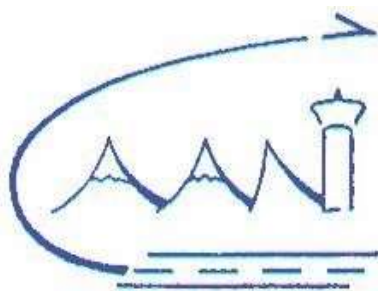


**Manual of Standards**  
**for**  
**Communication, Navigation and Surveillance**  
**Services (MOS – CNS)**



**CIVIL AVIATION AUTHORITY OF NEPAL**

**First Edition**  
**February 2022**

## **FOREWORD**

Pursuant to Rule 82, schedule-3 of Civil Aviation Regulation, 2058 B.S. (2002 A.D.), this Manual of Standards for Communication, Navigation and Surveillance Services (MOS-CNS) is issued by Civil Aviation Authority of Nepal (CAAN) specifying the national standards, requirements and procedures pertaining to the planning, operation and maintenance of CNS facilities by the CNS Service Providers (CNSP). These guidelines shall be applicable to all CNSP directly involved in installation, operations and maintenance of CNS equipment/systems that are in operation at different civil aviation offices of Nepal.

Air Navigation Services Safety Standards Department (ANSSSD) of the Civil Aviation Authority of Nepal has developed these requirements to administer the CNS operations and Air Traffic Safety Electronic Personnel (ATSEP) activities.

While developing this requirement, ICAO Annex-10, ICAO Training Manual for Air Traffic Safety Electronics Personnel (Doc 10057), ICAO Manual of Testing of (Ground based) Radio Navigation Aids (Doc 8071), ICAO Safety Management Manual (Doc 9859) and other relevant ICAO documents have been used as the basis especially in matters pertaining to maintain standards of CNS facilities.

This is a controlled document and is subject to periodic review. ANSSSD will maintain this manual as complete, accurate and up-date as possible. Comments and recommendations for revision/ amendment action to this publication shall be forwarded to the Director of ANSSSD, CAAN Head Office.



**Er. Pradeep Adhikari**  
**Director General**  
**Civil Aviation Authority of Nepal**  
**Date: February 2022**

## **AMENDMENTS**

The amendment listed below incorporated into this copy of the Manual of Standards for Communication, Navigation and Surveillance Services (MOS - CNS).

### **RECORD OF AMENDMENTS AND CORRIGENDA**

<b>Amendments</b>			

<b>Corrigenda</b>			

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## CHAPTER 1: INTRODUCTION

### 1.1 General

#### 1.1.1 Background

- a. This Manual of Standards for Communication, Navigation and Surveillance Services (MOS-CNS) contains the standards, requirements and procedures pertaining to the planning, operation and maintenance of CNS facilities that are applicable to all CNS Service Providers (CNSP). It also spells out the requirements to be met for human resource management, safety management system, facility malfunction incident and radio interference reporting, contingency plan, security program and document and records interface agreements with other organizations.
- b. Air Navigation Services Safety Standards Department (ANSSSD) of the CAAN has developed this manual of standards to administer the CNS operations at different civil aviation offices of Nepal. CNSP in CAAN is required to comply with the provisions contained in this document for the safety of civil aviation.
- c. In the circumstance of any perceived discrepancy of meaning between manual of standards and the CAAN regulations/requirements, the primacy of intent rests with the regulations/requirements. Where there is any inconsistency between the regulations/requirements and the MOS, regulations/requirements shall prevail.
- d. The CNSP shall document local procedures in their own operations manuals, to ensure the maintenance and compliance with the CAAN regulations and requirements. The CNSP shall submit the operation manuals and its amendments to the Director General of CAAN to obtain the approval.

#### 1.1.2 Differences between ICAO Standards and those in MOS

CNSP shall ensure that the CNS services that it provides is in conformity with the provisions in this manual of standards and complies with all the standards and recommended practices in ICAO Annex 10 (All Volumes).

#### 1.1.3 MOS Documentation Change Management

- a. ANSSSD has the responsibility of technical contents and changes of this document that may only be amended under the authority of Director General of CAAN.
- b. All users of this manual are encouraged to submit recommendations for proposed revisions, additions or omissions to the Authority for consideration and inclusion in the

amendments as appropriate in following contact address:

Air Navigation Service Safety Standards Department  
Civil Aviation Authority of Nepal  
Head Office, Babarmahal Kathmandu  
Phone No: 014267784  
Fax No: 014262923  
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- c. Request for any change to the content of this document may come from
  - i. CNS areas within CAAN;
  - ii. aviation industry service providers or operators;
  - iii. individuals or authorization holders.
  
- d. The need to change standards in this manual may arise for any of the following reasons,
  - i. to ensure safety;
  - ii. to ensure standardization;
  - iii. to respond to changed CAAN standards;
  - iv. to respond to ICAO documents;
  - v. to accommodate proposed initiatives or new technologies.

#### **1.1.4 Related documents**

This manual is based mainly on compliance with the following documents:

- a. Civil Aviation Authority of Nepal Act 2053 (1996)
- b. Civil Aviation Regulations, 2058 (2002)
- c. Civil Aviation Requirements (CAR-10)
- d. ICAO Annex 10 - Aeronautical Telecommunications, Volume I – VI;
- e. ICAO Annex 19 - Safety Management System;
- f. ICAO Doc 8071 - Manual on Testing of Radio Navigation Aids, Volume I-III;
- g. ICAO Doc 4444 - Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM);
- h. ICAO Doc 9859 - Safety Management Manual; and
- i. ICAO Doc 10057 – Manual on ATSEP Competency Based Training and Assessment
- j. Relevant ICAO Documents and Circulars
- k. AIP Nepal, AICs, Supplement and DGCA Directives

## 1.2 Definitions and Abbreviations

### 1.2.1 Definitions

Unless otherwise stated, words in this document have the following meanings:

**Air traffic management:** The dynamic, integrated management of air traffic and airspace including air traffic services, airspace management and air traffic flow management — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

**Aeronautical telecommunication service:** A telecommunication service provided for any aeronautical purpose.

**ATSEP:** Air Traffic Safety Electronic Personnel (ATSEP) are the technical personnel directly involved in operations and maintenance of CNS equipment/systems that are in operation at different civil aviation offices.

**ATSEP License:** A document issued by CAAN authorizing the holder to exercise specified privileges.

**Communication System:** The ground-based, mobile and/or satellite-based facilities providing voice and/or data for supporting aeronautical fixed service and aeronautical mobile service.

**CNS Services:** A service provided by the CNS service provider that use the aeronautical telecommunication technology to support the air navigation services.

**Equipment/System:** One or more types of electronic equipment and ancillary devices functioning to provide a service.

**Maintenance Log:** Any type of Recording or logging of task/work done on equipment/system.

**Navigation System:** The ground-based and/or satellite-based facilities providing guidance information or position data for the efficient and safe operation of aircraft.

**Operation duty:** The duty assigned to work in shift for the operation of CNS facilities.

**Operations Manual:** The procedures, instructions and guidance for use by operational personnel that certificate holder shall provide to ensure compliance with regulations, standards and requirements.

**Rating:** An authorization entered on or associated with a license and forming part thereof, stating special conditions, privileges or limitations pertaining to such license.

**Rated ATSEP:** A person holding valid ATSEP license with endorsement of any rating and authorized to certify particular type of equipment/system.



**Safety Management System (SMS):** A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

**Serious Service Failure:** Loss of aeronautical telecommunication service which breaches the established safety performance targets

**Surveillance System:** A system providing the aircraft position and/or other related information to air traffic service (ATS) unit and/or airborne users.

**System Performance Target:** A set of performance targets for each facility which an air navigation service provider sets out to achieve as spelt out in its operations manual.

**1.2.2 Abbreviations**

<b>AIP</b>	Aeronautical Information Publication
<b>ANSP</b>	Air Navigation Service Provider
<b>ANSSSD</b>	Air Navigation Service Safety Standards Department
<b>ASSRD</b>	Aviation Safety and Security Regulation Directorate
<b>ATC</b>	Air Traffic Controller
<b>ATS</b>	Air Traffic Services
<b>ATSEP</b>	Air Traffic Safety Electronic Personnel
<b>CAAN</b>	Civil Aviation Authority of Nepal
<b>CARs</b>	Civil Aviation Requirements
<b>CNS</b>	Communication, Navigation and Surveillance
<b>CNSP</b>	CNS Service Providers
<b>ICAO</b>	International Civil Aviation Organization
<b>LOA</b>	Letter of Agreement
<b>MOS</b>	Manual of Standards
<b>NOTAM</b>	Notice to Airmen
<b>OJT</b>	On the Job Training
<b>SARPs</b>	Standards and Recommended Practices
<b>SMS</b>	Safety Management System
<b>SOPs</b>	Standard Operating Procedures

### **1.3 Deviations from MOS**

- a. Where the CNSP is unable to comply with any provision in any of the Manuals of Standards, the ANSP shall inform the CAAN Aviation Safety and Security Regulation Directorate (ASSRD) within a reasonable period of time in writing. The CNSP shall examine the basis for its non-compliance and propose alternative steps to ensure that an equivalent level of safety is established. The ASSRD will review the CNSP's proposal in a timely manner and approve the proposal. The CNSP is required to follow-up diligently and thereafter report to the ASSRD within a reasonable period of time.
  
- b. If the Aviation Safety and Security Regulation Directorate (ASSRD) has approved the CNSP's proposal as in subsection 1.3 (a), the CNSP shall record the approved alternative means to be taken in the CNSP's operations manuals. The operations manuals shall also contain the details of and rationale for the alternative means, and any imposed limitations and conditions.

## CHAPTER 2: OPERATIONS MANUAL

### 2.1 General

CNSP is required to prepare the operations manual and submit to the CAAN to obtain the approval. Operations manual shall demonstrate how the CNSP will comply with the requirements of MOS for CNS services and shall show how the CNSP provide the CNS services in safe, reliable and efficient manners. The CNSP shall control the distribution of the operations manual and ensure that it is amended whenever necessary to maintain the accuracy of the information in the operations manual and to keep its contents up to date. The content of the operations manual shall contain at least the contents specified in this guideline.

### 2.2 Contents of the operations manual

The contents of the operations manual shall contain at least following information:

#### 2.2.1 General Information

- a. objective and scope/area of CNS services;
- b. regulations, requirements and standards that are required for providing CNS services;
- c. letter of agreement between stakeholders;
- d. license of using radio frequencies, equipment and other licenses (if any) obtained from the Department of Information and Broadcasting, Ministry of Communication and Information Technology, Government of Nepal; and
- e. safety policy.

#### 2.2.2 Technical specification and service standards

- a. the technical specification of each CNS system, equipment or software that CNSP uses to provide services;
- b. the system performance target of CNS service such as its availability and reliability;
- c. information on the compliance of standard that relates to the design, installation, testing, operation or maintenance of the CNSP's facilities and services based on ICAO Annex 10 and other documents or technical standards from the OEM.

#### 2.2.3 Operating procedures

- a. the procedure to be used for mentioning the methods and parameters to configure, setup or establish the system, equipment, or software for providing CNS service;

- b. the procedure to be used for changing the system, equipment, or software of existing services;
- c. the procedure to be used for monitoring and recording the performance of system, equipment, or software of CNS service and warning the users/other concerned stakeholders when the system, equipment or software is fail;
- d. the procedure to be used for commissioning or transition of the system, equipment or software of a new CNS service;
- e. the procedure to be used for reporting when failure occurs in the system, equipment or software of CNS service during both normal operation and maintenance;
- f. the procedure to be used for rectification or recover the system, equipment or software of CNS service during both normal operation and maintenance;
- g. the procedure to be used for testing the system, equipment or software of CNS service;
- h. the procedure to be used for investigation of the root cause of failure in the system, equipment or software of CNS service;
- i. the procedure to be used for protection and mitigation the impacts of radio frequency interference;
- j. the procedure to be used for keeping the training records of technical personnel;
- k. the procedure to be used for issuing NOTAM;
- l. the procedure to be used for maintaining spare parts of CNS equipment; and
- m. the procedure to be used for calibration of each test equipment.

#### **2.2.4 Maintenance procedures**

- a. the procedure to be used for maintenance of the system, equipment or software of CNS service;
- b. the procedure to be used for repairing the system, equipment or software of CNS service;
- c. the maintenance plan of the system, equipment or software of CNS service;
- d. the procedure to be used for updating operations manual after maintenance, system updates and revision; and
- e. the procedure to be used for ground and flight inspection of CNS service.

#### **2.2.5 Service Interruption**

- a. the procedure to be used when CNS service is interrupted
- b. the acceptable recovery time for CNS service
- c. the procedure to be used to notify the concerned stakeholders when CNS service is interrupted

## CHAPTER 3: PERSONNEL REQUIREMENT AND TRAINING OF AN ATSEP

### 3.1 Personnel Requirement

- a. The CNSP shall ensure adequate number of competent ATSEP to perform the operation and maintenance of CNS services in a safe, efficient and reliable manner;
- b. The CNSP shall define appropriate minimum qualification and experience requirements for the ATSEP;
- c. The CNSP shall provide an analysis of the number of ATSEP required to perform the CNS services for each facility taking into account the duties and workload required in operation manual;
- d. Job description of all the ATSEP shall be clearly defined and provided to each ATSEP describing the job purpose, key responsibilities and outcome to be achieved;
- e. Prepared job description shall be reviewed as per the change in CNS facilities whenever it is required;
- f. The CNSP shall prepare standard regarding shift operation specifying required number of ATSEP in each shift;
- g. The CNSP shall prepare standard specifying number of rated manpower on each facility per shift;
- h. Procedure for duty take-off/hand-over in written form shall be developed by the CNSP; and
- i. The CNSP shall prepare duty logs that specify ATSEP activities during the duty period.

### 3.2. Training of an ATSEP

- a. An ATSEP who perform either of the following shall be trained in the available CNS facilities:
  - i. system, operational or functional checks, including associated parameter checks and system performance measurements;
  - ii. system, component or software installation, repair, maintenance and modification;
  - iii. scheduled and unscheduled maintenance tasks.
- b. The CNSP shall develop an appropriate training program based on the ICAO Manual on Air Traffic Safety Electronics Personnel Competency-based Training and Assessment

(Doc 10057) for the ATSEP to perform their duties for providing each service in a safe, efficient, continuous and sustainable manner.

- c. The training program shall contain at least the following information:
  - i. Initial training to provide basic knowledge and skills for ATSEP. It includes basic training applicable to all ATSEP and qualification training specific to ATSEP profiles;
  - ii. Unit training to provide orientation of the activities an ATSEP will perform in a specific environment. It addresses theoretical and practical issues from an equipment-specific and/or site-specific perspectives. It includes on-the-job (OJT) training and ATSEP competencies are also assessed in this phase;
  - iii. Continuation training to maintain competencies and preparing for system upgrades and/or modifications. It includes refresher, emergency and conversion training; and
  - iv. Development training to develop an additional competencies required by a change or evolution of an ATSEP's profile.
- d. The CNSP shall conduct a yearly review of the training plan for each ATSEP to identify any gaps in competency or changes in training requirements and prioritize the type of training required for the coming year.
- e. The CNSP shall arrange license/rating plan for ATSEP and maintain the record of training/license/rating at least until the CNS system of which the ATSEP was trained on is no longer in use.
- f. The individual training records for each of ATSEP shall include a training plan detailing the courses completed as well as the time frame for attending future course as required under his/her training plan.
- g. The CNSP shall develop an assessment methodology to determine the competency of an ATSEP

## CHAPTER 4: CNS OPERATION AND MAINTENANCE PLAN

### 4.1 General

The CNSP shall provide sufficient facilities and equipment including spare parts and suitable power supplies for providing CNS services in a safe, reliable and efficient manner.

### 4.2 Commissioning of New Facility

- a. When commissioning of any new CNS facility, the CNSP shall,
  - i. ensure to meet the specifications for that facility while installing;
  - ii. ensure the compliance of SARPS prescribed in ICAO Annex 10 (All Volumes);
  - iii. conduct necessary test and flight inspection in accordance with the ICAO Doc 8071 Manual on Testing of Radio Navigation Aids, where applicable; and
  - iv. conduct safety assessment according to the safety management system process.
- b. The CNSP shall obtain the licenses of using radio frequencies, equipment and other licenses (if any) from the Department of Information and Broadcasting, Ministry of Communication and Information Technology, Government of Nepal, if the equipment or facility operate the radio transmission.

### 4.3 Testing and Inspection

- a. The CNSP shall conduct the periodic ground and flight inspection with the appropriate interval period in accordance with ICAO Doc 8071 Manual on Testing of Radio Navigation Aids, in order to ensure that the CNS facility meet services standards;
- b. The CNSP may perform a test transmission when it is necessary to test a service, equipment or facility. In such circumstance, the CNSP shall notify, in a timely manner to the concerned stakeholders related to such service in order to ensure safety during testing period;
- c. The CNSP shall ensure that all the systems and equipment are regularly tested and calibrated in order to perform within performance requirements specified in the operations manual;
- d. The CNSP shall provide adequate test equipment for testing and maintenance in order to ensure the continuity of service;
- e. The CNSP shall develop the calibration plan of each test equipment and shall regularly calibrate/maintenance each test equipment according to the plan; and



- f. In order to provide the information for search and rescue (SAR) and incident/accident investigation, the CNSP shall immediately verify and record the status of relevant system, equipment or software after the incident/accident occurrence that shall be assessed by a competent ATSEP for the particular CNS facility.

## **4.4 Operation and Maintenance Plan**

### **4.4.1 Safety Requirements for Overall Operation and Maintenance Plan**

- a. The CNSP shall establish an overall operation and maintenance plan for the aeronautical telecommunication service, which shall as a minimum, meet the following safety requirements as stipulated in ICAO Doc 4444, Chapter 2 (ATS Safety Management).
- b. All facilities shall:
  - i. be tested for normal operations on a routine basis; and
  - ii. meet the required level of reliability and availability.
- c. In addition, the overall operation and maintenance plan shall:
  - i. provide for the timely and appropriate detection and warning of system failures and degradations;
  - ii. include documentation on the consequences of system, sub-system and equipment failures and degradations; and
  - iii. include measures to control the probability of failures and degradations.

### **4.4.2 Details of Operation and Maintenance Plan for Each Facility**

In addition to the overall operation and maintenance plan, the CNSP shall establish an operation and maintenance plan for each facility. The plan shall include:

- a. procedure for the periodic inspection and testing of each facility to verify that it meets the operational and performance specifications of that facility;
- b. details of flight test, if necessary, such as the standards and procedures to be used and flight test interval, which shall be in compliance with guidelines to ICAO Doc 8071 or any other appropriate ICAO document;
- c. the interval between periodic inspection and flight test and the basis for that interval. Whenever the interval is changed, the reasons for such change should be documented;
- d. the operation and maintenance instructions for each facility;
- e. an analysis of the number of personnel required to operate and maintain each facility taking into account the workload required;

- f. the corrective plan and procedures for each facility, including such as whether the repair of modules and component are undertaken in-house or by equipment manufacturers; and
- g. the spare support plan for each facility.

#### **4.5 Monitoring and reporting system**

- a. The CNSP shall establish the procedures for monitoring, reporting and warning the users and other concerned stakeholders when the system, equipment or software is fail;
- b. The CNSP shall ensure that the operating environment of the system and equipment is in accordance with the requirements specified in the technical manual of system/equipment;
- c. The CNSP shall provide the information on the operational status of CNS systems and other concerned systems to the ATS unit without delay;
- d. The CNSP shall establish the procedures for protection and mitigation the impacts of radio frequency interference;
- e. The CNSP shall develop a mandatory incident reporting system to CAAN after any serious incident/accident or service failure in accordance with Safety Occurrence Reporting Procedure of CAAN. In addition, the CNSP shall conduct the safety investigation to identify the root cause and method of prevention; and
- f. The CNSP shall collect and store safety data for statistical analysis and research.

## CHAPTER 5: SAFETY MANAGEMENT SYSTEM

### 5.1 Introduction

The CNSP shall establish a Safety Management System (SMS) in accordance with the framework in the ICAO Annex 19 Safety Management. The SMS should be fully integrated with the CNSP's day-to-day operations and should involve its entire staff. CNS personnel should be trained to understand the need for SMS. The service provider (CNSP) should continuously work towards nurturing a safety culture within the organization.

### 5.2 SMS Framework

The SMS framework shall comply with the following key components:

#### a. Safety Policy and Objectives

##### i. Management commitment and responsibility

The SMS shall have a clear definition of the philosophy and fundamental approach the CNSP will adopt for the management of safety within its organization. This includes setting the safety policies and how they relate to the operation and maintenance processes of the service provider. The policies shall also clearly encapsulate the senior management's commitment to improve safety in the organization as a top priority, with the provision of the necessary human and financial resources for its implementation. The safety policy shall be periodically reviewed to ensure it remains relevant.

##### ii. Safety accountabilities

The SMS shall have clear lines of safety accountabilities within the organization, including a direct accountability for safety on the part of senior management. Safety accountabilities shall be documented and communicated throughout the organization.

##### iii. Appointment of key safety personnel

The CNSP shall appoint a safety manager to serve as the focal point and driving force for the implementation and maintenance of SMS activities. However, the safety manager should not be held solely responsible for safety. Specific safety

activities and the functional or operational safety performance and outcome are the responsibility of the relevant operational or functional staff.

iv. SMS implementation plan

The CNSP shall develop and maintain an SMS implementation plan that defines the organization's approach to manage safety in a manner that meets the organization's safety needs. The SMS implementation plan shall be endorsed by senior management of the organization.

v. Documentation

A SMS manual shall be produced as part of the operations manual, as this is the key instrument for guiding and communicating the organization's SMS approach and methodology to the whole organization.

**b. Safety Risk Management**

i. Hazard identification process

The CNSP shall develop and maintain a formal process for effectively collecting, recording, acting on and generating feedback about hazards in operations, based on a combination of reactive, proactive and predictive methods of safety data collection.

ii. Risk assessment and mitigation process

The CNSP shall develop and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability) and control (in terms of mitigation) of risks to an acceptable level. The CNSP shall ensure that human factors are considered as an integrated part of the safety risk assessment processes that the organization conducts.

**c. Safety Assurance**

i. Safety performance monitoring and measurement

1. The CNSP shall develop and maintain the means to verify the safety performance of the organization compared to the safety policy and objectives, and to validate the effectiveness of safety risks controls. A safety incident reporting system shall be set up to collect any information on actual or potential

hazards, maintenance errors or deficiencies and other safety incidents which are not normally reported in a formal fault reporting system.

2. The CNSP shall establish the safety performance indicators and targets of its SMS and submit them to ANSSSD. Details on the establishment of safety performance indicators and targets are given in ICAO Document 9859.

ii. The management of change

The CNSP shall develop and maintain a formal process to identify changes within the organization that may affect established processes and services. A risk assessment shall be carried out before the implementation of such changes, such as when upgrading or modification is made to an aeronautical telecommunication facility, in order to ensure safety performance.

iii. Continuous improvement of the SMS

The CNSP shall develop and maintain a formal process to identify the causes of sub-standard performance of the SMS, determine the implications of sub-standard performance in operations, and eliminate such causes, in order to ensure the continual improvement of the SMS.

iv. Safety investigation

Safety investigation is critical to the effectiveness of an SMS, and it shall be used as a means to improve the service provider's SMS. It is through a systematic safety investigation of incidents that shortcomings of the SMS could be uncovered and rectified. Any serious service failure or safety incident shall be investigated by the service provider as it may be indicative of potentially serious hazards. A systematic investigation may uncover systemic problems which otherwise may remain unnoticed.

v. Safety audit

Regular internal safety audits shall be conducted by the service provider to assure the effectiveness of its SMS. The safety audit shall be conducted by a team of trained auditors who are familiar with the operation of the aeronautical telecommunication service, but also independent and not involved with the day to day operation of the service. Records of such safety audits and corrective follow up actions shall be kept.

vi. Safety assessment

The CNSP shall conduct the safety assessment in the following cases:

- a. commissioning of new services or facilities;
- b. any changes (modifications, upgrades, withdrawal and etc.) to the system, equipment or software of existing services;
- c. environment condition changes;
- d. service location/coverage changes;
- e. organization management changes which may affect to provide services;
- f. any changes which may affect to the air traffic services;
- g. other cases which may affect to the safety of the services.

vii. Safety reviews

The CNSP shall conduct the safety reviews in order to ensure that the system, or equipment:

- a. are tested for normal operations on a routine basis;
- b. meet the required level of reliability and availability as defined in the operation manual;
- c. provide for the timely and appropriate detection and warning of system failures and degradations;
- d. include documentation on the consequences of system, subsystem and equipment failures and degradations;
- e. include measures to control the probability of failures and degradations;
- f. include adequate backup facilities and/or procedures in the event of a system failure or degradation.

**d. Safety Promotion**

i. Training and education

The CNSP shall develop and maintain a safety training programme to ensure that personnel are trained and competent to perform the SMS duties. The scope of the safety training shall be appropriate to each individual's involvement in the SMS.

ii. Safety communication

The CNSP shall communicate and promote the organization's SMS processes and activities to its entire staff, including that of the maintenance contractors, to ensure that staff is fully aware of the SMS. The CNSP shall develop and maintain formal means for safety communication to ensure that staff is fully aware why particular safety actions and procedures are introduced or changed.

## CHAPTER 6: HUMAN RESOURCE MANAGEMENT

### 6.1 General

The CNSP shall have adequate number of qualified and experienced technical personnel for providing each service in a safe, reliable and efficient manner.

### 6.2 Organization Management

The CNSP shall ensure following in MOS:

- a. organizational structure which clearly depicts the lines of management and functional responsibility across all function areas of services;
- b. the position of each personnel indicating the name, qualification, experience, duties and responsibilities of personnel who are involved in providing services;
- c. job description which clearly indicates the specific duties and responsibilities of technical personnel;
- d. number of technical personnel based on methodology for determining staff need; and
- e. training program;

### 6.3 Human Factors

- a. The CNSP should ensure that human factors principles are observed in the design, operation and maintenance of CNS facilities.
- b. The CNSP should ensure that systems and automation must be designed to assist the human operator and should be human-centered. Human-centered automation enhances efficient, effective and safe operation.
- c. The CNSP shall consider minimizing the occurrence of errors by ensuring high levels of staff competence; designing controls so that they match human characteristics; providing proper checklists, procedures, manuals, maps, charts, SOPS, etc.; and reducing noise, vibration, temperature extremes and other stressful conditions and by cross-monitoring.
- d. The CNSP shall ensure human factors training is provided in order to improve safety, decrease organizational exposure to risk, reduce and capture errors.



- e. The CNSP shall ensure that human factors are embedded within safety management processes in the following areas:
- i. Analysis of safety data and safety information to identify Human Factors and Human Performance issues;
  - ii. Assessing Human Factors as part of the safety risk assessment and safety investigations;
  - iii. Monitoring Human Factors and Human Performance during normal operations;
  - iv. Support safety management activities with adequate Human Factors expertise;
  - v. Identify roles where Human Performance is safety critical;
  - vi. Considering Human Factors in designing systems, roles and supporting procedures (including safety risk mitigation);
  - vii. Staff (including managers) have received an appropriate level of training and are competent to perform their duties;
  - viii. Human Factors in communications;
  - ix. Evaluation of culture and its impact on Human Performance; and
  - x. Human Factors considerations for fitness for duty.

Note – Detail Guidance material on human factors principles is given in the ICAO Human Factors Training Manual (Doc 9683) and Circular 249 (Human Factors Digest No. 11 – Human Factors in CNS/ATM Systems).

## CHAPTER 7: FACILITY MALFUNCTION INCIDENT AND RADIO INTERFERENCE REPORTING

### 7.1 Facility Malfunction Incident Reporting

- a. The CNSP shall establish procedures for the reporting, collection and notification of facility malfunction incidents and safety incidents.
- b. Reports of such incidents should be compiled and reviewed periodically by the CNSP to:
  - i. determine the cause of the incidents and determine any adverse trends;
  - ii. implement corrective and preventive actions where necessary to prevent recurrence of the incidents; and
  - iii. implement any measures to improve the safety performance of the aeronautical telecommunication service

### 7.2 Management of Aeronautical Radio Spectrum

The CNSP shall establish a procedure for the management and protection of aeronautical radio spectrum. Any frequency allocation within the aeronautical radio spectrum shall be centrally controlled by a designated responsible person to ensure that there will be no conflict and interference to any radio stations or facility. Updated records shall be kept of all allocated frequencies.

### 7.3 Radio Interference Reporting

The CNSP shall ensure that there is no wilful transmission of unnecessary or anonymous radio signals, messages or data by any of its radio stations. Procedures shall also be established with the local telecommunication authority to address occurrence of radio frequency interference. Any frequency interference occurrence shall be reported, investigated and follow-up actions taken to prevent recurrence.

### 7.4 Notification of aeronautical telecommunication facility status

The CNSP shall, as soon as possible

- a. forward to the Aeronautical Information Services
  - i. information on the operational details of any new facility for publication in the Nepal Aeronautical Information Publication; and
  - ii. information concerning any change/fault in the operational status of any existing facility, for the issue of a Notice to Airmen.

- b. ensure that the information forwarded under sub-paragraph (a) has been accurately and timely published.

### **7.5 Safety Investigation**

- a. Any serious service failure or safety incident shall be reported to Aviation Safety and Security Regulation Directorate (ASSRD) within 48 hours of occurrence and be investigated by the CNSP. The purpose of the investigation should be to understand how and why the incident happened, including possible organizational contributing factors and to recommend actions to prevent a recurrence.
- b. The copy of investigation report shall be forwarded to Aviation Safety and Security Regulation Directorate (ASSRD). The recommendation from such investigation should also be disseminated to relevant staff to raise their safety awareness.
- c. Depending on the circumstances of the serious service failure or safety incident, such as whether the CNSP has violated any regulatory requirements, Aviation Safety and Security Regulation Directorate (ASSRD) may conduct its own investigation in addition to that conducted by the CNSP.

## CHAPTER 8: CONTINGENCY PLAN

### 8.1 General

The CNSP shall develop the contingency plan that defines the planned actions to be taken in the event that services are interrupted.

### 8.2 Contingency plan

- a. The content of the contingency plan shall cover the following information,
  - i. the procedure to be used to recover the CNS system, equipment or software of each service;
  - ii. the procedure to be used when the specified recovery time is not achieved;
  - iii. the alternative arrangements for providing CNS services.
- b. In addition, the Aviation Safety and Security Regulation Directorate (ASSRD) may ask the CNSP to revise or develop the contingency plan to cover the other safety risks for safety benefits.

## CHAPTER 9: SECURITY PROGRAM

### 9.1 General

The CNSP shall develop the security plan to minimize the risk of unauthorized access or malicious damage to the system, equipment, software or data of each service.

### 9.2 Security Plan

The CNSP shall develop the security plan to cover the following information,

- a) the procedure to be used for preventing and detecting intentional or unintentional damage to any system, equipment, software or data used for providing services;
- b) the procedure to be used for responding to a threat of intentional damage to a system, equipment, software or data;
- c) the procedure to be used for preventing unauthorized people from having access to any system, equipment, software or data used by the CNSP in providing services

## CHAPTER 10: DOCUMENTS AND RECORDS

### 10.1 Documents and Records to be maintained

The CNSP shall maintain all documents and records that are necessary for the operation and maintenance of the CNS service. Copies of these documents shall also be made available to ATSEP where needed. These documents and records should include:

- a. Manual of Standards for Communication, Navigation and Surveillance Services (MOS-CNS);
- b. ICAO Annex 10 Volumes I to VI and other relevant ICAO documents;
- c. the approved operation manual and all documents referenced within the manual;
- d. the technical manuals of each service;
- e. the other necessary work instructions, procedures and documents for providing each service;
- f. records of design, manufacturing, procurement, installation, testing, commissioning, maintenance, routine operation, modification, and decommissioning;
- g. record of configuration parameters or settings of system, equipment or software of each service;
- h. records of hazard logs and risk assessments done;
- i. records of malfunction and safety incident reports;
- j. record of maintenance history of system, equipment or software of each service;
- k. records of NOTAM of each service;
- l. records of ground and flight inspection;
- m. records of internal/external audit reports;
- n. records of accident/incident investigation report;
- o. records of activities (site log) in the facility of each service; and
- p. records of job description, training program and plan of each staff.

CNSP shall establish a process to control the authorization, publication, distribution and amendment of all above mentioned documents and records to ensure that they are constantly updated. The records shall be retained for at least 5 years by CNSP.

## CHAPTER 11: INTERFACE AGREEMENTS WITH OTHER ORGANIZATIONS

### 11.1 General

In order to ensure the safe provision of services, the CNSP shall establish the interface agreement with associated organizations or service providers related for providing CNS services.

### 11.2 Interface agreement with ATS providers

The CNSP shall establish the interface agreement with ATS provider that clearly indicates the technical personnel responsibilities and arrangements in relation to normal service provision and abnormal contingency provisions.

### 11.3 Interface agreement with aerodrome operator

The CNSP shall establish the interface agreement with aerodrome operator that clearly indicates the responsibilities of the aerodrome operator and the CNSP for aerodrome infrastructure and aerodrome works that are associated with, or may affect to the safe provision of services. The interface agreement shall cover at least the following information,

- a. access authorization and physical security of facilities;
- b. coordination procedures between CNSP and aerodrome operator;
- c. provision of mains and stand-by electrical power.

### 11.4 Interface agreement with organizations providing support services

The CNSP shall establish the interface agreement with other organizations providing (sub-contracting) a support service, facility, or data, which interconnects or interfaces with a CNS service. The interface agreement shall cover at least the following information,

- a. a functional specification for the support service;
- b. the values or characteristics of availability, reliability, accuracy, integrity, and recovery time, as relevant, of the support service;
- c. the monitoring and reporting of the operational status of the support service, facility, or data, provided by the other organization;

## Appendix 1

### Civil Aviation Authority of Nepal Air Traffic Safety Engineering Incident Report Form

(To be filled by ATSEP)

1 Categories of Occurrence ACCID <input type="checkbox"/> INCID <input type="checkbox"/> PROCEDURAL <input type="checkbox"/> FAILURE <input type="checkbox"/> HAZARD <input type="checkbox"/>					
2 Occurrence Location	3 Date (dd/mm/yyyy)		5 Duration	6 ATS Facility <input type="checkbox"/> RTF <input type="checkbox"/> Radar <input type="checkbox"/> NAV AID <input type="checkbox"/> Other: .....	7 Service Affected
	12 Time (UTC)				
8 Equipment Type/Manufacturer	9 Frequency	10 Call-sign		11 Equipment Location	
12 Facility Configuration <input type="checkbox"/> In Service or <input type="checkbox"/> Out of service <input type="checkbox"/> Main Mode or <input type="checkbox"/> Standby/Test <input type="checkbox"/> CH A (1) or <input type="checkbox"/> CH B (2) <input type="checkbox"/> Other:  External Information Source:		13 Equipment Status		112 Previous Defects/ Occurrences <input type="checkbox"/> YES <input type="checkbox"/> No <input type="checkbox"/> Not Known	15 RTF Frequencies/ Radar Source
16 NARRATIVE - use a diagram if necessary (attach copies of all relevant information)					
<i>(Use additional sheet if necessary.)</i>					
17 Recordings impounded <input type="checkbox"/> No <input type="checkbox"/> Yes  Details....	18 Can the information be disseminated in the interests of flight safety? <input type="checkbox"/> YES <input type="checkbox"/> NO	20 Name		23 Address & Telephone number (if reporter wishes to be contacted privately)	
		21 Organization/Position			
		22 Start time and duration of shift		212 Signature	
19 Other fault report action <input type="checkbox"/> ATC Reporting <input type="checkbox"/> Local Reporting <input type="checkbox"/> Other:				25 Date (dd/mm/yyyy)	