สำนักงานการบินพลเรือนแห่งประเทศไทย
The Civil Aviation Authority of Thailand

Manual of Standards

Aeronautical Information Services

CAAT-ANS-MOSAIS

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Approved By

Chula Sukmanop, PhD

Director General

The Civil Aviation Authority of Thailand

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Foreword

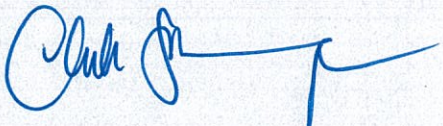
The General Director of The Civil Aviation Authority of Thailand is responsible under Section 15/17 (5) of the Air Navigation Act B.E. 2497 amended by the Air Navigation Act (No. 14) B.E. 2562 for issuing CAAT regulation on Air Navigation Services for Aeronautical Information Services Standards to stipulate 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 Section 15/17 (5) of the Air Navigation Act B.E. 2497 amended by the Air Navigation Act (No. 14) B.E. 2562, CAAT regulation No.11 on Air Navigation Services for Aeronautical Information Services Standards and CAAT rule on Manual of Standards – Aeronautical Information Services for promulgating standards for Aeronautical Information Services. 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 Regulation, Requirement and Rules 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 The Civil Aviation Authority of Thailand.



Chula Sukmanop, PhD
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Record of Revision

Issue Number	Revision Number	Effective Date	Revised By	Section Affected
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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, CAAT Regulation, Requirement and Rules refers to the standards and methods to be used in regulating:

a) the requirements and standards for compliance, including:

1) the Operations Manual;

2) the provider's organisation, facilities and equipment, personnel, and check and training system, formal arrangements, safety management system and records;

3) Aeronautical Information Management (AIM), Aeronautical Data and Aeronautical Information, Aeronautical Information Product, Distribution Service and Aeronautical Information Update.

b) what is required to accompany an application for an Aeronautical Information Service Provider's (hereinafter 'AIS Provider') 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]; and

b) The Civil Aviation Authority of Thailand Regulation, Requirement and Rules [2] (The CAAT Regulation, Requirement and Rules); and

c) Manual of Standards (MOS); and

d) Advisory Circulars (ACs).

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[1]
- พระราชบัญญัติการเดินอากาศ พ.ศ. 2497 แก้ไขเพิ่มเติมโดย พระราชบัญญัติการเดินอากาศ (ฉบับที่ 14) พ.ศ.2562
- พระราชกำหนดการบินพลเรือนแห่งประเทศไทย พ.ศ.2558

[2]
- ข้อบังคับของสำนักงานการบินพลเรือนแห่งประเทศไทย ฉบับที่ 11 ว่าด้วยมาตรฐานการบริการการเดินอากาศ ด้านข่าวสารการบิน
- ข้อกำหนดของสำนักงานการบินพลเรือนแห่งประเทศไทย ฉบับที่ 25 ว่าด้วยการขอและออกใบรับรองบริการการเดินอากาศ
- ประกาศสำนักงานการบินพลเรือนแห่งประเทศไทย เรื่อง การกำหนดประเภทนิติบุคคล อายุใบรับรอง และหน้าที่อื่นของผู้ได้รับใบรับรองบริการการเดินอากาศ
- ระเบียบสำนักงานการบินพลเรือนแห่งประเทศไทย ว่าด้วยการจัดทำรายงานของผู้ได้รับใบรับรองบริการการเดินอากาศ
- ระเบียบสำนักงานการบินพลเรือนแห่งประเทศไทย ว่าด้วยคู่มือมาตรฐานการให้บริการข่าวสารการบิน
- ระเบียบสำนักงานการบินพลเรือนแห่งประเทศไทย ว่าด้วยคู่มือการดำเนินงานด้านข่าวสารการบิน

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 aeronautical information services within Bangkok FIR. The AIS provider in Thailand is required to comply with the provisions contained in this MOS. The AIS provider shall document local procedures in their own operations manuals, to ensure the maintenance of and compliance with standards.

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 An AIS provider shall ensure that any aeronautical information service that it provides is provided in accordance with:

a) the standards set out in the Manual of Standards (MOS);
b) the standards set out or referred to in ICAO Annex 4, ICAO Annex 5, ICAO Annex 15, ICAO DOC 10066 (PANS-AIM), ICAO Doc 8126 and ICAO Doc 8697 as varied by Gen 1.7 of Part General of the AIP-Thailand; and
c) Others document related to Aeronautical Information Services.

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 regulation and requirement. 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.

1.1.2.8 Where the AIS provider is unable to comply with any provision in any of this MOS, the AIS provider shall inform the CAAT within a reasonable period of time and in writing. The AIS provider shall explain the basis for its non-compliance and propose alternative steps to ensure that an equivalent level of safety is established. The CAAT will review the AIS provider's proposal in a timely fashion and approve the proposal, subject to

such other conditions it may impose. The AIS provider is required to follow-up diligently and thereafter report to CAAT within a reasonable period.

1.1.2.9 Where the CAAT has approved the AIS provider's proposal in subsection 1.1.2.8, the AIS provider shall record the approved alternative steps to be taken in the AIS provider's operations manuals. The operations manuals shall also contain the details of and rationale for the alternative steps, and any result limitations or conditions imposed.

1.1.3 Editorial Practices

1.3.1 To avoid any misunderstanding within the MOS, the words 'shall' as used within the requirements indicate the compliance is compulsory' while 'should' means that it is strongly advisable that an instruction is carried out; it is recommended or discretionary.

1.1.4 Differences Between ICAO Standards and those in MOS

1.1.4.1 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.

1.1.5 Differences Published in AIP

1.1.5.1 Differences from ICAO Standards, Recommended Practices and Procedures are published in AIP GEN 1.7.

1.1.6 MOS Documentation Change Management

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

1.1.6.2 This MOS is issued, and may only be amended, under the authority of the DGCA.

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

Email: ans@caat.or.th

1.1.6.4 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 authorisation holders.

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

a) to ensure safety;

b) to ensure standardisation;

c) to respond to changed CAAT standards;

d) to respond to ICAO prescription;

e) to accommodate proposed initiatives or new technologies.

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

1.1.7 Related Document

1.1.7.1 These standards should be read in conjunction with:

a) Civil Aviation Authority of Thailand Regulation and Requirement;

b) ICAO Annex 4 – Aeronautical Chart;

c) ICAO Annex 5 – Units of Measurement to be Used in Air and Ground Operations;

d) ICAO Annex 15 – Aeronautical Information Services;

e) ICAO Annex 19 – Safety Management

f) ICAO Procedures for Air Navigation Services - Aeronautical Information Management (PANS-AIM) (Doc 10066);

g) ICAO Aeronautical Information Services Manual (Doc 8126);

h) ICAO Aeronautical Chart Manual (Doc 8697);

i) ICAO Abbreviation (DOC 8400);

j) ICAO Safety Management System (DOC 9859); and

k) AIP-Thailand.

1.2 Definitions and Abbreviations

1.2.1 Definitions

For the purpose of these 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
Aerodrome	A defined area on land or water (including any buildings, installations and equipment) intended to be used either wholly or in part for the arrival, departure and surface movement of aircraft.
Aerodrome mapping database (AMDB)	A collection of aerodrome mapping data organized and arranged as a structured data set.
Aeronautical chart	A representation of a portion of the Earth, its culture and relief, specifically designated to meet the requirements of air navigation.
Aeronautical data	A representation of aeronautical facts, concepts or instructions in a formalized manner suitable for communication, interpretation or processing.
Aeronautical fixed service (AFS)	A telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services.
Aeronautical information	Information resulting from the assembly, analysis and formatting of aeronautical data.
Aeronautical Information Circular (AIC)	A notice containing information that does not qualify for the origination of a NOTAM or for inclusion in the AIP, but which relates to flight safety, air navigation, technical, administrative or legislative matters.
Aeronautical information management (AIM)	The dynamic, integrated management of aeronautical information through the provision and exchange of quality-assured digital aeronautical data in collaboration with all parties.
Aeronautical Information Product	Aeronautical data and aeronautical information provided either as digital data sets or as a standardized presentation in paper or electronic media. Aeronautical information product includes: – Aeronautical Information Publication (AIP), including Amendments and Supplements;

Definition	Meaning
	– Aeronautical Information Circulars (AIC); – Aeronautical charts; – NOTAM; and – Digital data sets. *Note. — Aeronautical Information Products are intended primarily to satisfy international requirements for the exchange of aeronautical information.*
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.
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 services provider (AIS provider).	An organisation responsible for the provision of an aeronautical information service.
AIP amendment	Permanent changes to the information contained in the AIP.
AIP Supplement	Temporary changes to the information contained in the AIP which are provided by means of special pages.
Air traffic management (ATM)	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.
ASHTAM	A special series NOTAM notifying by means of a specific format change in activity of a volcano, a volcanic eruption and/or volcanic ash cloud that is of significance to aircraft operations.
Cyclic redundancy check (CRC)	A mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data.
Data accuracy	A degree of conformance between the estimated or measured value and the true value.

Definition	Meaning
Data completeness	The degree of confidence that all of the data needed to support the intended use is provided.
Digital data sets	Digital data sets shall be in the form of the following data sets: a) AIP data set; b) Terrain data sets; c) Obstacle data sets; d) Aerodrome mapping data sets; and e) Instrument flight procedure data sets.
Data format	A structure of data elements, records and files arranged to meet standards, specifications or data quality requirements.
Data integrity (assurance level)	A degree of assurance that aeronautical data and its value has not been lost or altered since the origination or authorized amendment.
Data product	Data set or data set series that conforms to a data product specification
Data product specification	Detailed description of a data set or data set series together with additional information that will enable it to be created, supplied to and used by another party
Data quality	A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution, integrity (or equivalent assurance level), traceability, timeliness, completeness and format.
Data resolution	A number of units or digits to which a measured or calculated value is expressed and used.
Data set	Identifiable collection of data
Data timeliness	The degree of confidence that the data is applicable to the period of its intended use.
Data traceability	The degree that a system or a data product can provide a record of the changes made to that product and thereby enable an audit trail to be followed from the end-user to the originator.
Flight information service	A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.
Gregorian calendar	Calendar in general use; first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar (ISO 19108*).

Definition	Meaning
	Note. — In the Gregorian calendar, common years have 365 days and leap years 366 days divided into twelve sequential months.
International NOTAM office (NOF)	An office designated by a State for the exchange of NOTAM internationally.
Metadata	Data about data
Next intended user	The entity that receives the aeronautical data or information from the Aeronautical Information Service.
NOTAM	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.
Obstacle	All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that: a) are located on an area intended for the surface movement of aircraft; or b) extend above a defined surface intended to protect aircraft in flight; or c) stand outside those defined surfaces and that have been assessed as being a hazard to air navigation.
Origination (aeronautical data or aeronautical information)	The creation of the value associated with new data or information or the modification of the value of an existing data or information.
Originator (aeronautical data or aeronautical information)	An entity that is accountable for data or information origination and from which the AIS organisation receives aeronautical data and information.
Pre-flight information bulletin (PIB)	A presentation of current NOTAM information of operational significance, prepared prior to flight.
Quality	Degree to which a set of inherent characteristics fulfils requirements
Quality assurance	Part of quality management focused on providing confidence that quality requirements will be fulfilled

Definition	Meaning
Quality control	Part of quality management focused on fulfilling quality requirements
Quality management	Coordinated activities to direct and control an organization with regard to quality
SNOWTAM	A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format.
Terrain	The surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, permanent ice and snow, and excluding obstacles.
Traceability	Ability to trace the history, application or location of that which is under consideration
Validation	Confirmation, through the provision of objective evidence, that the requirements for a specific intended use or application have been fulfilled
Verification	Confirmation, through the provision of objective evidence, that specified requirements have been fulfilled

1.2.2 Abbreviations

1.2.2.1 Unless otherwise stated, abbreviations in this MOS have the meanings given in the AIP or as follows:

Abbreviations	Full Name
AFS	Aeronautical fixed service
AIC	Aeronautical information circular
AIM	Aeronautical information management
AIP	Aeronautical information publication
AIRAC	Aeronautical information regulation and control
AIS	Aeronautical information service
ANS	Aeronautical fixed service
ANSP	Air navigation services provider
ATM	Air traffic management
ATS	Air traffic services
CAAT	The Civil Aviation Authority of Thailand
CRC	Cyclic redundancy check

Abbreviations	Full Name
DGCA	Director General of Civil Aviation Authority of Thailand
eAIP	Electronic aeronautical information publication
FIR	Flight information region
ft.	Feet(s)
GML	Geography markup language
ICAO	International Civil Aviation Organization
ILS	Instrument landing system
ISO	International organization for standardization
JSON	JavaScript object notation
km.	Kilometre(s)
m.	Meter(s)
MOS	Manual of standards
NDB	Non-directional radio beacon
NOF	International NOTAM office
NOTAM	Notice to airmen
OJT	On-the-job training
PANS-AIM	Procedures for air navigation services- Aeronautical Information Management
PIB	Pre-flight information bulletin
PSR	Primary surveillance radar
QMS	Quality Management Systems
RVR	Runway visual range
SARPs	Standards and Recommended Practices
SID	Standard instrument departure
SMS	Safety management systems
SSR	Secondary surveillance radar
STAR	Standard instrument arrival
TMA	Terminal control area
UML	Unified Modelling Language
VHF	Very high frequency
VOR	VHF omnidirectional radio range
WGS-84	World Geodetic System — 1984
XML	Extensible markup language

Chapter 2 Operations Manual

2.1 General

2.1.1 An AIS provider shall provide, maintain, amend and keep up to date its operations manuals relating to the provision of its services that complies with the standards set out in this manual for the use and guidance of operations personnel.

2.1.2 An AIS provider shall ensure the operations manuals contain the instructions and information required by the operations personnel to perform their duties;

2.1.3 The AIS provider shall:

a) keep the manual in a readily accessible form; and

b) ensure that each member of its personnel who performs functions in connection with any aeronautical information service that it provides has ready access to the manual.

c) ensure that the operations personnel are informed of amendments to the operations manual applying to their duties in a manner that enables their application as of their entry into force.

2.1.4 The AIS provider shall submit an operation manual to CAAT for an approval. If the AIS provider is given a direction by CAAT to amend the manual, the provider must comply with the direction.

2.1.5 The AIS provider must ensure:

a) that all the amendments are incorporated in all copies of the manual kept by the operator; and

b) that copies of the amendments are given to CAAT

2.2 Content of operations manual

2.2.1 An operation manual must contain:

a) A table of contents based on the items in the manual, indicating the page number on which each item begins;

b) A description of the provider's organisational structure and a statement setting out the functions that the provider performs, or proposes to perform;

c) A description of the chain of command established, or proposed to be established, by the provider and a statement of the duties and responsibilities of any supervisory positions within the organisational structure;

d) A statement showing how the provider determines the number of operational staffs required including the number of operational supervisory staff;

e) A list of the aeronautical information services that the provider provides, or proposes to provide including service type, scope and/or location and operation hours;

f) A statement of the job description for each operating position;

g) A description of the provider's document control and record keeping system;

h) A copy of any agreement entered into by the provider in relation to the provision of any of the aeronautical information services;

i) A copy of the document that sets out the provider's safety management system;

j) A copy of the provider's contingency plan;

k) A copy of the provider's data, personnel and physical security program;

l) A description of the processes and documentation used to present to staff the relevant standards, rules and procedures contained in Manual of Standards, ICAO Annexes 4, 5, 15 and 19, DOC 10066, DOC 8126, DOC 8697, DOC 9859, ICAO Regional Supplementary Procedures, and any of the provider's site-specific instructions for the provision of aeronautical information services;

m) A description of the processes and documentation used to provide operational instructions to personnel;

n) A description of the procedures to be followed to ensure all operational staff are familiar with any operational changes that have been issued since they last performed operational duties;

o) A description of the provider's training and checking program;

p) A description of facilities & Equipment Requirements.

q) The procedures to be followed for revising the operations manual.

r) A description of Quality Management System

s) A description of the procedures that ensure that all equipment, including software, is operated in accordance with the manufacturer's operating instructions and manuals;

t) A description of the procedures for making changes.

Chapter 3 General Provisions for Aeronautical Information Services

3.1 General

3.1.1 The AIS provider shall ensure that aeronautical data and aeronautical information necessary for the safety, regularity or efficiency of air navigation is made available in a form in conformity with ICAO Annex 15 and suitable for the operational requirements of the ATM community, including:

a) those involved in flight operations, including flight crews, flight planning and flight simulators; and

b) the ATS units responsible for flight information service and the services responsible for pre-flight information.

Note. — A description of the ATM community is contained in the Global ATM Operational Concept (Doc 9854).

3.1.2 The AIS provider shall receive, collate or assemble, edit, format, publish/store and distribute aeronautical data and aeronautical information concerning Bangkok FIR in which Thailand has responsibility for air traffic services. Aeronautical data and aeronautical information shall be provided as an Aeronautical Information Products.

Note. — An Aeronautical Information Service may include origination functions.

3.2 Copyright

3.2.1 Any aeronautical information product which has been granted copyright protection by AIS provider and provided to another State in accordance with subsection 12.1.4 (Exchange & Delivery) shall only be made available to a third party on the condition that the third party is made aware that the product is copyright protected and provided that it is appropriately annotated that the product is subject to copyright by AIS provider.

3.2.2 Any aeronautical information product which has been granted copyright protection by an ICAO Contracting State and provided to AIS provider in accordance with subsection 12.1.4 (Exchange & Delivery) shall only be made available to a third party on the condition that the third party is made aware that the product is copyright protected and provided that it is appropriately annotated that the product is subject to copyright by ICAO Contracting State.

3.2.3 When aeronautical information and aeronautical data is provided to a State in the form of digital data set to be used by aeronautical information services, the receiving State shall not provide the digital data sets of the providing State to any third party, without the consent of AIS provider.

3.2.4 When aeronautical information and aeronautical data is provided to AIS provider in the form of digital data set to be used by aeronautical information services, AIS provider shall not provide the digital datasets of the providing State to any third party, without the consent of the providing State.

3.3 Cost recovery

3.3.1 The overhead cost of collecting and compiling aeronautical data and aeronautical information should be included in the cost basis for airport and air navigation services charges, as appropriate, in accordance with the principles contained in ICAO's Policies on Charges for Airports and Air Navigation Services (Doc 9082).

3.4 General provision for aeronautical information products

3.4.1 AIS provider must provide and publish aeronautical information products

3.4.2 AIS provider must, in addition to subsection 3.4.1 —

a) designate an office as Thailand's point of contact with the aeronautical information services of other States for the interchange of Aeronautical Information Products; and

b) make the AIP, AIP Amendments, AIP Supplements and AIC available to any person upon payment of a charge that may apply to the supply of the publications; and

c) establish a system to disseminate the AIP, AIP Amendments, AIP Supplements, aeronautical charts, and AIC in accordance with AIRAC procedures; and

d) ensure that every aeronautical chart published as part of the AIP conforms to the applicable standards for the charts; and

e) coordinate the input of all aeronautical information from the originators prescribed in subsection 12.1.2.2 Collection of information, except;

i. information which is of immediate operational significance necessitating the immediate issue of a NOTAM; and

ii. temporary information of a duration of 3 months or lower, that only requires the issue of a NOTAM.

f) The AIS shall ensure that the NOTAM services to be established shall:

i. designate a NOF for Thailand;

ii. operate the NOF on a 24-hour basis;

iii. establish agreements with other international NOTAM offices for the exchange of NOTAM;

iv. use appropriate telecommunication facilities to issue and receive NOTAM;

v. issue a checklist of the NOTAM that are currently in force, at intervals of not more than one month;

vi. issue promptly NOTAM, SNOWTAM and ASHTAM in a format in accordance with PANS-AIM.

g) issue a checklist of the NOTAM that are currently in force, at intervals of not more than one month;

h) issue promptly NOTAM, SNOWTAM and ASHTAM in a format in accordance with PANS-AIM.

3.5 General provision for pre-flight information services

3.5.1 AIS provider shall be made available to flight operations personnel and flight crew members, aeronautical information that;

a) is essential for the safety, regularity and efficiency of air navigation; and

b) relates to the geographic area, aerodromes and air routes listed in the holder's certificate

3.6 Miscellaneous specifications

3.6.1 Aeronautical information products intended for international distribution shall include English text for those parts expressed in plain language.

3.6.2 Place names shall be spelt in conformity with local usage, transliterated, when necessary, into the ISO-Basic Latin alphabet.

3.6.3 Units of measurement used in the origination, processing and distribution of aeronautical data and aeronautical information shall be consistent with the tables contained in Annex 5.

3.6.4 ICAO Abbreviation Codes (DOC 8400) shall be used in aeronautical information products whenever they are appropriate and their use will facilitate distribution of aeronautical data and aeronautical information.

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Chapter 4 Human Resource Management

4.1 The AIS provider shall employ sufficient number of competent personnel to perform the operation of the service. The AIS provider shall provide in the operations manual an analysis of the number of personnel required to perform the aeronautical information service taking into account the duties and workload required.

4.2 The AIS provider must engage, employ or contract:

a) A senior person identified as the chief executive who has the authority within the applicant's organisation to ensure that the Aeronautical Information Service listed in its certificate can be financed and is responsible for establishing and maintaining an effective management system;

b) A senior person or persons who has the authority, duties and responsibilities of managing safety, quality, security, finance and human resources- related functions as applicable and are responsible for ensuring that the organisation complies with its certificate

c) Sufficient suitably qualified and trained personnel, at all times, to provide aeronautical product and services listed in the applicant' s exposition in accordance with the standards set out in this manual.

4.3 The AIS provider must establish procedures in accordance with the standards set out in this manual to:

a) Ensure the competence of those personnel authorised by the applicant to check, edit and publish aeronautical information for the aeronautical information services listed in their exposition; and

b) Maintain the competence of those authorised personnel; and

c) Provide those authorized personnel with written evidence of the scope of their authorization

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Chapter 5 Technical Personnel

5.1 General

5.1.1 The AIS provider 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 AIS provider shall establish appropriate minimum qualification and experience requirements for the technical personnel.

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

5.2.3 The job description shall depict the job purpose, key responsibilities, and outcome to be achieved of each staff. Initial and periodic assessments shall be established that require personnel to demonstrate the required competencies.

5.3 Technical personnel from sub-contractor

5.3.1 If the AIS provider has contracted the technical personnel from sub-contractor to perform some duties, the AIS provider shall also ensure that they have qualification and experience adequate to perform the assigned duties.

5.3.2 The AIS provider shall take responsibilities for any action of technical personnel from subcontractor.

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Chapter 6 Training and Checking Program

6.1 The AIS provider shall establish procedures to ensure that all its personnel, including cartographic technical staff, possess the skills and competencies required in the provision of aeronautical information services.

6.2 The AIS provider shall develop an overall training policy and programme The training policy and programme shall lay down the training courses that different levels of staff have to undergo to perform their duties, including initial, on-the-job training (OJT), recurrent and specialised training.

6.3 The AIS provider shall ensure that its staff undergo a suitable period of supervised on-the-job training (OJT) before being deployed for duties.

6.4 The AIS provider shall maintain individual training records including certificate for each of its staff, which shall include a training plan detailing the courses completed by each staff as well as the time-frame for attending future courses as required under his training plan.

6.5 The AIS provider shall conduct a yearly review of the training plan for each staff at the beginning of the year to identify any gaps in competency changes in training requirement and prioritise the type of training required for the coming year.

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Chapter 7 Facilities and Equipment

7.1 General

7.1.1 An AIS provider must have the facilities and equipment that are necessary for providing its AIS, including appropriate premises and equipment to allow operational personnel to perform their duties.

7.1.2 An AIS provider must provide its operational personnel with access to the aeronautical data and aeronautical information required for the publication of the Aeronautical Information Product that the provider publishes.

7.2 Facilities and Equipment

7.2.1 AIS provider must determine, provide and maintain the facilities it needs to achieve product conformity, including:

a) Workspace;

b) Equipment, hardware and software; and

c) Supporting services

Note - Guidance on facilities and equipment for aeronautical information services can be found in ICAO Aeronautical Information Services Manual (Doc 8126).

7.2.2 At the most basic level, facilities for AIS provider should include:

a) Suitable furniture for staff to work comfortably, efficiently and ergonomically;

b) Sufficient space between work-stations to avoid disruption to other staff;

c) Noisy equipment isolated away from operational personnel or sound-proofed;

d)Adequate overhead or specialist lighting to be able to easily read source document;

e) A quiet area for proof-reading; and

f) Suitable computing equipment for word-processing and data capture.

7.2.3 AIS provider needs to ensure that any systems automation and services are designed with the intent of avoiding incompatibilities, divergences and unnecessary duplication of effort and importantly that there is an overall systems integration management plan in place. Standardization of procedures, products and services is essential for the successful automation of AIS.

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Chapter 8 Management System

8.1 Introduction

This Chapter sets out the standard for Safety Management System and Quality Management System

8.2 Safety Management System (SMS)

8.2.1 General

a) The AIS provider shall implement the safety management system (SMS) approved by CAAT.
b) All activities undertaken in an AIS SMS shall be fully documented. All documentation shall be kept for a minimum of 5 years.
c) The AIS provider shall submit any amendments to the SMS manual to CAAT for approval in a timely manner prior to implementation.
d) The AIS provider shall establish a safety reporting system and maintain a safety database.
e) The AIS provider shall provide any related information to CAAT if requested.

8.2.2 Safety Management System Framework

A safety management system framework for the implementation and maintenance of an SMS. The framework comprises 4 components and 12 elements as the minimum requirements for SMS implementation:

8.2.2.1 Safety Policy and Objectives

a) Management commitment and responsibility

The SMS shall have a clear definition of the philosophy and fundamental approach the service provider will adopt for the management of safety within its organisation . 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 organisation 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.

b) Safety accountabilities

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

c) Appointment of key safety personnel

The AIS provider 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 managers and staff.

d) Coordination of emergency response planning

The service provider shall ensure that an emergency response plan is properly coordinated with the emergency response plans of those organizations it must interface with during the provision of its products and services.

e) SMS documentation

A SMS manual shall be produced as part of the operations manual, as this is the key instrument for guiding and communicating the organisation's SMS approach and methodology to the whole organisation .Guidance on the production of an SMS manual can be found in ICAO Doc 9859.

8.2.2.2 Safety Risk Management

a) Hazard identification

The AIS provider 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.

b) Safety risk assessment and mitigation processes

The AIS provider 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.

8.2.2.3 Safety Assurance

a) Safety performance monitoring and measurement

The AIS provider shall develop and maintain the means to verify the safety performance of the organisation compared to the safety policy and objectives, and to validate the effectiveness of safety risks controls .The AIS provider shall establish the safety performance indicators and targets of its SMS and submit them to CAAT for agreement . Details on the establishment of the safety performance indicators and targets can be found in ICAO Doc 9859.

b) Management of change

The AIS provider shall develop and maintain a formal process to identify changes within the organisation which may affect established processes and services .A risk assessment shall be carried out before the implementation of such changes.

c) Continuous improvement of the SMS

The AIS provider 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 or mitigate such causes, in order to ensure the continual improvement of the SMS.

8.2.2.4 Safety Promotion

a) Training and education

The AIS provider 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.

b) Safety communication

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

Note. — Reference may also be made to ICAO Safety Management Manual (Doc 9859) for any additional guidance where appropriate.

8.3 Quality Management System (QMS)

The standard for Quality Management System describes in subsection 12.6

Chapter 9 Contingency Plan

9.1 An AIS provider must have a contingency plan that sets out the procedures to be followed if a service provided as part of its AIS is interrupted.

9.2 The contingency plan must include:

a) the actions to be taken by personnel responsible for providing the service; and

b) possible alternative arrangements for providing the service; and

c) arrangements for resuming normal provision of the service.

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Chapter 10 Security Program

10.1 The AIS provider shall develop the security program 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 any system, equipment, software or data;

c) the procedure to be used for preventing unauthorized people from having access to working space, working area, any system, equipment, software or data used by the AIS provider in providing services.

10.2 An AIS provider should ensure that aeronautical data and aeronautical information necessary for the provision of its AIS is stored digitally (preferably).

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Chapter 11 Documents and Records

11.1 Documents to be maintained

11.1.1 The AIS provider shall maintain all documents and records which are necessary for the operation of the service. Copies of these documents shall also be made available to personnel where needed. These documents shall include but not limited to:

a) the Manual of Standards — Aeronautical Information Services;

b) the AIS provider's operations manual;

c) ICAO Annexes 4, 5 and 15, Doc 8126, Doc 8697, Doc 10066 and other relevant ICAO documents;

d) records of all incoming and outgoing aeronautical information to be identified by serial number and date; and that supplementary information can be similarly verified and, where necessary, authenticated;

e) records of each person who is authorised to check, edit and publish aeronautical information;

f) records that list the endorsements, qualifications and competencies of personnel who process, check, edit, publish or supply aeronautical data and aeronautical information;

g) records that identify each data originator that provides aeronautical data or aeronautical information to the provider;

h) records of internal quality and safety audit reports;

i) records of reporting, investigation and correction of error;

j) records of job description, training programme and plan of each staff;

k) all records are legible and of a permanent nature.

11.2 Document Control

11.2.1 The AIS Provider shall establish procedures to identify, collect, index, store, maintain and dispose of the records that are necessary for the aeronautical information services listed in subsection 11.1.1

11.2.2 The AIS provider shall ensure that where documents are held as computer-based records and where paper copies of computer- based records are made, they are subjected to the same control as paper documents.

11.3 Retention period

11.3.1 All records shall retain for at least five years except NOTAM, AIP Supplements and aeronautical Information Circulars, which need only be retained at least 90 days after cancellation.

Chapter 12 Aeronautical Information Management (AIM)

12.1 Information Management requirements

12.1.1 General

The information management resources and processes established by an AIS provider shall be adequate to ensure the timely collection, processing, storing, integration, exchange and delivery of quality- assured aeronautical data and aeronautical information within the air traffic management (ATM) system.

12.1.2 Collection

12.1.2.1 General

a) The identification of data originators, or the relevant entities responsible for delivering data to the AIS, shall be documented based on the scope of aeronautical data and aeronautical information to be collected.

b) A record of data originators should be maintained.

Note. — Metadata requirements in subsection 13.2.4 specify which information is to be recorded for each originator.

c) Each data element to be collected should be mapped to an identified data originator, in accordance with the formal arrangements established between data originators and the AIS.

d) The list of aeronautical information subjects and their properties, as contained in PANS-AIM Appendix 1, should be used to establish formal arrangements between the originators and the AIS.

e) Valid codes for the code lists of the aeronautical data properties and sub-properties should be defined in the formal arrangements between the originators and the AIS.

f) PANS-AIM Appendix 1 shall be considered as a reference for aeronautical data and aeronautical information origination and publication requirements.

12.1.2.2 Collection of Information

a) AIS provider shall establish procedures to collect and collate the information required for the aeronautical information service listed in their certificate.

b) The procedures shall ensure that:

i. Applicable information is obtained from organisations that provide services in support of the Thailand air navigation system; and

ii. Applicable information is obtained from the aeronautical information services of other States relevant to the requirements of international aircraft operators operating on air route stages originating from the Thailand; and

iii. Arrangements for the timely provision of information are made with the information originators; and

iv. Information received from the information originators is certificated as accurate by a person identified by the originator to be responsible for the accuracy of that information.

c) The procedures for the NOTAM service shall furthermore ensure that any originator's request for the issue of a NOTAM does not require the NOTAM to be effective for more than three months.

12.1.3 Processing

Collected data shall be verified and validated for compliance with completeness, format, timeliness, traceability and data quality requirements.

12.1.4 Exchange & Delivery

12.1.4.1 Exchange of aeronautical data and aeronautical information

a) The AIS provider shall provide one copy of each of the following aeronautical information products (where available) that have been requested by the AIS of an ICAO Contracting State in the mutually-agreed form(s) between the AIS provider, without charge, even where authority for publication/ storage and distribution has been delegated to a non-governmental agency:

i. Aeronautical Information Publication (AIP), including Amendments and Supplements;

ii. Aeronautical Information Circulars (AIC);

iii. NOTAM; and

iv. Aeronautical Charts.

b) Where aeronautical information and aeronautical data is provided in the form of digital data sets to be used by aeronautical information services, it shall be provided on the basis of agreement between the AIS provider and the concerned Contracting States

c) Wherever practicable, direct contact between the AIS provider and the AIS of an ICAO Contracting State shall be established in order to facilitate the international exchange of aeronautical data and aeronautical information.

12.1.4.2 Provision for the exchange of data sets

Globally interoperable aeronautical information exchange models and data exchange models shall be used for the provision of data sets.

a) The aeronautical information model used should encompass the aeronautical data and aeronautical information to be exchanged.

b) The aeronautical information model used should:

i. use the Unified Modelling Language (UML) to describe the aeronautical information features and their properties, associations and data types;

ii. include data value constraints and data verification rules;

iii. include provisions for metadata as specified in subsection 14.9.2; and

iv. include a temporality model to enable capturing the evolution of the properties of an aeronautical information feature during its life cycle.

c) The aeronautical data exchange model used should:

i. apply a commonly used data encoding format;

ii. cover all the classes, attributes, data types and associations of the aeronautical information model detailed in subsection 12.1.4.2; and

iii. provide an extension mechanism by which groups of users can extend the properties of existing features and add new features which do not adversely affect global standardization.

Note. 1 — The intent of using a commonly used data encoding format is to ensure interoperability of aeronautical data exchange between agencies and organisations involved in the data processing chain.

Note. 2 — Examples of commonly used data encoding formats include Extensible Markup Language (XML), Geography Markup Language (GML), and JavaScript Object Notation (JSON).

12.2 Data Quality Specification

12.2.1 Data Accuracy

The order of accuracy for aeronautical data shall be in accordance with its intended use.

Note. — Specifications concerning the order of accuracy (including confidence level) for aeronautical data are contained in the PANS-AIM, Appendix 1.

12.2.2 Data Resolution

The order of resolution of aeronautical data shall be commensurate with the actual data accuracy.

Note.1 — Specifications concerning the resolution of aeronautical data are contained in the PANS-AIM, Appendix 1.

Note.2 —The resolution of the data contained in the database may be the same or finer than the publication resolution.

12.2.3 Data Integrity

a) The integrity of aeronautical data shall be maintained throughout the data process from origination to distribution to the next intended user.

Note. — Specifications concerning the integrity classification related to aeronautical data are contained in the PANS-AIM, Appendix 1.

b) Based on the applicable integrity classification, procedures shall be put in place in order to:

i. for routine data: avoid corruption throughout the processing of the data;

ii. for essential data: assure corruption does not occur at any stage of the entire process and include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and

iii. for critical data: assure corruption does not occur at any stage of the entire process and include additional integrity assurance processes to fully mitigate the effects of faults identified by thorough analysis of the overall system architecture as potential data integrity risks.

12.2.4 Data Traceability

Traceability of aeronautical data shall be ensured and retained as long as the data is in use.

12.2.5 Data Timeliness

Timeliness shall be ensured by including limits on the effective period of the data elements.

Note.1 — These limits may be associated with individual data elements or data sets.

Note.2 — If the effective period is defined for a data set, it will account for the effective dates of all of the individual data elements.

12.2.6 Data Completeness

Completeness of the aeronautical data shall be ensured in order to support the intended use.

12.2.7 Data Format

The format of delivered data shall be adequate to ensure that the data is interpreted in a manner that is consistent with its intended use.

12.3 Aeronautical data and aeronautical information validation and verification

12.3.1 Material to be issued as part of an aeronautical information product shall be thoroughly checked before it is submitted to the AIS provider, in order to ensure that all necessary information has been included and that it is correct in detail.

12.3.2 An AIS provider shall establish verification and validation procedures which ensure that upon receipt of aeronautical data and aeronautical information, quality requirements are met.

12.4 Data error detection

12.4.1 Digital data error detection techniques shall be used during the transmission and/or storage of aeronautical data and digital data sets.

12.4.2 Digital data error detection techniques shall apply to all integrity levels of data sets as specified in subsection 12.2.3

12.4.3 The technical means used for data error detection should be based on the use of systematic cycling codes.

Note. — The means to implement systematic cycling codes include the use of hash functions and cyclic redundancy check (CRC).

12.5 Automation

12.5.1 Automation shall be applied in order to ensure the timeliness, quality, efficiency and cost-effectiveness of aeronautical information services.

Note. — Guidance material on the development of databases and the establishment of data exchange services is contained in the Aeronautical Information Services Manual (Doc 8126).

12.5.2 In order to meet the data quality requirements, automation shall:

a) enable digital aeronautical data exchange between the parties involved in the data processing chain; and

b) use aeronautical information exchange models and data exchange models designed to be globally interoperable.

12.6 Quality Management System (QMS)

12.6.1 Quality management systems shall be implemented and maintained by AIS providers encompassing all functions of an aeronautical information service, as outlined in subsection 3.1.2 The execution of such quality management systems shall be made demonstrable for each function stage.

Note. — Guidance material is contained in the Manual on the Quality Management System for Aeronautical Information Services (Doc 9839) (to be developed).

12.6.2 Quality management should be applicable to the whole aeronautical information data chain from data origination to distribution to the next intended user, taking into consideration the intended use of data.

12.6.3 The quality management system established in accordance with subsection 12.6.1 shall follow the ISO 9000 series of quality assurance standards and be certified by an accredited certification body.

12.6.4 The general requirements for a QMS shall be to:

a) develop a quality manual that includes the scope of a quality management system as applied to AIM processes;

b) identify the processes needed for the QMS;

c) determine the sequence and interaction of these processes;

d) determine criteria and methods required to ensure the effective operation and control of these processes;

e) ensure the availability of information necessary to support the operation and monitoring of these processes;

f) measure, monitor and analyse these processes, and implement action necessary to achieve planned results and continual improvement; and

g) maintain appropriate records that are necessary to provide confidence of conformity of the processes and resulting product.

12.6.5 In the framework of the quality management system, a user feedback system shall be defined and implemented.

Note. 1 — Quality management may be provided by a single quality management system or a series of quality management systems.

Note. 2 — Formal arrangements concerning data quality between originator and distributor and between distributor and next intended user may be used to manage the aeronautical information data chain.

12.6.6 The quality management system established by the AIS provider shall include the necessary policies, processes and procedures, including those for the use of metadata,

to ensure and verify that aeronautical data is traceable throughout the aeronautical information data chain so as to allow any data anomalies or errors detected in use to be identified by root cause, corrected and communicated to affected users.

12.6.7 The quality management system established by the AIS provider shall provide the users with the necessary assurance and confidence that the aeronautical information and aeronautical data satisfy the aeronautical data quality specification specified in subsection 12.2 and the data traceability requirements through the provision of appropriate metadata as specified in subsection 13.2.3 The system shall also provide assurance of the applicability period of intended use of aeronautical information/data as well as that the agreed distribution dates will be met.

12.6.8 The quality management system established by the AIS provider shall ensure that electronic aeronautical data sets shall be protected by the inclusion in the data sets of a 32-bit cyclic redundancy check)CRC (implemented by the application dealing with the data sets .

12.7 Quality Control

12.7.1 Quality checks should be implemented to ensure compliance with product specifications contained in PANS-AIM .

12.7.2 When the same data is duplicated in different Aeronautical Information Products, coherency checks should be undertaken .

Note. — Error-producing faults in the entire process may be mitigated by additional data quality assurance techniques as may be required. These could include application tests for critical data (for example, by flight check); the use of security, logic, semantic, comparison, and redundancy checks; digital error detection; and the qualification of human resources and process tools such as hardware and software.

12.8 Human Factor Considerations

12.8.1 The organisation of an AIS as well as the design, contents, processing and distribution of aeronautical data and aeronautical information shall take into consideration human factors principles which facilitate their optimum utilization.

12.8.2 Due consideration shall be given to the integrity of information where human interaction is required and mitigating steps taken where risks are identified.

Note. — This may be accomplished through the design of systems, operating procedures or improvements in the operating environment.

12.9 Common Reference System

12.9.1 Common reference system for air navigation including horizontal, vertical and temporal reference system shall comply with Annex 15.

12.9.2 World Geodetic System — 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system for air navigation. Consequently, published aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

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Chapter 13 Aeronautical Data and Aeronautical Information

13.1 Scope of aeronautical data and aeronautical information

13.1.1 The aeronautical data and aeronautical information to be received and managed by the AIS providers shall include at least the following sub-domains :

a) National regulations, rules and procedures;

b) Aerodromes and heliports;

c) Airspace;

d) ATS and other routes;

e) Instrument flight procedures;

f) Radio navigation aids/systems;

g) Obstacles; and

h) Geographic information.

Note. 1 — Detailed specifications concerning the content of each sub-domain are contained in the PANS-AIM, Appendix 1.

Note. 2 — Aeronautical data and aeronautical information in each sub-domain may be originated by more than one organisation or authority.

13.1.2 Determination and reporting of aeronautical data shall be in accordance with the accuracy and integrity classification required to meet the needs of the end-user of aeronautical data .

Note. — Specifications concerning the accuracy and integrity classification related to aeronautical data are contained in the PANS-AIM, Appendix 1.

13.2 Aeronautical Data Requirement

13.2.1 AIS provider shall ensure that aeronautical data received from data originators shall be complied with aeronautical data requirement mentioned in PANS-AIM.

13.2.2 Data Origination Requirements

Data shall be collected and transmitted to the AIS in accordance with the accuracy requirements and integrity classification specified in Appendix 1 PANS-AIM.

13.2.3 Metadata

a) Metadata shall be collected for aeronautical data processes and exchange points

b) Metadata collection shall be applied throughout the aeronautical information data chain, from origination to distribution to the next intended user.

13.2.4 Metadata requirements

The metadata to be collected shall include, as a minimum:

a) the name of the organisations or entities performing any action of originating, transmitting or manipulating the data;

b) the action performed; and

c) the date and time the action was performed.

Note. — ISO Standard 19115 specifies requirements for geographic information metadata.

13.3 Formal arrangements

13.3.1 An aeronautical information services provider shall ensure that formal arrangements are established:

a) with all parties transmitting data to them; and

b) between themselves when exchanging aeronautical information and data.

13.3.2 Formal arrangements should include the following minimum content:

a) the aeronautical data to be provided;

b) the data quality requirements for each data item supplied according to the data catalogue;

c) the method(s) for demonstrating that the data provided conforms with the specified requirements;

d) the action to be taken in the event of discovery of a data error or inconsistency in any data provided;

e) the following minimum criteria for notification of data changes:

i. criteria for determining the timeliness of data provision based on the operational or safety significance of the change;

ii. any prior notice of expected changes; and

iii. the means to be adopted for notification;

f) the party responsible for documenting data changes;

g) data exchange details such as format or format change processes;

h) any limitations on the use of data;

i) requirements for the production of data origination quality reports;

j) metadata requirements; and

k) contingency requirements concerning the continuity of data provision.

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Chapter 14 Standards for Aeronautical Information Products

14.1 General

14.1.1 The AIS provider shall provide aeronautical information in the form of Aeronautical Information Products and associated services in accordance with Annex15.

14.1.2 When aeronautical data and aeronautical information are provided in multiple formats, processes shall be implemented to ensure data and information consistency between formats.

14.2 Aeronautical information in a standardized presentation

14.2.1 Aeronautical information provided in a standardized presentation shall include the AIP, AIP Amendments, AIP Supplements, AIC, NOTAM and Aeronautical Charts.

Note. 1 — Aeronautical information products shall comply with the detailed specifications about AIP, AIP Amendments, AIP Supplements, AICs and NOTAM that are contained in the Annex 15 and PANS-AIM.

Note. 2 — Cases where digital data sets may replace the corresponding elements of the standardized presentation are detailed in the PANS-AIM.

14.2.2 The AIP, AIP Amendment, AIP Supplement and AIC provided as an electronic document (eAIP) should allow for both displaying on electronic devices and printing on paper.

14.3 AIP Requirement

14.3.1 The AIS provider shall publish Aeronautical Information Publication (AIP) containing current information, data and aeronautical charts relating to the airspace in which Thailand has responsibility for air traffic services. The contents of the AIP shall be in accordance with Annex 15 and PANS-AIM.

14.3.2 The AIP provider shall ensure that the AIP to be published is self-contained and includes;

a) a statement of the competent authority responsible for the air navigation facilities, services or procedures covered by the AIP;

b) the general conditions under which the services or facilities are available for international use;

c) a list of the significant differences with the ICAO SARPS that Thailand has filed with ICAO with regards to its own regulations and practices;

d) a summary of any significant regulations and practices followed by Thailand where the ICAO SARPS allow alternative course of action.

14.3.3 The AIP shall contain current information, data and aeronautical charts relating to

a) the regulatory, airspace requirements, and procedures for air navigation in the Bangkok FIR; and

b) the services and facilities that support international air navigation to and from Thailand; and

c) the services and facilities that support air navigation within the Bangkok FIR; and

d) aerodromes operating under public aerodrome operating certificate.

14.3.4 The AIP may contain current information, data, and aeronautical charts relating to aerodromes not operating under public aerodrome operating certificate, if:

a) the aerodrome operator provides the holder of the aeronautical information service certificate for the AIP service with the required data and information relating to the aerodrome; and

b) the aerodrome operator accepts responsibility for the accuracy and currency of that data and information.

14.4 AIP Amendment

14.4.1 The AIS provider shall ensure that permanent changes to the AIP Thailand are published as AIP Amendments. Each AIP Amendment shall be allocated a series number, which shall be consecutive. Each AIP Amendment page, including the cover sheet, shall display a publication date. A brief indication of the subjects affected by the amendment shall be given on the AIP Amendment cover sheet.

14.4.2 The AIS provider shall establish and publish the publication dates for its AIP Amendments in the AIP Thailand

14.5 AIP Supplement

14.5.1 The AIS provider shall ensure that temporary changes of long duration (more than three months) and information of short duration which contains extensive text and/or graphics are published as AIP Supplement.

14.5.2 Each AIP Supplement shall be allocated a serial number which shall be consecutive and based on the calendar year. AIP Supplement pages shall be kept in the AIP as long as all or some of their contents remain valid.

14.5.3 The AIS provider shall issue a checklist of valid AIP Supplements at intervals of not more than one month. This information shall be issued through the medium of the monthly plain language list of valid NOTAM required by subsection 15.2.4.

14.6 Aeronautical Information Circulars (AIC)

14.6.1 The AIS provider shall originate an AIC whenever it is necessary to promulgate aeronautical information which does not qualify for inclusion in the AIP or NOTAM. An AIC shall be originated whenever it is desirable to promulgate:

a) a long-term forecast of any major change in legislation, regulations, procedures or facilities;

b) information of a purely explanatory or advisory nature liable to affect flight safety;

c) information or notification of an explanatory or advisory nature concerning technical, legislative or purely administrative matters.

14.6.2 Each AIC shall be allocated a serial number which should be consecutive and based on the calendar year.

14.6.3 A checklist of AIC currently in force shall be issued at least once a year, with distribution as for the AIC.

14.7 Aeronautical Charts

14.7.1 The AIS provider shall ensure that all aeronautical charts which are produced in Thailand are in conformity with ICAO Annex 4.

14.7.2 The AIS provider shall publish all Mandatory Charts and Conditional Required Charts which are applicable in Thailand:

14.7.2.1 Mandatory Charts

i. For all aerodrome

a. Instrument Approach Chart — ICAO, where instrument approach procedures have been established;

b. Aerodrome/Heliport Chart — ICAO;

ii. For aerodromes used by international civil aviation

a. Precision Approach Terrain Chart — ICAO; where precision approach runways Categories II and III

b. Aerodrome Obstacle Chart — ICAO Type A; where significant obstacles exist in the take-off flight-path areas.

c. Aerodrome Terrain and Obstacle Chart — ICAO (Electronic), where made available, Precision Approach Terrain Chart — ICAO and Aerodrome Obstacle Chart — ICAO Type A are not required.

iii. For all areas where Flight Information Regions (FIR) have been established

a. Enroute Chart

b. the World Aeronautical Chart — ICAO 1:1 000 000 for all areas delineated in Appendix 5 of Annex 4.

14.7.2.2 Conditional Required Charts

i. The Aerodrome Obstacle Chart — ICAO Type B

AIS provider shall be produced only where a need exists for a chart to assist in the determination of critical heights, e.g. for circling procedures, or of procedures for use in the event of an emergency during take-off or landing, and of obstacle clearing and marking criteria. Where the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) is made available, Aerodrome Obstacle Chart — ICAO Type B is not required.

ii. The Aerodrome Ground Movement Chart — ICAO

AIS provider shall be produced only where the detailed information needed for the ground movement of aircraft along taxiways to and from the aircraft stands and the parking and docking of aircraft, cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart — ICAO.

iii. The Aircraft Parking/Docking Chart — ICAO

AIS provider shall be made available only where, due to the complexity of terminal facilities, the information on the ground movement of aircraft between the taxiways and the aircraft stands and the parking/docking of aircraft cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart — ICAO or on the Aerodrome Ground Movement Chart — ICAO.

iv. The Aeronautical Chart — ICAO 1:500 000 and the Aeronautical Navigation Chart — Small Scale
AIS provider shall provide only when operational requirements for visual navigation or chart production considerations indicate a need for these charts either as a substitute for or to supplement the World Aeronautical Chart — ICAO 1:1 000 000.

v. Plotting Chart — ICAO.
[Reserved]

vi. The Area Chart — ICAO
AIS provider shall be made available only where the air traffic services routes or position reporting requirements are complex and cannot be adequately shown on the Enroute Chart — ICAO.

vii. the Standard Departure Chart — Instrument (SID) — ICAO
AIS provider shall be made available wherever a standard departure route — instrument has been established and cannot be shown with sufficient clarity on the Area Chart — ICAO.

viii. The Standard Arrival Chart — Instrument (STAR) — ICAO
AIS provider has to be made available wherever a standard arrival route — instrument has been established and cannot be shown with sufficient clarity on the Area Chart — ICAO.

ix. The Visual Approach Chart — ICAO
AIS provider shall be made available for all aerodromes used by international civil aviation where only limited navigation facilities are available or radio communication facilities are not available or no adequate aeronautical charts of the aerodrome and its surroundings at 1:500 000 or greater scale are available, or where visual approach procedures have been established.

x. ATC Surveillance Minimum Altitude Chart — ICAO
AIS provider shall be made available, where vectoring procedures are established and minimum vectoring altitudes cannot be shown adequately on the Area Chart — ICAO, Standard Departure Chart — Instrument (SID) — ICAO or Standard Arrival Chart — Instrument (STAR) — ICAO

14.7.2.3 Requirement in 14.7.2.1 and 14.7.2.2 applied for all aerodromes regularly used by international civil aviation, the Aerodrome/Heliport Chart is required, as well as the Aerodrome Obstacle Chart, Type A where significant obstacles exist in the take-off flight-path areas. Where the Aerodrome Terrain and Obstacle Chart — ICAO (Electronic) is made available, the Aerodrome Obstacle Chart — ICAO Type A (Operating Limitations) is not required

14.7.3 The order of chart resolution of aeronautical data shall be that as specified for a particular chart and specifications concerning the order of chart resolution for aeronautical data are contained in the PANS-AIM (Doc 10066), Appendix 1.

14.7.4 The AIS provider shall ensure that all aeronautical charts listed in subsection 14.7.2 are readily available to users by form part of the AIP, or be provided separately to recipients of the AIP, or be provided as Aeronautical Information Products in accordance with Annex 15. The AIS provider shall take all reasonable measures to ensure that the information it provides and the aeronautical charts made available are comprehensive and accurate and that they are maintained up-to-date by an adequate revision service.

14.7.5 The AIS provider shall ensure that each type of aeronautical chart provides information relevant to the function of the chart and its design shall observe human factors principles which facilitate its optimum use.

14.7.6 The AIS provider shall ensure that the presentation of information in the aeronautical charts are accurate, free from distortion and clutter, unambiguous, and readable under all normal operating conditions.

14.7.7 The AIS provider shall ensure that aeronautical data quality requirements related to the data integrity and charting resolution are in accordance with PANS-AIM Appendix 1. The integrity of the data shall be maintained throughout the data process from survey/origin to the next intended user. Aeronautical data integrity requirement shall be based upon the potential risk resulting from the corruption of data and the use to which the data item is put.

14.7.8 The AIS provider shall ensure that electronic aeronautical data shall be protected by the inclusion in the data sets of a 32-bit cyclic redundancy check (CRC) implemented by the application dealing with the data sets.

14.8 NOTAM

14.8.1 The AIS provider shall promptly originate and issue a NOTAM whenever the information to be distributed is of a temporary nature and of short duration or when operationally significant permanent changes, or temporary changes of long duration are made at short notice, except for extensive text and/or graphics.

14.8.2 The AIS provider shall ensure that NOTAM requirement is in accordance with Annex 15 and PANS-AIM

a) each NOTAM issued is allocated a series identified by a letter and a four-digit number followed by a stroke and a two-digit number for the year. The four-digit number shall be consecutive and based on the calendar year;

b) each NOTAM issued is brief, deal with only one subject, and be compiled so that its meaning is clear without reference to another document;

c) if a NOTAM contains information that requires an amendment to the AIP or an AIP Supplement, the NOTAM shall contain a cross reference to the affected AIP text or AIP Supplement;

d) if a NOTAM is issued which cancels or supersedes a previous NOTAM, the serial number of the previous NOTAM shall be specified;

e) if an error is detected in a NOTAM, a replacement NOTAM which cancels the original shall be issued;

14.9 Digital Data

14.9.1 General

14.9.1.1 AIS provider shall provide digital data in the form of the following data sets:

a) AIP data set

b) terrain data sets

c) obstacle data sets

d) aerodrome mapping data sets

e) instrument flight procedure data sets.

14.9.1.2 Each data set shall be provided to the next intended user together with a minimum set of metadata that ensures data traceability from the end-user to the originator.

14.9.1.3 A checklist of valid data sets shall be regularly provided.

14.9.1.4 AIS provider shall ensure that digital data specifications shall be in accordance with PANS-AIM.

14.9.2 Metadata

Each data set shall include the following minimum set of metadata:

a) the name of the organisations or entities providing the data set;

b) the date and time when the data set was provided;

c) validity of the data set; and

d) any limitations with regard to the use of the data set.

14.9.3 Data Set

The requirement for data sets shall be provided in accordance with PANS-AIM.

14.9.4 AIP data set

14.9.4.1 The Aeronautical (AIP (data set shall contain the digital representation of aeronautical information of lasting character)permanent information and long duration temporary changes (essential to air navigation.

14.9.4.2 An AIP data set should cover the extent of information as provided in the AIP.

14.9.4.3 When it is not possible to provide a complete AIP data set, the data subset(s (that are available should be provided.

14.9.5 Terrain and Obstacle data sets

14.9.5.1 General

a) AIS provider shall made available terrain and obstacle data set in accordance with Annex 15 and PANS-AIM

b) Numerical requirements for terrain and obstacle data sets are contained in the PANS-AIM (Doc 10066)

c) AIS provider shall make arrangements with its data originator for providing terrain and obstacle data sets

14.9.5.2 Coverage areas

The coverage areas for sets of terrain and obstacle data shall be specified as :

a) Area 1: the entire territory of a State;

b) Area 2: within the vicinity of an aerodrome, subdivided as follows;

i. Area 2a: a rectangular area around a runway that comprises the runway strip plus any clearway that exists.

ii. Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side;

iii. Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a; and

iv. Area 2d: an area outside the Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing terminal control area (TMA) boundary, whichever is nearest;

c) Area 3: the area bordering an aerodrome movement area that extends horizontally from the edge of a runway to 90 m from the runway centre line and 50 m from the edge of all other parts of the aerodrome movement area.

d) Area 4: The area extending 900 m prior to the runway threshold and 60 m each side of the extended runway centre line in the direction of the approach on a precision approach runway, Category II or III. Where the terrain at a distance greater than 900 m (3,000 ft) from the runway threshold is mountainous or otherwise significant, the length of Area 4 should be extended to a distance not exceeding 2,000 m (6,500 ft) from the runway threshold.

14.9.5.3 Terrain data sets

a) Terrain data sets shall contain the digital representation of the terrain surface in the form of continuous elevation values at all intersections (points) of a defined grid, referenced to common datum.

b) Terrain data shall be provided for Area 1

c) For aerodromes regularly used by international civil aviation, terrain data shall be provided for:

   i. Area 2a;

   ii. the take-off flight path area; and

   iii. an area bounded by the lateral extent of the aerodrome obstacle limitation surfaces.

d) For aerodromes regularly used by international civil aviation, additional terrain data should be provided within Area 2 as follows:

   i. in the area extending to a 10 km radius from the ARP; and

   ii. within the area between 10 km and the TMA boundary or a 45 km radius (whichever is smaller), where terrain penetrates a horizontal terrain data collection surface specified as 120 m above the lowest runway elevation.

e) AIS provider should make arrangements for the coordination of providing terrain data for adjacent aerodromes where their respective coverage areas overlap to assure that the data for the same terrain are correct.

f) For those aerodromes located near territorial boundaries, AIS provider should make arrangements with States concerned to share terrain data.

g) For aerodromes regularly used by international civil aviation, terrain data should be provided for Area 3.

h) For aerodromes regularly used by international civil aviation, terrain data shall be provided for Area 4 for all runways where precision approach Category II or III operations have been established and where detailed terrain information is required by operators to enable them to assess the effect of terrain on decision height determination by use of radio altimeters.

Note 1. - Figure 1, contains graphical illustrations of terrain data collection surfaces - Area 1 and Area 2.

Note 2. - Figure 3, contains graphical illustrations of terrain and obstacle data collection surfaces - Area 3.

Note 3. - Figure 4, contains graphical illustrations of terrain and obstacle data collection surfaces - Area 4.

14.9.5.4 Obstacle data sets

a) Obstacle data sets shall contain the digital representation of the vertical and horizontal extent of obstacles.

b) Obstacles data shall not be included in terrain data sets.

c) The obstacle data shall be provided for obstacles in Area 1 whose height is 100 m or higher above ground.

d) For aerodromes regularly used by international civil aviation, the obstacle data shall be provided for all obstacles within Area 2 that are assessed as being a hazard to air navigation.

e) For aerodromes regularly used by international civil aviation, obstacle data shall be provided for:

   i. Area 2a for those obstacles that penetrate an obstacle data collection surface outlined by a rectangular area around a runway that comprises the runway strip plus any clearway that exists. The Area 2a obstacle collection surface shall have height of 3 m above the nearest runway elevation measured along the runway centre line, and for those portions related to a clearway, if one exists, at the elevation of the nearest runway end;

   ii. objects in the take-off flight path area which project above a plane surface having a 1.2 per cent slope and having a common origin with the take-off flight path area; and

   iii. penetrations of the aerodrome obstacle limitation surfaces.

f) For aerodromes regularly used by international civil aviation, obstacle data should be provided for Areas 2b, 2c and 2d for obstacles that penetrate the relevant obstacle data collection surface specified as follows:

   i. Area 2b: an area extending from the ends of Area 2a in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side. The Area 2b obstacle collection surface has a 1.2 per cent slope extending from the ends of Area 2a at the elevation of the runway end in the direction of departure, with a length of 10 km and a splay of 15 per cent to each side;

ii. Area 2c: an area extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The Area 2c obstacle collection surface has a 1.2 per cent slope extending outside Area 2a and Area 2b at a distance of not more than 10 km from the boundary of Area 2a. The initial elevation of Area 2c has the elevation of the point of Area 2a at which it commences; and

iii. Area 2d: an area outside Areas 2a, 2b and 2c up to a distance of 45 km from the aerodrome reference point, or to an existing TMA boundary, whichever is nearest. The Area 2d obstacle collection surface has a height of 100 m above ground;

except that data need not be collected for obstacles less than a height of 3 m above ground in Area 2b and less than a height of 15 m above ground in Area 2c.

g) For aerodromes regularly used by international civil aviation, the obstacle data should be provided for Area 3 for obstacles that penetrate the relevant obstacle data collection surface extending a half-metre (0.5 m) above the horizontal plane passing through the nearest point on the aerodrome movement area.

h) For aerodromes regularly used by international civil aviation, the obstacle data shall be provided for Area 4 for all runways where precision approach Category II or III operations have been established.

i) AIS provider should make arrangements for the coordination of providing obstacle data for adjacent aerodromes where their respective coverage areas overlap to assure that the data for the same obstacle are correct.

j) For those aerodromes located near territorial boundaries, AIS provider should make arrangements with States concerned to share obstacle data.

Note 1. - Figure 2, contains graphical illustrations of obstacle data collection surfaces - Area 1 and Area 2.

Note 2. - Figure 3, contains graphical illustrations of terrain and obstacle data collection surfaces - Area 3.

Note 3. - Figure 4, contains graphical illustrations of terrain and obstacle data collection surfaces - Area 4.

14.9.6 Aerodrome mapping data sets

14.9.6.1 Aerodrome mapping data sets shall contain the digital representation of aerodrome features.

14.9.6.2 Aerodrome mapping data sets shall be available for aerodromes regularly used by international civil aviation.

14.9.7 Instrument flight procedure data sets

14.9.7.1 Instrument flight procedure data sets shall contain the digital representation of instrument flight procedures.

14.9.7.2 Instrument flight procedures data sets should be made available for aerodromes that has Instrument flight procedure published in AIP.

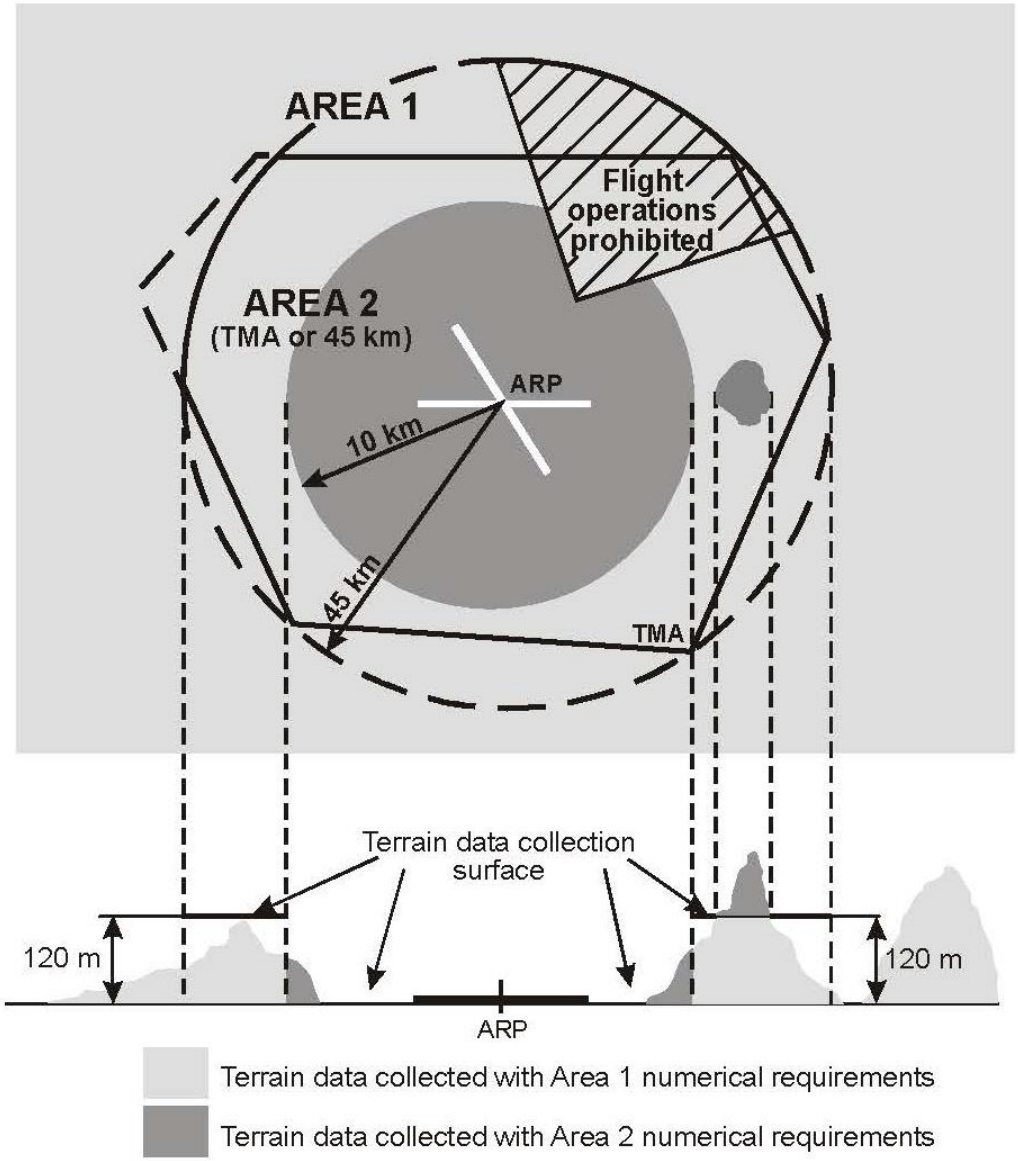

Figure 1: Terrain data collection surfaces - Area 1 and Area 2

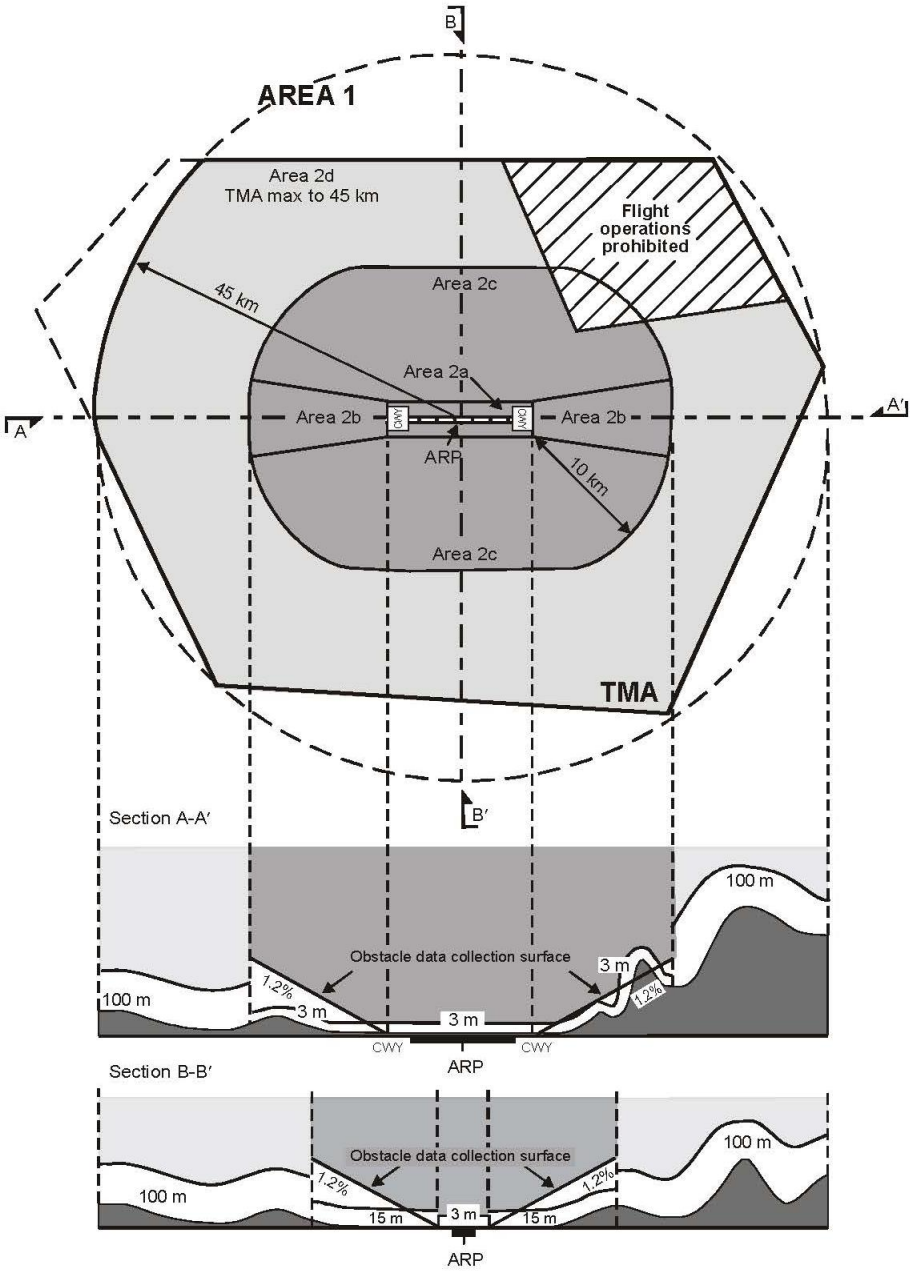

Figure 2: Obstacle data collection surfaces - Area 1 and Area 2

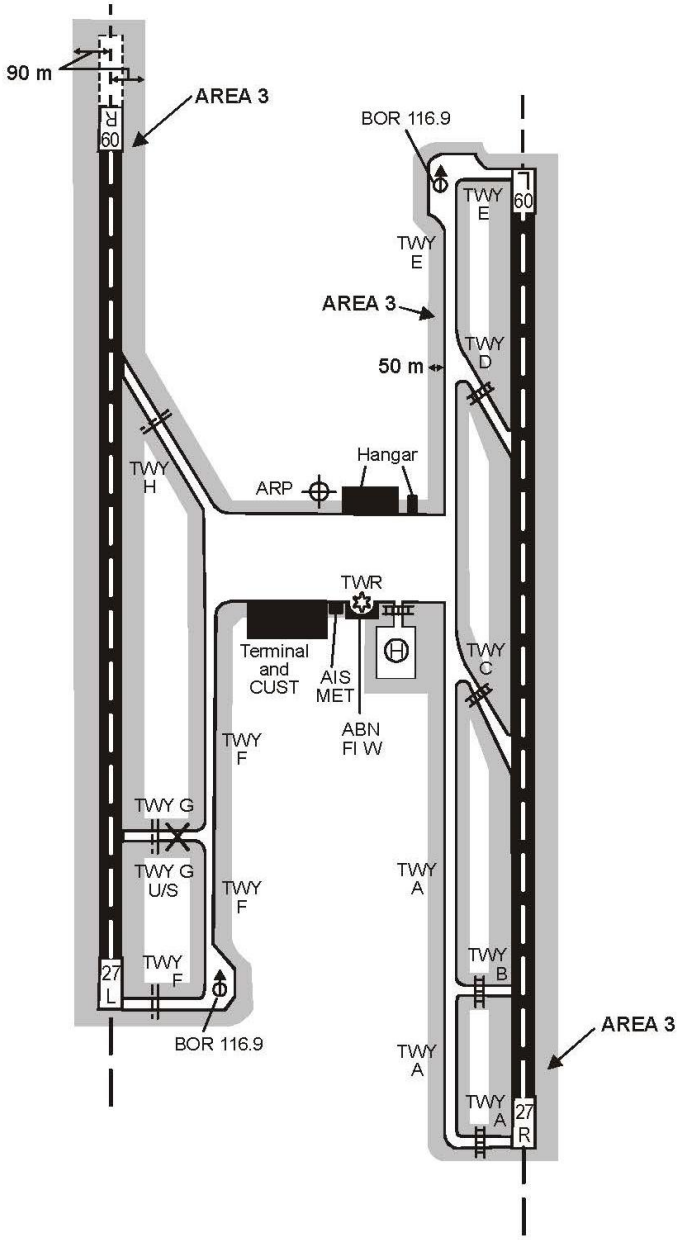

Figure 3: Terrain and Obstacle data collection surfaces - Area 3

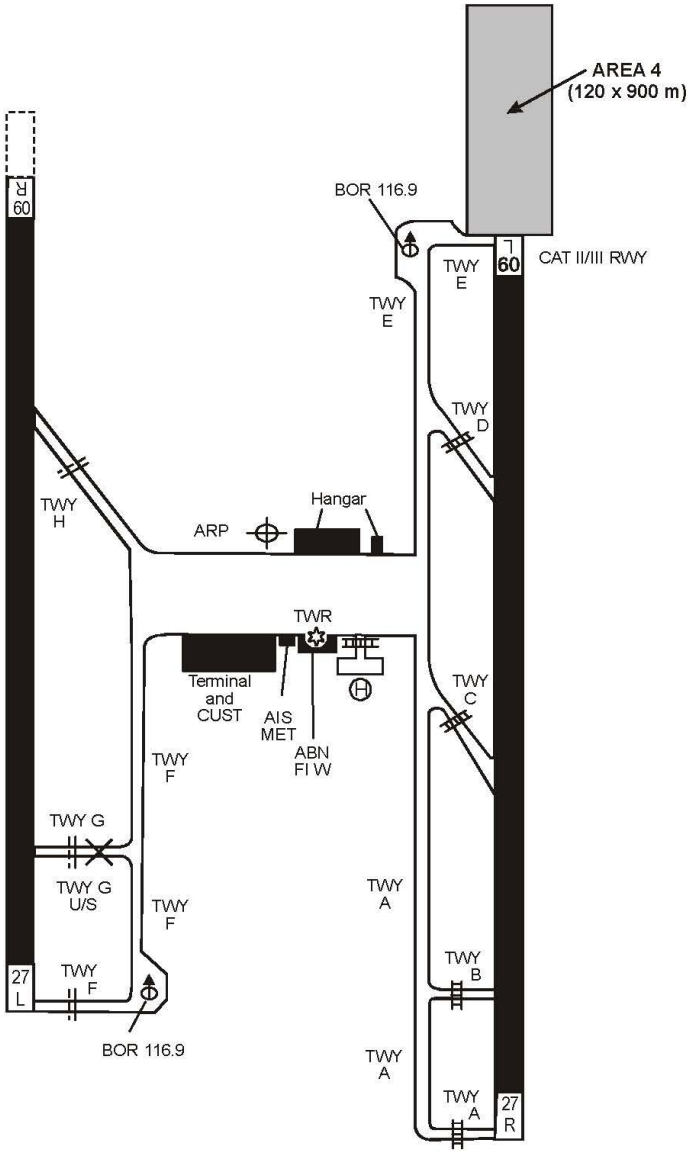

Figure 4: Terrain and Obstacle data collection surfaces - Area 4

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Chapter 15 Standards for Distribution Services

15.1 General

15.1.1 Aeronautical information products shall be distributed to authorized users who request them

15.1.2 AIP, AIP Amendments, AIP Supplements and AIC shall be made available by the most expeditious means.

15.1.3 Global communication networks and Web services should, whenever practicable, be employed for the provision of Aeronautical Information Products.

15.2 NOTAM Distribution

15.2.1 NOTAM shall be prepared in conformity with the relevant provisions of the ICAO communication procedure.

15.2.2 The Aeronautical Fixed Service (AFS) shall, whenever practicable, be employed for NOTAM distribution.

15.2.3 When a NOTAM is sent by means other than the AFS, a six-digit date-time group indicating the date and time of NOTAM origination, and the identification of the originator shall be used, preceding the text. The originating State shall select the NOTAM that are to be given international distribution

15.2.4 The AIS provider shall ensure that a monthly printed plain language list of valid NOTAM, including indications of the latest AIP Amendments, AIC issued and a checklist of AIP Supplements is prepared with a minimum of delay and forwarded by the most expeditious means to recipients of the Aeronautical Information Products

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Chapter 16 Pre and Post Flight Information Service

16.1 Pre-Flight Information Service

16.1.1 The AIS provider shall be made available to flight operations personnel, including flight crews and services responsible for pre-flight information for any aerodrome/heliport used for international air operations, aeronautical information relative to the route stages originating at the aerodrome/heliport.

16.1.2 The aeronautical information provided under 16.1.1 must include, where applicable:

a) relevant elements of the Aeronautical Information Products

b) a summary of valid NOTAM of operational significance and other information of an urgent character, in the form of plain-language pre-flight information bulletins (PIB);

c) relevant maps and charts;

d) current information relating to the aerodrome of departure concerning any of the following:

i. construction or maintenance work on or immediately next to the manoeuvring area:

ii. rough portions of any part of the manoeuvring area, whether marked or not, including broken parts of the surface of runways and taxiways:

iii. presence and depth of snow, ice, or water on runways and taxiways, including their effect on surface friction:

iv. snow, drifted or piled on or next to runways or taxiways:

v. parked aircraft or other objects on or immediately next to taxiways:

vi. the presence of other temporary hazards including those created by birds:

vii. failure or irregular operation of part or all of the aerodrome lighting system including approach, threshold, runway, taxiway, and obstruction lights, and manoeuvring area unserviceability lights, and aerodrome power supply:

viii. failure, irregular operation or changes in the operational status of air navigation facilities including ILS and markers, PSR, SSR, VOR, NDB, VHF aeromobile channels, RVR observing system, and secondary power supply.

16.1.3 Automated Pre-flight Information System

The AIS provider shall ensure that the automated pre-flight information system for the supply of aeronautical data and aeronautical information for self- briefing, flight planning and flight information service:

a) provide for continuous and timely updating of the system database and monitoring of the validity and quality of the aeronautical data stored;

b) permit access to the system by operations personnel, including flight crew members, aeronautical personnel concerned and other aeronautical users through suitable telecommunications means;

c) ensure provision, in paper copy form, of the aeronautical data and aeronautical information accessed, as required;

d) use access and interrogation procedures based on abbreviated plain language and ICAO location indicators, as appropriate; and

e) provide rapid response to a user request for information

16.2 Post-flight information Service

16.2.1 The AIS provider shall ensure that arrangements shall be made to receive at Thailand's aerodromes, information concerning the state and operation of air navigation facilities and the presence of birds noted by aircrews and shall ensure that such information is made available for such distribution as the circumstances necessitate.

16.2.2 The AIS provider shall ensure that any aerodrome/heliport used for international air operations, arrangements shall be made to receive information concerning the state and operation of air navigation facilities, services noted and the presence of wildlife hazard observed by aircrews.

16.2.3 The information about presence of wildlife hazard shall be made available to the aeronautical information service for distribution as the circumstances necessitate.

Chapter 17 Standards for Aeronautical Information Updates

17.1 General

The AIS provider shall ensure that aeronautical data and aeronautical information shall be kept up to date in accordance with Annex 15 and PANS-AIM.

17.2 Aeronautical Information Regulation and Control (AIRAC)

17.2.1 The AIS provider shall publish under the AIRAC system the establishment, withdrawal of, and premeditated significant changes (including operational trials) to aeronautical information stipulated under Annex 15. Guidance material on the procedures applicable to the AIRAC system is found in ICAO Doc 8126.

17.2.2 The information notified under the AIRAC system shall not be changed further for at least another 28 days after the effective date, unless the circumstance notified is of a temporary nature and would not persist for the full period.

17.2.3 The information under the AIRAC system shall be distributed at least 42 days in advance of the effective date with the objective of reaching recipients at least 28 days in advance of the effective date. The information published shall not be changed further for at least another 28 days after the effective date, unless the circumstance notified is of a temporary nature and would not persist for the full period.

17.2.4 Whenever major changes are planned and where advance notice is desirable and practicable, Aeronautical information in accordance as specified in Annex 15 shall be made available by the AIS provider so as to reach recipients at least 56 days in advance of the AIRAC effective date.

17.2.5 The AIS provider shall publish, on a yearly basis, an AIC listing the AIRAC effective dates, publication dates and latest dates on which the raw data must reach AIS.

17.2.6 AIRAC effective dates shall be used for implementation date of pre- planned operationally significant changes requiring cartographic work and/or for updating of navigation databases.

17.2.7 However, the provider may contravene AIRAC adherence if the contravention is necessary in the interests of aviation safety

17.2.8 If the provider contravenes AIRAC adherence, the provider must give CAAT written notice of the contravention as soon as practicable after the contravention occurs.

17.3 AIP updates

17.3.1 AIP shall be amended or reissued at such regular intervals as may be necessary to keep them up to date.

17.3.2 Permanent changes to the AIP shall be published as AIP Amendments.

17.3.3 Temporary changes of long duration (more than three months) and information of short duration which contains extensive text and/or graphics shall be published as AIP Supplements.

17.4 NOTAM

17.4.1 When an AIP Amendment or an AIP Supplement is published in accordance with AIRAC procedures, a "Trigger" NOTAM shall be originated.

17.4.2 A NOTAM shall be originated and issued promptly whenever the information to be distributed is of a temporary nature and of short duration (three months or lower) or when operationally significant permanent changes, or temporary changes of long duration are made at short notice, except for extensive text and/or graphics.

17.4.3 A NOTAM shall be originated and issued concerning the information mentioned in Annex 15.

17.5 Data set updates

17.5.1 Data sets shall be amended or reissued at such regular intervals as may be necessary to keep them up to date but not more than five years.

17.5.2 Permanent changes and temporary changes of long duration (more than three months) made available as digital data shall be issued in the form of a complete data set or a sub-set that includes only the differences from the previously issued complete data set.

17.5.3 Updates to AIP, AIP data sets and Instrument Flight Procedures data sets shall be synchronised.