS Antenna installations~~	~~Aug 2013~~	Superseded by 12/2020
34.	04 of 2013	Use of Mobile Telephones in Air Traffic Service Operational Areas	Sept 2013	
35.	01 of 2014	Management of CNS Stores- Survey reporting of Equipments/ accessories to be used as spares/ cannibalisation after completion of their life cycle/ decommissioning	Feb 2014	
~~36.~~	~~02 of 2014~~	~~ILS Maintenance Schedule – Frequency of ILS Field Readings~~	~~Mar 2014~~	Superseded by 02/2022
~~37.~~	~~03 of 2014~~	~~Intimation of Major failures of CNS/ATM Facilities~~	~~Jun 2014~~	Superseded by 04/2020
38.	04 of 2014	Preservation and Replaying of ANS and Aerodrome related Recording Media for investigation of Accident/Incident/Occurrences	Jul 2014	
~~39.~~	~~05 of 2014~~	~~Renewal of Certification/Approval of CNS/ATM Facilities by DGCA~~	~~Dec 2014~~	Cancelled since DGCA is no more providing certification of CNS/ATM Facilities.
40.	01 of 2015	Management of CNS Stores Guidelines for procurement through NIT/NIQ	Apr 2105	
41.	02 of 2015	Prior Inspection of CNS-ATM Equipment by Technical Team	May 2015	
~~42.~~	~~03 of 2015~~	~~Continued operation of CNS Equipments /Facility beyond their tentative life span~~	~~Dec 2015~~	Superseded by 04/2021
~~43.~~	~~04 of 2015~~	~~Guidelines for Wireless Operating Licence (WOL) in AAI~~	~~Dec 2015~~	Superseded by 12/2019
~~44.~~	~~01 of 2016~~	~~SOP for internal performance monitoring, management and operation of CNS/ATM Automation facilities~~	~~Apr 2016~~	Superseded by 07/2019
~~45.~~	~~02 of 2016~~	~~Guidelines for choice of media for the provision of redundant communication links for transportation of operational data transportation~~	~~May 2016~~	Superseded by 13/2019
~~46.~~	~~03 of 2016~~	~~Notification of incidents and investigation thereof – Reportable significant degradation/failure of CNS facilities~~	~~Jun 2016~~	Superseded by 06/2022
47.	04 of 2016	SOP for CCTV and Access Control Systems at ANS Operational Units	July 2016	
~~48.~~	~~05 of 2016~~	~~SOP for checking the efficacy of Installation and Maintenance of Lightning, Surge Protection and Earthing systems for CNS/ATM Facilities.~~	~~Sep 2016~~	Superseded by 03/2022

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49.	01 of 2017	Policy for card/ module level failures of CNS/ATM systems	May 2017	
~~50.~~	~~02 of 2017~~	~~Action to be taken on avoidable common observations of DGCA inspection/ Audit for CNS/ATM Automation facilities~~	~~Aug 2017~~	Superseded by 05/2018
51.	01 of 2018	Guidelines/Precautions to be taken while undertaking updates/upgrades (Hardware/Software) of operational ATM Automation systems	Jan 2018	
52.	02 of 2018	Standardized Debriefing Proforma for CNS Facilities.	Jan 2018	
53.	03 of 2018	Revised Guidelines for preparation of Station CNS Manual	Apr 2018	
54.	04 of 2018	SOP for opening & closing of watch from CNS point of view	Aug 2018	
~~55.~~	~~05 of 2018~~	~~SOP for inspection/Safety oversight Audit of CNS/ATM facilities by DGCA~~	~~Sep 2018~~	Superseded by 07/2020
56.	06 of 2018	Standard Operating Procedure (SOP) for issuance of new/change of 4 letter AFTN Location Indicators & notification of Location names within Indian Flight Information Regions	Oct 2018	
57.	~~07 of 2018~~	~~Critical and Sensitive area dimensions of ILS Localizer and Glide path~~	~~Dec 18~~	Superseded by 08/2019
~~58.~~	~~01 of 2019~~	~~Checklist of Current CNS Circulars~~	~~Jan 19~~	Superseded by 01/2020
59.	02 of 2019	Provisioning of CNS Documents on AAI-AIM Portal	Jan 19	
60.	03 of 2019	Utilization of CNS Module on AIMS Portal	Feb 19	
61.	04 of 2019	Standardization & uniformity of e-mail ids in CNS Department	Feb 19	
62.	05 of 2019	Periodical "On the Job Check" of Air Traffic Safety Electronics Personnel [ATSEP]	Mar 19	
63.	06 of 2019	Maintenance and Calibration of Test Equipment	Apr 19	
64.	07 of 2019	SOP for internal performance monitoring, management and operation of CNS/ATM Automation facilities	Apr 19	
65.	~~08 of 2019~~	~~Maintenance of Radio Navigation Aids sites & ILS Critical/Sensitive Areas~~	~~May 19~~	Superseded by 09/2021
66.	09 Of 2019	Documentation and preservation of Maintenance Records of CNS/ATM facilities	June 19	
67.	~~10 of 2019~~	~~Cyclone preparedness and response guidance for operation and maintenance management of CNS/ATM Automation and ancillary systems~~	~~June 19~~	Superseded by 10/2021
68.	11 of 2019	Guidelines for CNS Mast Works	July 19	
69.	12 of 2019	Guidelines for Regulatory Clearance from WPC/DoT for various Wireless Networks (Aeronautical and non-Aeronautical) in AAI	July 19	
~~70.~~	~~13 of 2019~~	~~Guidelines for choice of media for the provision of redundant Communication links for various operational data transportation~~	~~July 19~~	Superseded by 03/2020
71.	14 of 2019	Procedure to conduct Competency Check for CNS Executives who hold proficiency in AIS-ASBS	Sep 19	
72.	~~15 of 2019~~	~~Charging of Simulation Study Fees from Organizations other than AAI~~	~~Sep 19~~	Superseded by 13/2021
73.	~~01 of 2020~~	~~Check list of CNS Manuals and Circular as on 01st January 2020~~	~~Jan 20~~	Superseded by 01/2021
74.	02 of 2020	Internal Investigation of CNS Incidents/events and implementation of corrective action plan for internal standardization, quality assurance and systematic improvement	Jan 20	
75.	~~03 of 2020~~	~~Guidelines for choice of media for the provision of redundant Communication links~~	~~Mar 20~~	Superseded by 09/2023

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		~~for various operational data transportation~~		
76.	04 of 2020	Intimation of Failure/Degradation of CNS/ATM Facilities not reported through AIS or Incident report	May 20	
77.	05 of 2020	SOP for conducting practical & viva exam through Web conferencing for various CNS courses	May 20	
78.	06 of 2020	SOP for conducting CNS training courses through virtual training/online solution for ATSEP	May 20	
79.	07 of 2020	Standard Operating Procedure (SOP) to be followed for Inspection/ Safety Oversight Audit of CNS /ATM Automation Facilities by DGCA	July 20	
80.	08 of 2020	Guidelines for provisioning AFTN/AMHS connectivity for Non-AAI Users and/or AAI Users at Field Stations including RCS Stations	July 20	
81.	09 of 2020	Interim Maintenance Management of Communication, Navigation and Surveillance (CNS) and Airport System (AS) Facilities at Regional Connectivity Scheme (RCS) Airports	Aug 20	
82.	10 of 2020	Procurement of Good and Services – Guidelines regarding recommended life span of ANS Systems (CNS/ATM Equipment and Ancillary Systems)	Aug 20	
83.	11 of 2020	Guidelines for responsibility of reviewing and updating of CNS Manuals, Circulars, SOPs, etc.	Sep 20	
84.	12 of 2020	Provision and Periodic Maintenance of Bird Control Devices and Pest Control for CNS/ATM Equipments	Oct 20	
85.	13 of 2020	Standard Operating Procedure for Aeronautical Station Operators (ASO)	Dec 20	
86.	~~14 of 2020~~	~~Standard Operating Procedure for International NOTAM Offices~~	~~Dec 20~~	Superseded by 08/2022
87.	15 of 2020	Guidelines for Implementation of In-house Innovation in CNS/ATM Systems and Sub-Systems for Operational Use	Dec 20	
88.	~~01 of 2021~~	~~Check list of CNS Manuals and Circulars as on 01st January 2021~~	~~Jan 21~~	Superseded by 01/2022
89.	~~02 of 2021~~	~~Guidelines for obtaining in-principal approval for hiring or surrendering of communication links for various operational data transportation~~	~~Mar 21~~	Superseded by 09/2023
90.	~~03 of 2021~~	~~Power Supply policy for CNS/ ATM Systems~~	~~Mar 21~~	Superseded by 02/2023
91.	04 of 2021	Continued Operation of CNS/ATM Equipment's/Facility beyond their tentative life span	Apr 21	Supersedes 03/2015
92.	05 of 2021	Guidelines to be followed by stations for the purpose of verification and validation of coordinates by CHQ for all Radio Navigational facilities ready for commissioning.	May-21	
93.	06 of 2021	Recommended Check List for processing Safety Case Assessment and Reporting System (SCARS) for CNS projects at Airports	Jun-21	
94.	07 of 2021	Recommended check list for site selection of Radio Navigation Aids at Airport	Jul-21	
95.	08 of 2021	Recommended check list for provision of Instrument Landing System (ILS) Category (Cat) III ground infrastructure and other operational requirements at Airports.	Aug-21	
96.	09 of 2021	Maintenance of Radio Navigational Aids sites and ILS Critical/Sensitive Areas	Sep-21	Supersedes 08/2019

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97.	10 of 2021	Cyclone preparedness and response guidance for operation and maintenance management of CNS/ATM Automation and ancillary systems	Sep-21	Supersedes 10/2019
98.	11 of 2021	Standard Operating Procedure for issuance of SNOWTAM in accordance with Amendment 42 to Annexure-15 & Amendment 10 to PANS-ATM (Doc.4444)	Sep-21	
99.	12 of 2021	Recommended Pre-Commissioning Check list for CNS Equipment/Facilities	Dec-21	
100.	13 of 2021	Charging of Simulation Study Fees from Organizations Other than AAI	Dec-21	Supersedes 15/2019
101.	01 of 2022	Check list of CNS Manuals and Circulars as on 01st January 2022	Jan 22	Supersedes 01/2021
102.	02 of 2022	Displacement Sensitivity (DS) Measurement of Instrument Landing System (ILS)	Jan 22	Supersedes 02/2014
103.	03 of 2022	Standard Operating Procedures (SOP) for checking the efficacy of Installation and Maintenance of Lightning, Surge Protection and Earthing systems for CNS/ATM Facilities	Jan 22	Supersedes 05/2016
104.	04 of 2022	Guidelines for the deployment of Voice-Automatic Terminal Information Service (Voice-ATIS) facility at AAI Airports	Feb 22	
105.	~~05 of 2023~~	~~Site approval for installation/ trans-installation of ILS (LLZ/GP) and DVOR~~	~~Apr 22~~	Superseded by 06/2023
106.	06 of 2022	Notification of incidents and investigation thereof- Reportable significant degradation/ failure of CNS facilities	Jul 22	Supersedes 03/2016
107.	07 of 2022	Periodic Competence Enhancement Programs and Pre-deployment sensitization for Shift Supervisory Officers (SSO's)	Dec 22	
108.	08 of 2022	Standard Operating Procedure for promulgation of NOTAM in respect of Communication, Navigation, Surveillance and Automation Systems/Facilities.	Dec 22	Supersedes 14/2020
109.	09 of 2022	Standard Operating Procedure for installation/trans-installation/ replacement of Nav-Aids Systems/Facilities.	Dec 22	
110.	02 of 2023	Power Supply Policy for CNS/ATM Systems	Jan-2023	Supersedes 03/2021
111.	03 of 2023	Provision of Fire Detection, Suppression and Alarm Systems in CNS/ATM Facilities	Jan-2023	Supersedes 05/2012
112.	04 of 2023	Guidelines regarding capitalization of CNS equipment	Apr-2023	
113.	05 of 2023	Award of CAMC/AMC for CNS/ATM facilities and supporting/ ancillary systems for CNS/ATM facilities	Aug-2023	
114	06 of 2023	Site approval for Installation/ Trans-Installation of ILS (LLZ/ GP), DVOR and NDB	Aug-2023	Supersedes 05/2022
115.	07 of 2023	Declaration of Computer resources related to communication, Navigation and Surveillance System for Air traffic Management being Critical information Infrastructure of AAI as protected system	Sep-2023	
116.	08 of 2023	Empanelment of OJT Instructors	Aug-2023	Supersedes 04/2012
117.	09 of 2023	Guidelines for- A. Obtaining in-principal approval for Hiring or surrendering of communication links B. Establishment of redundant communication links	Nov-2023	Supersedes 03/2020 & Supersedes 02/2021

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Check list of CNS Manuals and Circulars as on 01st January 2024

Annexure – III

List of CNS Technical Advisory Circulars as on 01.01.2024

S. No.	Advisory Circular No.	SUBJECT	Month of issue
1.	01 of 2019	Operation and Maintenance advisory for Mopiens DVOR/DME and Thales ILS	Jun-2019
2.	02 of 2019	Guidelines for operation and maintenance of VHF TX., Rx. And Antenna System	Jul-2019
3.	01 of 2020	Guidelines for the corrective maintenance of NM7014/NM7034 ILS Equipment - Restoration of Indra Navia NM7000-B2/NM7000-B3 ILS Power Amplifier configuration Settings in case of configuration Settings are not retained on system power reset	Oct-2020
4.	02 of 2020	Creation of new IP interface for HYME (MET) data at SAAB ASMGCS stations	Oct-2020
5.	03 of 2020	Relocation of MLAT Remote Unit (RU) at SAAB ASMGCS stations	Oct-2020
6.	01of 2022	Advisory for the simultaneous safety assessment of ATIS and associated VHF radios for the commissioning of ATIS facility.	Mar-2022
7.	02 of 2022	Standard Operating Procedure (SOP) for processing the hotline requirements between various stations	Dec-2022
8.	01 of 2023	Interim Provision for Communication (VHF Transceiver-10 WAM/ Manpack) facility at Regional Connectivity Scheme (RCS) Airports and other small Airports for TWR and SMC Operation	Aug-2023
9.	02 of 2023	Guidelines for installation of qty. 04 additional lightening arrestors for the existing DVORs	Aug-2023

भारतीय विमानपत्तन प्राधिकरण
Airports Authority of India

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Annexure – IV

List of current Standard Operating Procedures (SOPs) as on 01.01.2024

S. No.	SOP No.	SUBJECT	Month of issue
1.	01 of 2018	Standard Operating Procedure [SOP] to be followed for Flight inspection of Navigational and Visual Aids	Feb 2018
2.	01 of 2023	Standard Operating Procedures [SOPs] for ILS (LLZ & GP) [make ILS RTS734]	Mar 2023

3) ACRONYMS used in the manual:-

AAI	Airports Authority of India
ACS	Aeronautical communication station
AM	Asst. Manager
AMC	Annual Maintenance Contract
APD	Airport Director
ATC	Air Traffic Control
BCAS	Bureau of Civil Aviation Security
CHQ	Corporate Head Quarters
CIP	Commercially Important Person
CISF	Central Industrial Security Force
CNS	Communication Navigation and Surveillance
CPMS	Corporate Planning and Management System
CRSD	Central Radio Stores Depot
DFMD	Door Frame Metal Detector
DME	Distance Measuring Equipment
DTO	Duty Technical Officer
DVOR	Doppler Very High Frequency Omni Range

DVTR	Digital Voice Tape Recorder
DVR	Digital Voice Recorder
EPABX	Electronic private automatic Branch Exchange
ETA	Expected Time of Arrival
ETD	Expected Time of Departure
FIU	Flight Inspection Unit
HHMD	Hand Held Metal Detector
ICAO	International Civil Aviation Organization
ID	Identity
MT	Motor Transport
NOTAM	Notice to Airmen
OIC	Officer-in-Charge
PA System	Public Address System
PIC	Photo Identity Card
RCU	Remote Control Unit
RED	Regional Executive Director
RHQ	Regional Head Quarters
SM	Senior Manager
SMU	Station Maintenance Unit
UTC	Universal Coordinated Time

VIP	Very Important Person
SCCTV	Surveillance Closed Circuit Television
FIDS	Flight Information display system