



Manual of Standards

Communication, Navigation, and Surveillance Services

CAAT-ANS-MOSCNS

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Approved By

Chula Sukmanop, PhD

Director General

The Civil Aviation Authority of Thailand

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Foreword

The Director General of the Civil Aviation Authority of Thailand (CAAT) is responsible under Section 6/1, 15/10 and 15/17 of the Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562 for issuing regulations, requirements, notifications, rules and orders to stipulate qualifications, rules, procedures, conditions, standards and practical guidance for the following matters to ensure conformity with current and timely International Standards.

The Manual of Standards (hereinafter ‘MOS’) is the means CAAT uses to meet its responsibilities under the Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562 for promulgating aviation safety standards. The MOS prescribes the detailed technical material (aviation safety standards) that is determined to be necessary for the safety of air navigation.

The MOS is referenced in the particular regulation. You should refer to the applicable provisions of the Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562 and CAAT Regulations and Requirement together with this MOS, to ascertain the requirements of, and the obligations imposed by or under the civil aviation legislation.

Readers should forward advice of errors, inconsistencies or suggestions for improvement to this manual to the Manager, Air Navigation Services Standards Department (please see in subsection 1.1.6.3).

The MOS is issued and amended under the authority of the Director General of Civil Aviation Authority of Thailand.

Chula Sukmanop, PhD
Director General
The Civil Aviation Authority of Thailand

Record of Revision

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Chapter 1 Introduction

1.1 General

1.1.1 Background

1.1.1.1 This MOS is made under the Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562. Regulation of CAAT No. XX on Communication, Navigation and Surveillance Services Standards refers to the standards and methods to be used in regulating:

a) the standards for compliance, include:

- 1) The operations manual;
- 2) The general provisions of Communication, Navigation and Surveillance (CNS) services, human resource management, personnel, training program, CNS facilities and equipment, safety management system, contingency plan, security program, document control system and records, and interface arrangements.

b) what is required to accompany an application for a Communication Navigation and Surveillance Service Provider's (hereinafter 'CNSP') certificate; and

c) discontinuance of the service.

1.1.2 Document set

1.1.2.1 The document hierarchy consists of:

- a) The Air Navigation Act B.E.2497 amended by the Air Navigation Act (No. 14) B.E. 2562 (the Act) and the Civil Aviation Emergency Decree B.E.2558 (the Decree)¹;
- b) Civil Aviation Authority of Thailand Regulation and Requirement (the CAAT regulation and requirement)²;
- c) Manual of Standards (MOS); and
- d) Advisory Circulars (ACs).

Note 1:

- พระราชบัญญัติการเดินอากาศ พ.ศ. 2497 แก้ไขโดย พระราชบัญญัติการเดินอากาศ (ฉบับที่ 14) พ.ศ.2562
- พระราชกำหนดการบินพลเรือนแห่งประเทศไทย พ.ศ.2558

Note 2:

- ข้อบังคับของสำนักงานการบินพลเรือนแห่งประเทศไทย ฉบับที่ XX ว่าด้วยมาตรฐานการบริการการเดินอากาศ เรื่อง ระบบการสื่อสาร ระบบช่วยการเดินอากาศ และระบบติดตามอากาศยาน
- ข้อกำหนดของสำนักงานการบินพลเรือนแห่งประเทศไทย ฉบับที่ XX ว่าด้วยหลักเกณฑ์และวิธีการขอและออกใบรับรองบริการการเดินอากาศ
- ประกาศสำนักงานการบินพลเรือนแห่งประเทศไทย เรื่องแบบคำขอใบรับรองการเดินอากาศ พ.ศ. XXXX
- ประกาศสำนักงานการบินพลเรือนแห่งประเทศไทย เรื่องกำหนดนิติบุคคล อายุ และหน้าที่อื่นของผู้ได้รับใบรับรองบริการการเดินอากาศ พ.ศ. XXXX

- ระเบียบสำนักงานการบินพลเรือนแห่งประเทศไทย ว่าด้วยการจัดทำรายงานของผู้ได้รับใบรับรองบริการการเดินอากาศ พ.ศ. 2562
- ระเบียบสำนักงานการบินพลเรือนแห่งประเทศไทย ว่าด้วยการจัดทำรายงานของผู้ได้รับใบรับรองบริการการเดินอากาศ พ.ศ. 2562

- 1.1.2.2 The Decree establishes the Civil Aviation Authority of Thailand (CAAT) with functions relating to civil aviation, in particular the safety of civil aviation, and related purposes.
- 1.1.2.3 The CAAT regulation and requirement establish the regulatory framework (Regulations) within which all service providers shall operate.
- 1.1.2.4 The MOS comprises specifications (Standards) prescribed by CAAT, of the detailed technical provisions that contains standards, procedures, instruction which are intended to form the basis of CNS services within Bangkok FIR. The CNSP in Thailand is required to comply with the provisions contained in this MOS.
- 1.1.2.5 Readers should understand that in the circumstance of any perceived disparity of meaning between MOS and the CAAT 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 prevail.
- 1.1.2.6 The CNSP shall document local procedures in their own operations manuals, to ensure the maintenance of and compliance with the CAAT regulations and requirements. The CNSP shall submit the operation manuals and its amendments to the Director General of CAAT to obtain the approval.
- 1.1.2.7 ACs are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means of complying with the regulations and requirements. ACs may explain certain regulatory requirements by providing interpretive and explanatory materials. It is expected that service providers will document internal actions in their own operational manuals, to put into effect those, or similarly adequate practices.

1.1.3 Differences between ICAO Standards and those in MOS

- 1.1.3.1 Notwithstanding the above, where there is a difference between a standard prescribed in ICAO documents and the Manual of Standards (MOS), the MOS standard shall prevail.

1.1.4 Differences Published in AIP

- 1.1.4.1 Differences from ICAO Standards, Recommended Practices and Procedures are published in the AIP Thailand GEN 1.7 Differences from ICAO Standards, Recommended Practices and Procedures.

1.1.5 MOS Documentation Change Management

1.1.5.1 The Air Navigation Services Standards Department (ANS) has responsibility for the technical contents of this MOS.

1.1.5.2 This MOS is issued, and may only be amended, under the authority of the Director General of CAAT.

1.1.5.3 Suggested changes to this MOS may be provided to the Manager of Air Navigation Services Standards Department of CAAT by:

Email: ans@caat.or.th

1.1.5.4 Requests for any change to the content of this MOS may come from:

- a) technical areas within CAAT; or
- b) aviation industry service providers or operators; or
- c) individuals or authorization holders.

1.1.5.5 The need to change standards in this MOS may arise for any of the following reasons:

- a) to ensure safety;
- b) to ensure standardization;
- c) to respond to changed CAAT standards;
- d) to respond to ICAO prescription;
- e) to accommodate proposed initiatives or new technologies.

1.1.5.6 CAAT may approve trials of new procedures or technologies to develop appropriate standards.

1.1.6 Related document

1.1.6.1 These standards should be read in conjunction with:

- a) Civil Aviation Authority of Thailand Regulation and Requirement;
- b) ICAO Annex 10 Aeronautical Telecommunications, Volume I – V;
- c) ICAO Annex 14 Aerodrome, Volume I-II;
- d) ICAO Annex 19 Safety Management System;
- e) ICAO Doc 4444 Procedures for Air Navigation Services – Air Traffic Management (PANS-ATM);
- f) ICAO Doc 8071 Manual on Testing of Radio Navigation Aids, Volume I-III;
- g) ICAO Safety Management Manual (Doc 9859); and
- h) AIP Thailand.

1.2 Definitions and Abbreviations

1.2.1 For the purpose of this manual of standards, the definition as contained in the ICAO annex and ICAO document, as amended from time to time, shall apply unless as otherwise indicated in AIP or as follow:

Definition	Meaning
Aeronautical information service (AIS)	A service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation.
Aeronautical information publication (AIP)	A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.
Air traffic service	A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).
Annex.	The reference to any Annexes in this MOS means Annexes containing standards and recommended practices as established by the International Civil Aviation Organization (ICAO) in accordance with the Convention on International Civil Aviation.
CAAT.	The Civil Aviation Authority of Thailand.
Communication Navigation and Surveillance Service.	A service provided by the air navigation facility that use the aeronautical telecommunication technology to support the air navigation services.
Communications system.	The ground-based, mobile and/or satellite-based facilities providing voice and/or data for supporting aeronautical fixed service and aeronautical mobile service.
Director General.	The Director General of CAAT.
Manual of Standard.	Standards and requirements prescribed by CAAT.
Navigation system.	The ground-based and/or satellite-based facilities providing guidance information or position data for the efficient and safe operation of aircraft.

Definition	Meaning
NOTAM (Notice to Airmen).	A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.
Operations Manual.	The procedures, instructions and guidance for use by operational personnel which certificate holder shall provide to ensure compliance with regulations, standards and requirements.
Safety management system (SMS).	A systematic approach to managing safety, including the necessary organizational structures, accountability, responsibilities, policies and procedures.
Surveillance system.	A system provides the aircraft position and/or other related information to air traffic service (ATS) unit and/or airborne users.

1.3 Deviations from MOS

- 1.3.1 If the CNSP is unable to comply with any provision this MOS, the CNSP shall inform the CAAT within a reasonable period of time and in writing. The CNSP shall explain the reason for its non-compliance and propose alternative means to ensure that an equivalent level of safety is established. The CAAT will review the CNSP's proposal in a timely fashion and approve the proposal, subject to such other conditions it may impose. The CNSP is required to follow-up diligently and thereafter report to CAAT within a reasonable period.
- 1.3.2 If the CAAT has approved the CNSP's proposal in subsection 1.3.1, 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.
- 1.3.3 If an emergency necessitates immediate action for the protection of life or property, and the action involves the safety of aircraft operations or disaster relief, the CNSP may deviate from any requirement of this MOS. However, the CNSP shall notify the CAAT as soon as practicable.

Chapter 2 Operations Manual

2.1 General

2.1.1 The operations manual establishes the standards and procedures under which the CNS services will be provided. It shows how the CNSP provide the CNS services in safe and efficient manners. The CNSP is required to prepare the operations manual and submit to the CAAT to obtain the approval. The content of operation manual shall contain at least the contents specified in the MOS.

2.2 Contents of the operations manual

An operations manual shall contain at least the following information,

2.2.1 General Information

- a) objective and scope/area of CNS services;
- b) regulations, requirements, standards and/or agreements that required for providing services;
- c) interface agreement between others service providers;
- d) interface agreement with organizations providing support services (if applicable);
- e) license of using radio frequencies, equipment and other licenses obtained from the Office of the National Broadcasting and Telecommunications Commission (if applicable);
- f) safety policy;

2.2.2 Organization Management

- a) organizational chart structure which clearly depicts the lines of management and functional responsibility across all function areas of services;
- b) position name, qualification, experience, duties and responsibilities of technical personnel who are involved in providing services;
- c) job description/assignment which clearly indicates the specific duties and responsibilities of technical personnel;
- d) Number of technical personnel including supervisory staff, and also methodology established for determining staffing needs;
- e) training program;

2.2.3 Service Standards

the information contains each standard that relates to the design, installation, testing, operation or maintenance of the CNSP's facilities and services, which could be the ICAO Annexes and Documents or technical standards from the manufacturers;

2.2.4 Technical specification and performance of service

- a) the technical specification of each system, equipment or software that CNSP uses to provide services;
- b) the values or performance characteristics that apply for each service such as availability, reliability, accuracy, integrity and continuity including the methods of calculations/measurements or references;

2.2.5 Operating procedures

- a) the procedure to be used for collecting the methods and parameters to configure, setup or establish the system, equipment, or software for providing each 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 record the performance of system, equipment, or software of each service;
- d) the procedure to be used for commissioning or transition the system, equipment or software of a new service;
- e) the procedure to be used for reporting when failure occurs in the system, equipment or software of each service during both normal operation and maintenance;
- f) the procedure to be used for rectification or recover the system, equipment or software of each service during both normal operation and maintenance;
- g) the procedure to be used for testing the system, equipment or software of each service;
- h) the procedure to be used for monitoring, reporting and warning the users and other concerned stakeholders when the system, equipment or software is fail;
- i) the procedure to be used for investigation the root cause of failure in the system, equipment or software of each service;
- j) the procedure to be used for protection and mitigation the impacts of radio frequency interference;
- k) the procedure to be used for keeping the training records of technical personnel;

l) the procedure to be used for coordination with the AIS provider;

2.2.6 Maintenance procedures

- a) the procedure to be used for maintenance the system, equipment or software of each service;
- b) the procedure to be used for repairing the system, equipment or software of each service;
- c) the procedure to be used for ground and flight inspection of each service (if applicable);
- d) the maintenance plan of the system, equipment or software of each service;
- e) the ground and flight inspection plan of each service (if applicable);

2.2.7 Safety Management System; the detail will be described in Chapter 8.

2.2.8 Test equipment

- a) the technical specifications of test equipment that used for testing and maintenance the system, equipment or software of each service;
- b) the procedure to be used for maintenance each test equipment;
- c) the procedure to be used for calibration each test equipment;

2.2.9 Service Interruption

- a) the procedure to be used when each service is interrupted;
- b) the acceptable recovery time for each service;
- c) the procedure to be used to notify the AIS provider and concerned stakeholders when each service is interrupted;

2.2.10 Document control system and records; the detail will be described in Chapter 11;

2.2.11 Security plan; the detail will be described in Chapter 10;

2.2.12 Change management; the procedure to be used for changing any current procedure of each service;

2.2.13 Contingency plan the detail will be described in Chapter 9;

2.3 Guideline for developing operations manual

- 2.3.1 The CNSP shall establish the master operation manual which covers the high-level policies and managements of organization.
- 2.3.2 The CNSP shall establish the specific operation manual for each CNS units in order to provide the specific working procedure for the technical personnel.
- 2.3.3 In order to develop the specific operation manual in 2.3.2, the CNSP may refer to the contents in the master operation manuals such as SMS Manual, Training Manual, Quality Control Manual, Security Program, Employee Handbook, and Technical Manual. The detail and content of the specific operation manual depends on the scope and size of CNS services.
- 2.3.4 The CNSP shall provide all related documents of operation manuals in 2.3.1 and 2.3.2 for the technical personnel that required to perform their duties. In addition, the technical personnel must have the convenient access to all related documents.

Chapter 3 General Provisions of CNS Services

3.1 General

3.1.1 The CNSP shall be able to demonstrate that its working methods and operating procedures are compliant with the standards of Annex 10 to the Chicago Convention on aeronautical telecommunications in the following,

- a) volume I on radio navigation aids in its 7th edition of July 2018, including all amendments up to and including No. 91;
- b) volume II on communication procedures including those with PANS status in its 7th edition of July 2016, including all amendments up to and including No. 91;
- c) volume III on communication systems in its 2nd edition of July 2007, including all amendments up to and including No. 90;
- d) volume IV on surveillance and collision avoidance systems in its 5th edition of July 2014, including all amendments up to and including No. 90;
- e) volume V on aeronautical radio frequency spectrum utilization, in its 3rd edition of July 2013, including all amendments up to and including No. 89.

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Chapter 4 Human Resource Management

4.1 General

- 4.1.1 The CNSP shall provide adequate number of qualified and experienced technical personnel for providing each service in a safe, efficient, continuous and sustainable manner.

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Chapter 5 Technical Personnel

5.1 General

5.1.1 The CNSP shall ensure that the technical personnel have appropriate qualification, experience and training to perform their duties for providing each service in a safe, efficient, continuous and sustainable manner.

5.2 Technical personnel qualification

5.2.1 The CNSP shall establish appropriate minimum qualification and experience requirements for the technical personnel.

5.2.2 The CNSP shall develop the job description which clearly indicates the specific duties and responsibilities of technical personnel.

5.3 Technical personnel from sub-contractor

5.3.1 If the CNSP has contracted the technical personnel from sub-contractor to perform some duties such as maintenance or repairing the equipment, the CNSP shall also ensure that they have qualification and experience adequate to perform the assigned duties.

5.3.2 The CNSP shall take responsibilities for any action of technical personnel from sub-contractor.

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Chapter 6 Training Program

6.1 General

6.1.1 The CNSP shall provide appropriate training and competence assessment for the technical personnel to perform their duties for providing each service in a safe, efficient, continuous and sustainable manner.

6.2 Training program

6.2.1 The CNSP shall establish the formal training program detailing the type of training to be provided for the technical personnel. The training program shall contain at least the following information,

- a) initial training;
- b) specialize training;
- c) on-the-job (OJT) training;
- d) recurrent and refresher training.

6.2.2 The CNSP shall develop the periodic training plan for each technical personnel.

6.2.3 The CNSP shall establish a system for the maintenance of training records for each technical personnel.

6.3 Competence assessment and approval document

6.3.1 The CNSP shall issue an approval document describing the operation or maintenance functions that the technical personnel may perform after they pass the training requirements and competence assessment. The approval document shall contain at least the following information,

- a) name and photo of the technical personnel;
- b) operation or maintenance functions that technical personnel can perform;
- c) type of system, equipment, or software;
- d) period during the approval document is effective.

Chapter 7 Facilities and Equipment

7.1 General

7.1.1 The CNSP shall provide adequate facilities and equipment including spare parts and suitable power supplies for providing each service in a safe, efficient, continuous and sustainable manner.

7-7.2 Commissioning of new service

- 7.2.1 When commissioning of any new CNS service or facility, the CNSP shall,
- a) ensure that the new CNS facility must be installed according to accepted good engineering practices and applicable electrical safety codes;
 - b) ensure that the siting and construction are in accordance with the clearance area standards in the Appendix A and the CAAT requirements for aerodrome standards;
 - c) establish the procedures to ensure the performance of such service or facility in accordance with standards defined in the ICAO Annex 10;
 - d) conduct engineering and flight test in accordance with the ICAO Doc 8071 Manual on Testing of Radio Navigation Aids (if applicable);
 - e) conduct safety assessment according to the safety management system process.
- 7.2.2 If the equipment or facilities operate the radio transmitting, the CNSP shall obtain the license of using radio frequencies, equipment and other licenses as required by the Office of the National Broadcasting and Telecommunications Commission (NBTC) requirements and regulations.

7.3 Testing and inspection

- 7.3.1 The CNSP shall conduct the periodic ground and if necessary, flight inspection with the appropriate interval period, which specified in the ICAO Doc 8071 or manufacturer technical manuals in order to ensure that the CNS facility meet services standards in the CAAT approved operations manual.
- 7.3.2 The CNSP shall ensure that all the systems, equipment or software are regularly tested and calibrated in order to perform within performance requirements specified in the operations manual.

- 7.3.3 The CNSP shall provide adequate test equipment for testing and maintenance in order to ensure the continuity of service.
- 7.3.4 The CNSP shall regularly calibrate and maintenance each test equipment. In addition, the CNSP shall develop the calibration plan of each test equipment.
- 7.3.5 The CNSP may make 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, the users, AIS provider, and other stakeholders related to such service in order to ensure safety during testing period.
- 7.3.6 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.

7.4 Monitoring and reporting system

- 7.4.1 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.
- 7.4.2 The CNSP shall ensure that the operating environment of the system, equipment or software is in accordance with the requirements specified in the manufacture technical manuals.
- 7.4.3 The CNSP shall provide without delay with the information on the operational status of radio navigation aids and other concerned systems to the ATS unit.
- 7.4.4 The CNSP shall establish the procedures for protection and mitigation the impacts of radio frequency interference.
- 7.4.5 The CNSP shall report to CAAT within 48 hours after any serious incident/accident or service failure. In addition, the CNSP shall conduct the safety investigation to identify the root cause and method of prevention.
- 7.4.6 The CNSP shall submit the safety investigation report in 7.4.4 to CAAT within 8 weeks.

Chapter 8 Safety Management System

8.1 General

8.1.1 The CNSP shall establish the safety management system (SMS) in accordance with the framework in the ICAO Annex 19 Safety Management.

8.2 Safety assessment

8.2.1 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.

8.3 Safety reviews

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

- 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.

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Chapter 9 Contingency Plan

9.1 General

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

9.2 Contingency plan

9.2.1 The content of the contingency plan shall cover the following information,

- a) the procedure to be used to recover the system, equipment or software of each service;
- b) the procedure to be used when the specified recovery time is not achieved;
- c) the alternative arrangements for providing service.

9.2.2 The content in 9.2.1 shall cover the employee strikes. In addition, the CAAT may ask the CNSP to revise or develop the contingency plan to cover the other safety risks for safety benefits.

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Chapter 10 Security program

10.1 General

10.1.1 The CNSP shall develop and put into effect the security program to minimize the risk of unauthorized access or malicious damage to the system, equipment, software or data of each service.

10.2 Security program

10.2.1 The CNSP shall develop the security program in accordance with the National Civil Aviation Security Program (NCASP) and 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.

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Chapter 11 Document and Record Control System

11.1 General

11.1.1 The CNSP shall establish the document and record control system in order to ensure that all the necessary documents and records are controlled and kept for the safety benefits and safety investigation.

11.2 Document control system

11.2.1 The CNSP shall hold and keep amended the documents that are necessary as basic references for their services. The documents that is essential for the provision of services are:

- a) the manual of standard (MOS) – Communication, Navigation and Surveillance;
- b) the ICAO Annex 10 Volumes I to V and relevant ICAO Documents;
- c) the approved operation manual and all documents referenced within the manual;
- d) the manufacture technical manuals of each service;
- e) the other necessary work instructions, procedures and documents for proving each service.

11.2.2 The documents in 11.2.1 shall be available to the technical personnel at their workplace.

11.2.3 CNSP shall establish a process to control the authorization, publication, distribution and amendment of all documents in 11.2.1

11.3 Record control system

11.3.1 The CNSP shall establish a process to retain the necessary documents, records or data for the safe provision of services and safety investigation. Records kept are to include at least the following:

- a) records of design, manufacturing, procurement, installation, testing, commissioning, routine operation, modification, and decommissioning;
- b) records of hazard analysis and risk assessments;
- c) record of performance of system, equipment or facility of each service;
- d) record of configuration parameters or settings of system, equipment or software of each service;
- e) record of maintenance history of system, equipment or software of each service;
- f) records of NOTAM of each service;

- g) records of commissioning, modification, repairing, and changing system, equipment or software of each service;
- h) records of ground and flight inspection;
- i) records of system, equipment or software failures and fault report;
- j) records of accident/incident investigation report;
- k) record of training and competent assessment of each technical personnel;
- l) records of activities (site log) in the facility of each service.

11.3.2 The CNSP shall retain the records in 11.3.1 for at least 5 years.

Chapter 12 Interface Agreements with other organizations

12.1 General

12.1.1 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 services.

12.2 Interface agreement with ATS providers

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

12.3 Interface agreement with aerodrome operator

12.3.1 The CNSP shall establish the interface agreement with aerodrome operator which 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.

12.4 Interface agreement with organizations providing support services

12.4.1 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 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;

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Appendix A Standards of clearance areas for the CNS facilities in the aerodrome

A1. In order to protect the radio signals of operating CNS facilities in the aerodrome, the CNSP shall coordinate with the aerodrome operator in order to ensure that no structure or building is installed and constructed in the clearance area. The standards of clearance areas for each CNS facilities are in the Table A1.

Table A1. Standards of clearance areas for each CNS facilities

Type of CNS facilities	Clearance area (radius from the center of facility (m))
DME station	300
VOR station	600
NDB station	200
Marker Beacon station	50
GBAS ground reference receiver	400
GBAS VDB transmitter	300
GBAS VDB monitoring station	400
VHF voice/datalink communication station	300
PSR station	500
SSR station	500
ADS-B station	300

A2. The modern CNS facilities may require the smaller clearance area due to the technology advancement in the antenna and signal processing, the CNSP shall follow the manufacturer's instructions.

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