



ICAO

Doc 9991

Manual on Aeronautical Information Services Training

First Edition, 2023



Approved by and published under the authority of the Secretary General

INTERNATIONAL CIVIL AVIATION ORGANIZATION



| ICAO

Doc 9991

Manual on Aeronautical Information Services Training

First Edition, 2023

Approved by and published under the authority of the Secretary General

INTERNATIONAL CIVIL AVIATION ORGANIZATION

Published in separate English, Arabic, Chinese, French, Russian
and Spanish editions by the
INTERNATIONAL CIVIL AVIATION ORGANIZATION
999 Robert-Bourassa Boulevard, Montréal, Quebec, Canada H3C 5H7

For ordering information and for a complete listing of sales agents
and booksellers, please go to the ICAO website at www.icao.int

First Edition, 2023

Doc 9991, *Manual on Aeronautical Information Services Training*

Order Number: 9991

ISBN 978-92-9265-994-3 (print version)

© ICAO 2023

All rights reserved. No part of this publication may be reproduced, stored in a
retrieval system or transmitted in any form or by any means, without prior
permission in writing from the International Civil Aviation Organization.

FOREWORD

This manual is aimed at individuals and organizations involved in the planning, design, delivery or evaluation of aeronautical information services (AIS) training, or converting established training programmes to a competency-based approach.

This manual contains:

- a) a step-by-step process for analysing local training needs and designing an adapted competency-based training and assessment (CBTA) model that is based on the ICAO competency framework for AIS technical personnel;
- b) the competency-based elements that are fundamental to the development, conduct and evaluation of AIS training; and
- c) the issues and elements that are specific to each training phase.

This manual does not prescribe a “one-size-fits-all” training programme. Instead, its purpose is to describe how the aeronautical information services providers (AISPs) can use the ICAO competency framework to establish an adapted competency model that is appropriate for regulatory, operational, technical and organizational environments of an AIS. The ICAO competency framework is defined in the *Procedures for Air Navigation Services – Training* (PANS-TRG, Doc 9868).

This manual provides AISPs with guidance on how to identify the competencies necessary for their environment and how to design the training and assessment needed for various AIS training phases. It contains guidance on generic instructional systems design, instructional techniques and guidance on administrative policies and procedures for training programmes. Organizations should ensure that their training programmes are aligned with the technical elements included in the guidance material. This will enable AIS technical personnel to effectively perform the functions required for the provision of aeronautical information services and products.

In addition to the material created as a result of the processes in this manual, organizations can develop and utilize a training procedures manual that describes the administrative procedures relating to:

- a) personnel authorized to conduct assessments of required qualifications;
- b) roles and responsibilities of personnel during the conduct of assessments;
- c) assessment procedures (preparation, conduct and post-assessment);
- d) conditions under which assessments are to take place;
- e) record-keeping; and
- f) actions to be taken when a trainee fails to meet the requirements of the assessment.

Comments on this manual are appreciated, particularly with respect to its application and usefulness. These comments will be taken into consideration in the preparation of subsequent editions. Comments concerning the manual should be addressed to:

The Secretary General
International Civil Aviation Organization
999 Robert-Bourassa Boulevard
Montréal, Quebec, Canada H3C 5H7

CONTENTS

	<i>Page</i>
Glossary	ix
Abbreviations and acronyms	xi
Reference documents	xiii
Chapter 1. Introduction	1-1
1.1 Prerequisites for establishing a competency-based training and assessment programme.....	1-1
1.2 Benefits of a competency-based training and assessment programme	1-1
1.3 General provisions for competency-based training and assessment	1-2
1.4 Competency	1-2
1.5 Organization of aeronautical information services training	1-3
1.6 Phases of aeronautical information services training	1-4
1.7 ICAO competency framework.....	1-4
1.8 The instructional system design model	1-5
1.9 Overview of competency-based training and assessment workflows.....	1-5
Chapter 2. Developing competency-based training	2-1
2.1 Overview	2-1
2.2 Adapting the ICAO competency framework to aeronautical information services	2-1
2.3 Understanding the regulatory context of aeronautical information services training.....	2-1
2.4 Understanding the safety context of aeronautical information services training.....	2-2
2.5 Understanding the performance components of aeronautical information services competencies	2-2
Chapter 3. Design of aeronautical information services competency-based training and assessment	3-1
3.1 General	3-1
3.2 Workflow 1: Analyse the training need	3-1
3.3 Workflow 2: Design competency-based training and assessment	3-5
3.4 Workflow 2 – Part 1: Design adapted competency model	3-6
3.5 Workflow 2 – Part 2: Design training and assessment plans	3-11
3.6 Workflow 3: Develop the training and assessment materials.....	3-19
3.7 Workflow 4: Conduct the course.....	3-20
3.8 Workflow 5: Evaluate the course	3-21
Chapter 4. Aeronautical information services training phases	4-1
4.1 General	4-1
4.2 Initial training	4-1
4.3 Functional training.....	4-2

	<i>Page</i>
4.4 Specialized training.....	4-3
4.5 Refresher training	4-3
Appendix A. Example training specification.....	App A-1
Appendix B. Example aeronautical information services adapted competency model.....	App B-1
Appendix C. Example evidence guide	App C-1
Appendix D. Example competency checklist	App D-1
Appendix E. Example competency assessment form	App E-1
Appendix F. Sample Syllabus	App F-1

GLOSSARY

Adapted competency model. A group of competencies with their associated description and performance criteria adapted from an ICAO competency framework that an organization uses to develop competency-based training and assessment for a given role.

Assessment (evidence) guide. A guide that provides detailed information (e.g. tolerances) in the form of evidence that an instructor or an evaluator can use to determine whether a candidate meets the requirements of the competency standard.

Competency. A dimension of human performance that is used to reliably predict successful performance on the job. A competency is manifested and observed through behaviours that mobilize the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions.

Competency-based training and assessment. Training and assessment that are characterized by a performance orientation, emphasis on standards of performance and their measurement, and the development of training to the specified performance standards.

Competency standard. A level of performance that is defined as acceptable when assessing whether or not competency has been achieved.

Conditions. Anything that may qualify a specific environment in which performance will be demonstrated.

Error. An action or inaction by an operational person that leads to deviations from organizational or the operational person's intentions or expectations.

Note.— See Chapter 1 of Annex 19 – Safety Management for a description of operational personnel.

Human factors principles. Principles which apply to aeronautical design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

ICAO competency framework. A competency framework, developed by ICAO, is a selected group of competencies for a given aviation discipline. Each competency has an associated description and observable behaviours.

Observable behaviour (OB). A single role-related behaviour that can be observed and may or may not be measurable.

Operations manual. A manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties.

Performance criteria. Statements used to assess whether the required levels of performance have been achieved for a competency. A performance criterion consists of an observable behaviour, condition(s) and a competency standard.

Recurrent training. This method of training is part of the refresher training phase and is designed to maintain or enhance skills that AIS technical personnel may require, especially when new or changed tools and/or procedures are introduced.

Refresher training. Training designed to review and reinforce existing competencies of AIS technical personnel to provide effective aeronautical services and products.

Trainee. The term “trainee” is used throughout this manual. It is a generic term for a person performing a learning activity without any reference to the trainee’s status. Therefore, in some instances, the trainee may already be a competent AIS employee who is performing a learning activity in the context of advanced specialized or refresher training.

Training objective. A clear statement that is comprised of three parts, i.e. the desired performance or what the trainee is expected to be able to do at the end of training (or at the end of particular stages of training), the performance standard that must be attained to confirm the trainee’s level of competence, and the conditions under which the trainee will demonstrate competence.

ABBREVIATIONS AND ACRONYMS

ADDIE	Analyse, design, develop, implement and evaluate
AIM	Aeronautical information management
AIS	Aeronautical information services
AISP	Aeronautical information services providers
ANSP	Air navigation services provider
CBTA	Competency-based training and assessment
CE	Competency element
KSA	Knowledge, skills and attitudes
OB	Observable behaviour
OJT	On-the-job training (method used during functional training)
PC	Performance criteria
QMS	Quality management system
SARPs	Standards and Recommended Practices
SMS	Safety management system
SOP	Standard operating procedure
WGS-84	World Geodetic System – 1984

REFERENCE DOCUMENTS

Annex 4 – Aeronautical Charts

Annex 15 – Aeronautical Information Services

Annex 19 – Safety Management

Aeronautical Information Services Manual (Doc 8126)

Aeronautical Chart Manual (Doc 8697)

Procedures for Air Navigation Services – Training (PANS-TRG, Doc 9868)

Procedures for Air Navigation Services – Aeronautical Information Management (PANS-AIM, Doc 10066)

Chapter 1

INTRODUCTION

1.1 PREREQUISITES FOR ESTABLISHING A COMPETENCY-BASED TRAINING AND ASSESSMENT PROGRAMME

There are certain prerequisites for establishing a CBTA programme. In particular, the personnel responsible for establishing and overseeing the CBTA programme for AIS should have thorough knowledge and understanding of the following:

- a) the CBTA methodology as described in the *Procedures for Air Navigation Services – Training* (PANS-TRG, Doc 9868);
- b) the contents of this training manual; and
- c) the AIS technical and production-based environment.

1.2 BENEFITS OF A COMPETENCY-BASED TRAINING AND ASSESSMENT PROGRAMME

The key benefits to organizations that implement a CBTA programme include:

- *Expertise.* Assurance that AIS technical personnel demonstrate sufficient expertise.
- *Performance standards.* Trainees achieve a level of performance that enables them to work independently and safely.
- *Flexible use of personnel.* Allows AISPs to be flexible in the deployment of personnel across a range of duties, as many competencies can be applicable to different tasks.
- *Evidence.* A competency-based approach is founded on the identification and collection of evidence of competent performance; in turn, it supports management in monitoring the competence of technical personnel.
- *Early identification of performance gaps.* The training is designed to close identified performance gaps. When assessing performance against a competency-based model developed for a specific role, it allows trainers to identify individual performance gaps. Subsequently, the training can be adapted to meet the trainee's individual needs.
- *Development of effective recruitment and selection tools.* With defined competencies required for a job, recruitment can be tailored to select individuals who possess the desired knowledge, skills and attitudes (KSA).

1.3 GENERAL PROVISIONS FOR COMPETENCY-BASED TRAINING AND ASSESSMENT

As part of an organization's quality management system (QMS), AIS technical personnel are required to be competent in the tasks they perform. The goal of CBTA is to provide a competent workforce for the provision of quality aeronautical information products and services. To focus training and assessment on how AIS technical personnel are expected to competently perform on the job, a description of this performance in the operational context is needed. Clear performance criteria are identified and assessed in an organizational competency framework to ensure consistency. The adapted competency model, with defined performance criteria, provides a means of assessing whether trainees achieve the desired performance. The AIS trainee, instructor, training organization and regulator must share a common understanding of the competency requirements of individual roles and responsibilities. Competency requirements must be identified and documented. Processes (that is, training, assessment plans, etc.) must be established and followed to ensure all AIS technical personnel are properly trained and assessed to perform their assigned functions. Using an adapted competency model with selected competencies, pre-defined observable behaviours, conditions and standards will ensure that these requirements are met.

1.4 COMPETENCY

1.4.1 Overview

1.4.1.1 Competency is a consistent dimension of human performance that is used to reliably predict successful performance on the job. Competency is manifested and observed through behaviours that mobilize the relevant KSA to carry out activities or tasks under specified conditions, as shown in Figure 1-1. A person successfully achieves a competency if its associated standard is met. Competencies allow people to formulate solutions for complex and difficult situations, including situations that are experienced for the first time.

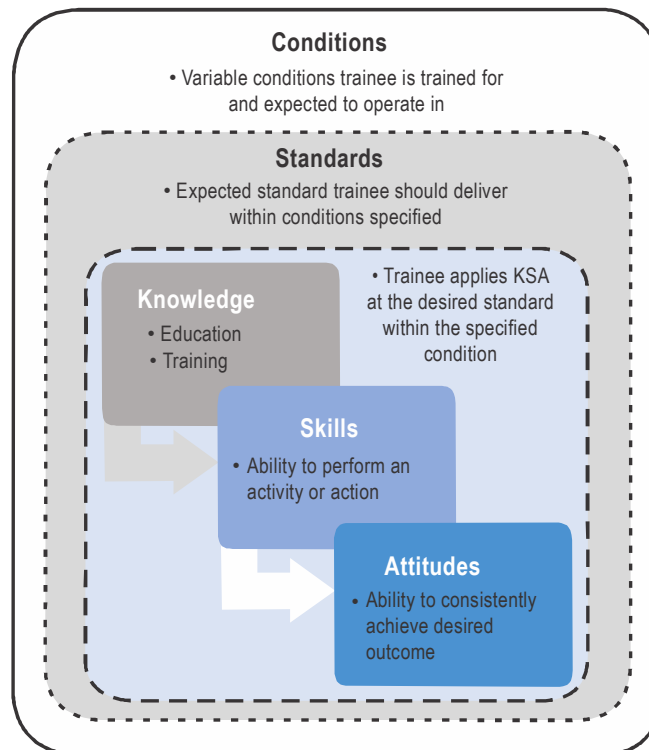


Figure 1-1. Knowledge, skills and attitudes demonstrating competence

1.4.1.2 Competence can only be observed through performance. However, it is not possible to directly observe all the different behaviours which contribute to competence, especially the cognitive skills; instead, they are inferred from observations of the trainee performing the tasks. After repeatedly observing the trainee consistently achieving a desired outcome, it is reasonable for the assessor to assume that the competencies have been acquired.

1.4.2 Knowledge

Knowledge is specific information that is required for trainees to develop and apply the skills and attitudes to recall facts, identify concepts, apply rules or principles, solve problems and think creatively in the context of work. Knowledge is an outcome of the learning process. There are different types of knowledge: declarative (facts, raw data); procedural (categorized/contextualized, application of conditional if-then rules); strategic (synthesis, inference to guide resource allocation for decision-making, problem-solving, behavioural action) and adaptive (generalization, innovation, invention).

1.4.3 Skill

Skill is the ability to perform an activity or action. There are three different types of skills: motor, cognitive and metacognitive skills. A motor skill is an intentional movement involving a motor or muscular component that must be learned and voluntarily produced to proficiently perform a goal-oriented task. A cognitive skill is any mental skill that is used in the process of acquiring knowledge. These skills include reasoning, perception and intuition. A metacognitive skill relates to the ability of trainees to monitor and direct their own learning processes (sometimes described as “thinking about thinking”). For example, planning how to approach a given learning task, monitoring comprehension, and evaluating progress towards the completion of a task are metacognitive skills. Skills are developed over time and with practice. Oftentimes, new and complex tasks are initially seen as cognitively demanding; however, when they are practiced more frequently, these cognitive processes become automatized and the skill requires less effort to perform.

1.4.4 Attitude

Attitude is a persisting internal mental state or disposition that can be learned and that influences an individual's choice of personal action towards an object, person, or event. Attitudes have affective components, cognitive aspects and behavioural consequences. To demonstrate the “right” attitude, a trainee needs to know how to behave in a given context.

1.5 ORGANIZATION OF AERONAUTICAL INFORMATION SERVICES TRAINING

The purpose of AIS training is the acquisition and maintenance of the competencies required to perform functions associated with the AIS. It includes the following situations:

- a) new personnel is appointed;
- b) current personnel is moving to a different job function;
- c) current personnel needs to acquire additional skills to perform additional functions;
- d) to advance towards specialized functions; and
- e) as a result of system upgrades or changes to procedures.

1.6 PHASES OF AERONAUTICAL INFORMATION SERVICES TRAINING

1.6.1 AIS training is described in this manual as a sequence of phases, namely initial, functional, specialized and refresher training, as shown in Figure 1-2.

1.6.2 The CBTA methodology should be applied for the development of all AIS training phases. The training phases and examples of curriculum design and delivery of each phase is presented in Chapter 4.



Figure 1-2. The phases of AIS training

1.7 ICAO COMPETENCY FRAMEWORK

1.7.1 The ICAO competency framework as described in the *Procedures for Air Navigation Services – Training* (PANS-TRG, Doc 9868) comprises the competencies, their definitions and observable behaviours used to develop an adapted competency model that is domain-specific and appropriate for the situation to which it applies.

1.7.2 A competency model is adapted to each specific domain and used to design the training and assessment programme necessary to acquire the defined competencies.

1.7.3 The ICAO competency framework is a generic, high-level structure that has been designed to apply to multiple aviation domains and during any phase of training and assessment.

Note.— The generic ICAO competency framework is defined in the Procedures for Air Navigation Services – Training (PANS-TRG, Doc 9868) and the AIS adapted competency model is described in more detail in this manual.

1.8 THE INSTRUCTIONAL SYSTEM DESIGN MODEL

1.8.1 The instructional system design model is based on five principles, also known as ADDIE, namely:

- Analyse
- Design
- Develop
- Implement
- Evaluate

1.8.2 While the competency-based framework is based on the ADDIE model, it is recognized that there are other models that are available for the design of CBTA.

1.9 OVERVIEW OF COMPETENCY-BASED TRAINING AND ASSESSMENT WORKFLOWS

1.9.1 The description of the instructional systems design model has been adapted to fit the AIS environment. The ADDIE workflow is shown in Figure 1-3.

1.9.2 Workflow 1, *analyse* (training need) establishes the training specification and includes all the tasks, functions and requirements of the planned training.

1.9.3 Workflow 2, *design* (competency-based training and assessment) is divided in two parts: Part 1 establishes the adapted competency model, and Part 2 delivers the training and assessment plans that will be used to develop and conduct the training course.

1.9.4 Workflow 3, *develop* (training and assessment material) and Workflow 4, *implement* (conduct the course) enable the training developer to create training material that can be used during the training programme.

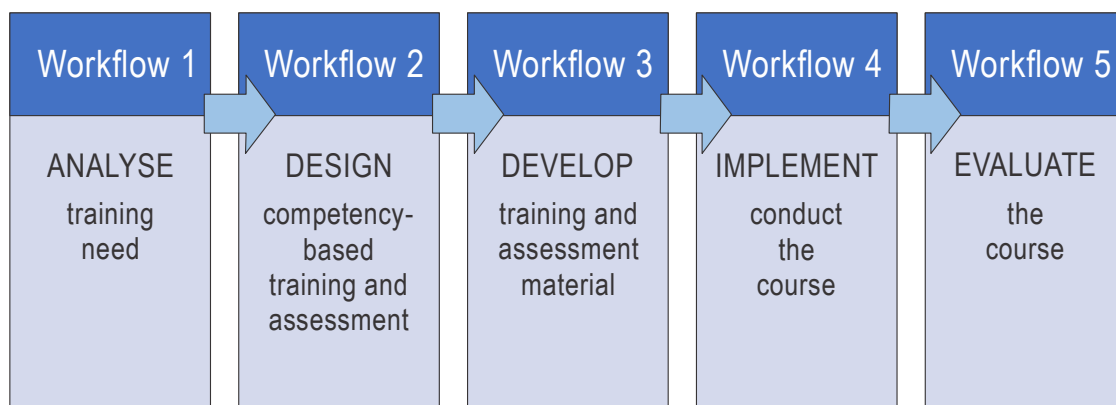


Figure 1-3. Overview of CBTA workflows

1.9.5 Finally, Workflow 5, *evaluate* (evaluate the course) reviews the effectiveness of the training and assessment conducted and recommends improvements, as appropriate.

1.9.6 A detailed description of the workflows is available in Chapter 3.

Chapter 2

DEVELOPING COMPETENCY-BASED TRAINING

2.1 OVERVIEW

2.1.1 In line with States' requirements, the AISP must ensure that job descriptions, training programmes, training plans and training records are developed, maintained and continuously improved based on the ICAO competency framework.

2.1.2 CBTA makes use of a systematic approach whereby the competencies and performance criteria are defined. The training programme is based on identified tasks, and a process for assessment is developed to ensure the identified competencies have been achieved. In particular, the performance criteria are established by the AISP since the competency standards are context-dependent per function.

2.1.3 The CBTA methodology is applied to all phases of training and supported by classroom events and performance reviews. Observations and periodic assessments should be conducted to ensure competencies are obtained and maintained. There may be instances when additional training is required, such as training for new system software, new tasks or functions, or training required after a prolonged absence.

2.2 ADAPTING THE ICAO COMPETENCY FRAMEWORK TO AERONAUTICAL INFORMATION SERVICES

The development of an adapted competency model and associated training and assessment must consider the regulatory, operational, technical and organizational environment, including safety context and performance components, applicable to the specific domain. The ICAO competency framework contains generic competencies that can be applied throughout various operational domains.

2.3 UNDERSTANDING THE REGULATORY CONTEXT OF AERONAUTICAL INFORMATION SERVICES TRAINING

2.3.1 It is important to understand that competency-based AIS training needs to align with regulatory requirements for AIS. The State is responsible for the integrity of the aeronautical data and aeronautical information and needs to ensure the AISP can prove AIS technical personnel are demonstrating safe behaviours. States' safety oversight are increasingly determining compliance based on employee interviews, incident logs and observations, rather than relying on training attendance records.

2.3.2 Processes to ensure personnel are properly trained should be within the context of the established QMS as required by Annex 15 – *Aeronautical Information Services*.

2.4 UNDERSTANDING THE SAFETY CONTEXT OF AERONAUTICAL INFORMATION SERVICES TRAINING

2.4.1 Given the increased reliance of the air navigation system on digital data supplied by an AISP, safety considerations are of paramount importance. Corrupt, erroneous, late or missing aeronautical data and aeronautical information can potentially affect the safety of air navigation.

2.4.2 As part of the overall safety performance, the AISP should provide the highest level of safety assurance. Personnel who perform the functions of the AIS must have the required KSA to support the organization's safety responsibilities. The implementation and management of a training programme is therefore an essential part of the AISP environment to ensure personnel understand their role in overall aviation safety.

2.4.3 Identifying the required AIS competencies and developing corresponding training is an ongoing process based on evaluations and State regulations.

2.4.4 Organizations using automated systems in the provision of aeronautical information products and services must train personnel with the required technical skills and abilities to perform all functions and monitor accuracy of outputs.

2.5 UNDERSTANDING THE PERFORMANCE COMPONENTS OF AERONAUTICAL INFORMATION SERVICES COMPETENCIES

Each competency of the AIS competency framework comprises behavioural performance components referred to as experience, behavioural attributes, knowledge (technical and application-based), skills and attitudes.

Chapter 3

DESIGN OF AERONAUTICAL INFORMATION SERVICES COMPETENCY-BASED TRAINING AND ASSESSMENT

3.1 GENERAL

This chapter provides guidance and examples for organizations intending to establish CBTA that is specific to their environment and requirements. It makes use of the ICAO competency framework and the ADDIE (analyse, design, develop, implement and evaluate) instructional design model methodology.

Note.— Since the workflows are interrelated, the output from one workflow becomes the input to the next workflow.

3.2 WORKFLOW 1: ANALYSE THE TRAINING NEED

3.2.1 Purpose

3.2.1.1 The purpose of Workflow 1 (analyse training need) is to establish a training specification that will be used in subsequent workflows, as seen in Figure 3-1.

3.2.1.2 The need to develop training may be triggered by various scenarios; however, the training designer typically receives a request detailing the nature of and the reason for the training. This request may include competency requirements under regulatory requirements.

3.2.1.3 The first step in the development of a CBTA programme is to conduct a training needs analysis. The training needs analysis identifies any operational, regulatory, technical and organizational requirements that will affect any training course being planned. The purpose of the training must be determined and should specifically include the associated tasks.

3.2.2 Training specification

3.2.2.1 A training specification does not cover the progression of training, but describes the end state to be achieved; it contains the outcome from the training needs analysis. Appendix A provides an example of a completed training specification for an AIS function. A separate training specification is needed for each function within an AIS training programme.

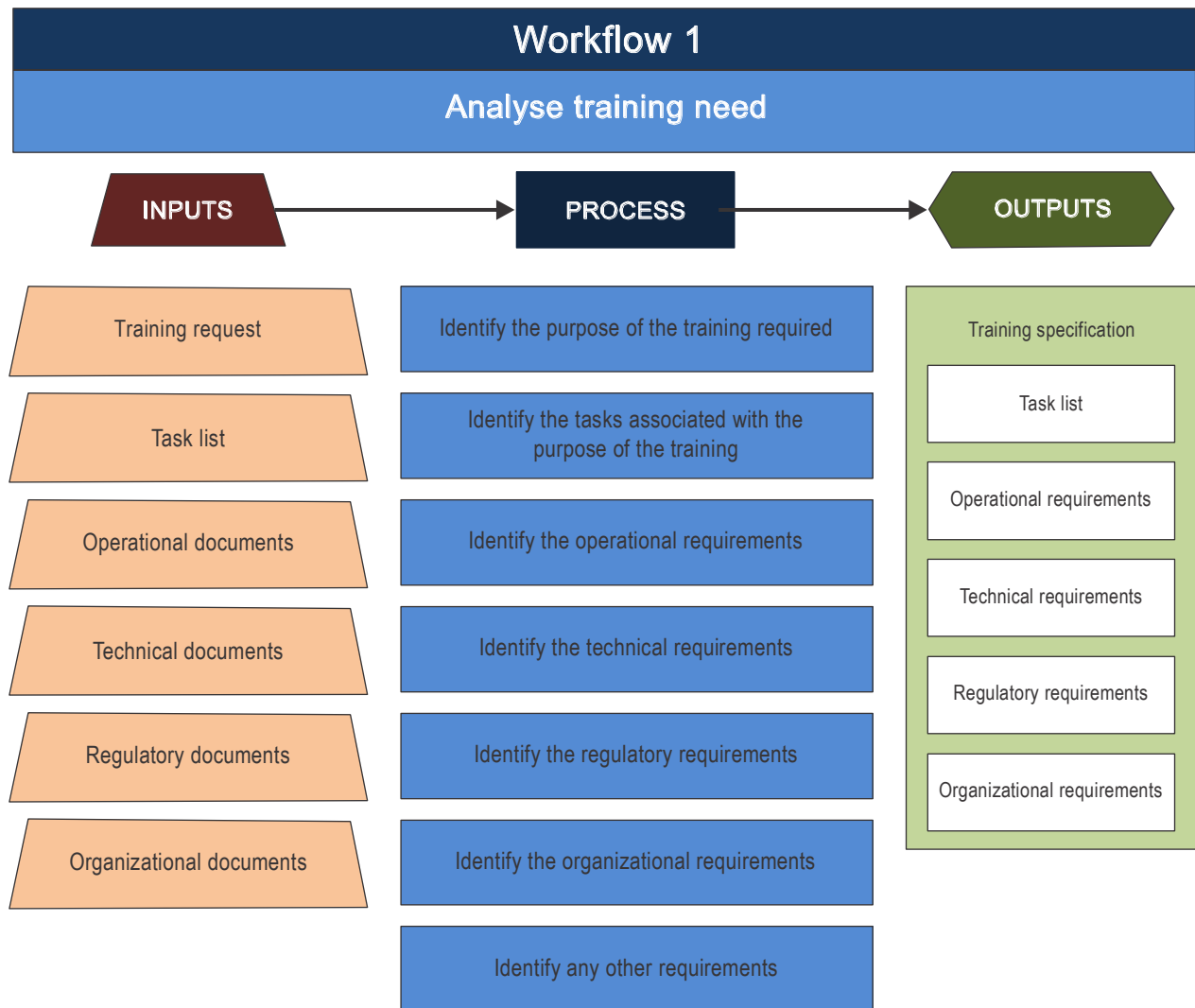


Figure 3-1. Workflow 1 – Analyse the training need

3.2.2.2 Table 3-1 contains a template explaining the features of a training specification.

Table 3-1. Features of a training specification

<i>Purpose</i>	
Describe the purpose of the training.	Capture the reason for the training.
State the phase(s) of training.	Initial, functional, specialized, refresher training.
Describe what certification, if any, the trainee will achieve on successful completion of the training.	Name an organization's certification programme, as applicable.
<i>Tasks</i>	
Describe the tasks associated with the purpose of the training.	Include a list of tasks that the trainee is being trained for.
<i>Operational requirements</i>	
Describe the procedures to be applied.	Document the standard operating procedures to be used during training.
Describe the operational environment required to successfully achieve the purpose of the training.	Specify the operational environment that the training will take place in. This may be a simulated or production environment.
Describe the nature of the work to achieve the training outcome.	Detail the type of work to be undertaken during training.
Describe non-routine situations that are necessary for successfully completing the training.	Document non-routine situations.
Describe the working configuration.	Trainee performs aeronautical data origination to data collation functions.
<i>Technical requirements</i>	
List any specific operational (or simulated operation) systems and/or equipment that are necessary to achieve the training outcome.	Record the equipment and systems that will be used during training.
<i>Regulatory requirements</i>	
Describe the rules, regulations, standards and guidance material that are applicable.	Capture the national regulations and standards applicable to the tasks.
Describe any regulatory requirements that will affect aspects of the training, including: a) duration;	Document any constraints implemented by national regulations, for example, the minimum hours of supervised work to be completed before trainees can operate in the production environment.

b) content; c) assessment procedures; d) course approval; and e) any others, if applicable.	
<i>Organizational requirements</i>	
Describe any organizational requirements that may affect the training.	Include any additional strategic objectives as defined in the organizational business plan to be met, for example turn-around times or customer satisfaction.
<i>Other requirements</i>	
Indicate other constraints.	Other requirements not already addressed can be captured in this section, for example safety or quality objectives to be met or multi-language data processing.
<i>Simulation requirements</i>	
Simulation requirements that are necessary to achieve the training outcome, if any.	Indicate any training environments that will be used for simulated scenarios.

3.3 WORKFLOW 2: DESIGN COMPETENCY-BASED TRAINING AND ASSESSMENT

3.3.1 Workflow 2 (design competency-based training and assessment) is divided into two parts; Part 1 delivers the adapted competency model, and Part 2 the training and assessment plans. The relationship between the AIS competency framework, adapted competency model, the training plan and the assessment plan is fundamental to understanding the CBTA programme.

3.3.2 Figure 3-2 defines how the outcomes from Workflow 1 and 2 are interrelated:

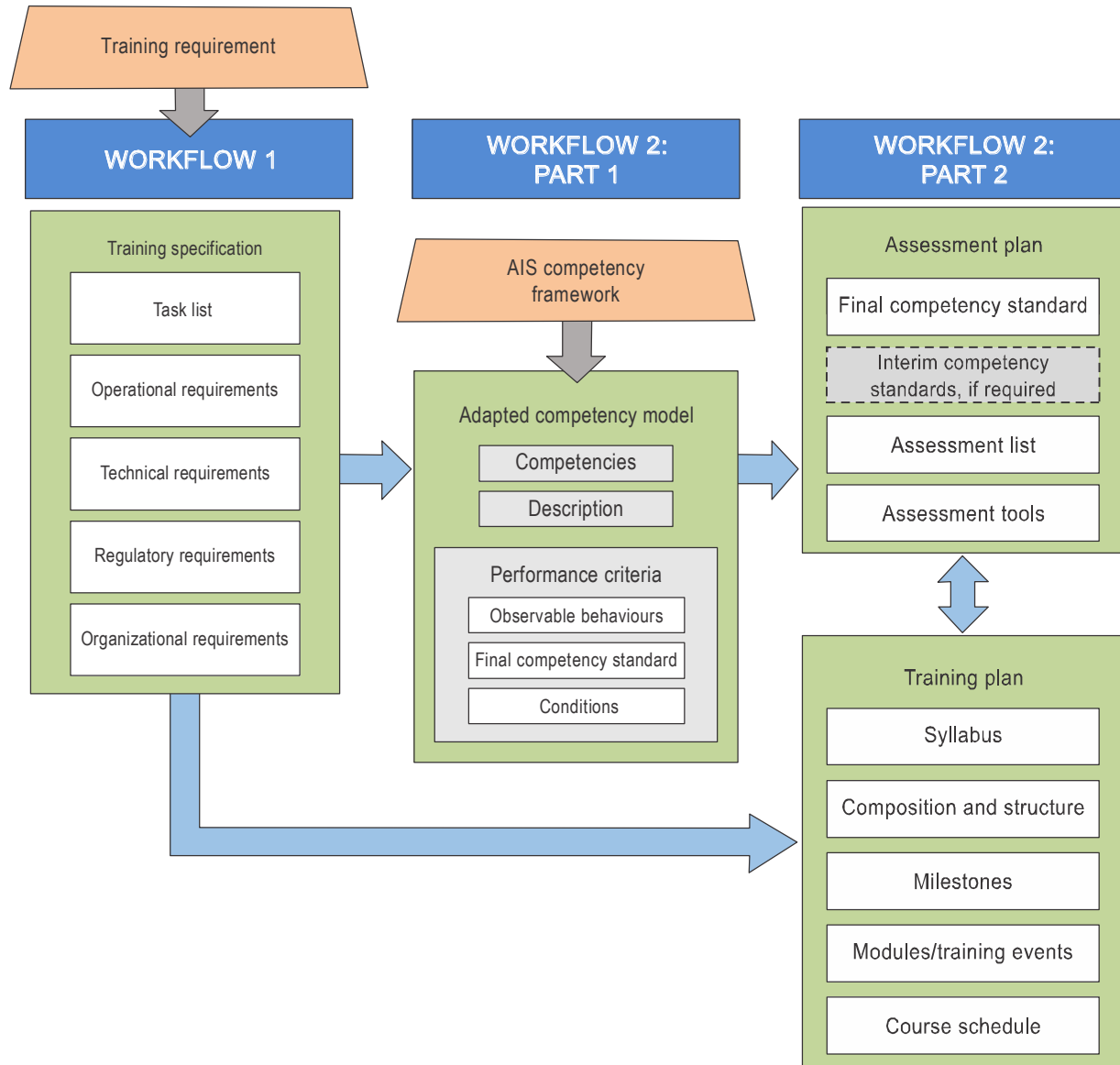


Figure 3-2. Relationship between Workflow 1 and Workflow 2

3.3.3 To design an adapted competency model, training and assessment plans suitable for an organization, the AIS competency framework is adapted to meet the AIS competency requirements, that is, suited to the tasks, roles, processes and functions performed by the AIS. The training specification serves as the common basis for the development of the adapted competency model, the training and the assessment plans.

3.3.4 Generally, when developing the adapted competency framework, the task list is used to aid with the selection of the competencies from the ICAO competency framework. The operational, technical, regulatory and organizational requirements aid the development of the conditions and standards that will apply to the competencies and observable behaviours.

3.3.5 The same task list and requirements are used to develop the training plan. This training plan is used to prepare the trainees to undertake assessment to determine if they are competent in accordance with the adapted competency model.

3.3.6 Finally, the adapted competency model and the training plan are used to develop the assessment plan.

3.4 WORKFLOW 2 – PART 1: DESIGN ADAPTED COMPETENCY MODEL

3.4.1 Purpose

3.4.1.1 The purpose of Workflow 2 – Part 1 (design competency-based training and assessment) is to establish an adapted competency model that is aligned with the training specifications identified in Workflow 1.

3.4.1.2 The workflow in Figure 3-3 below shows the stages for the creation of an adapted competency model:

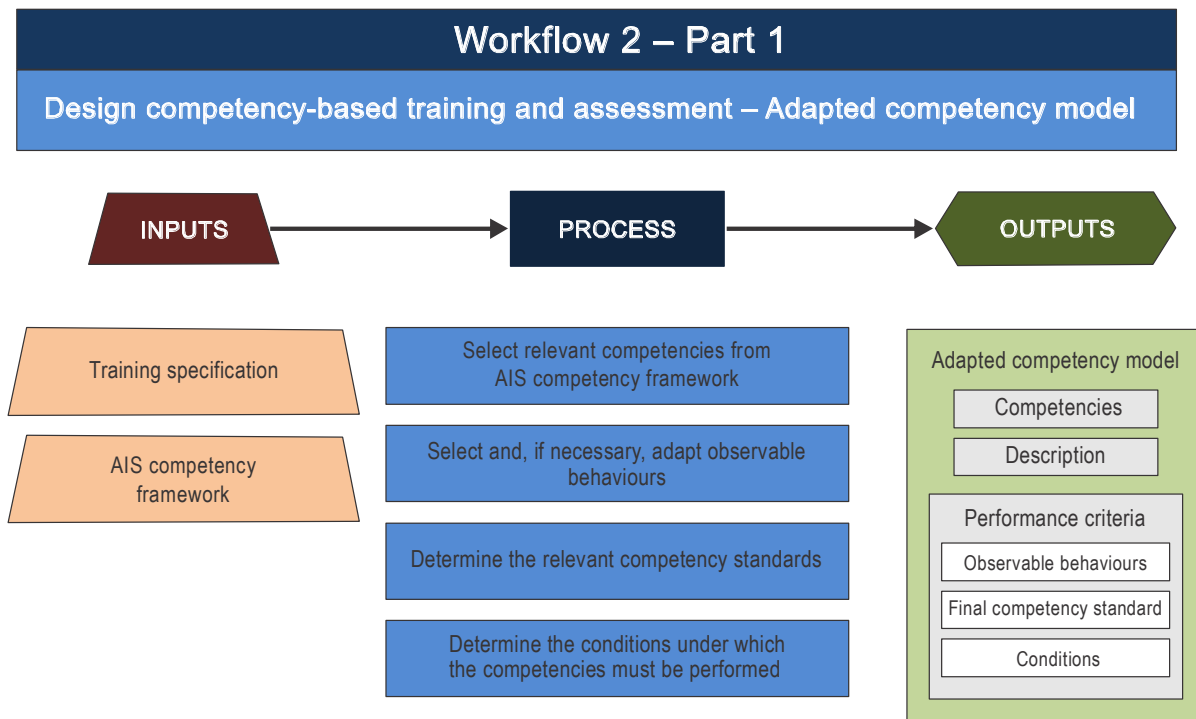


Figure 3-3. Workflow 2 – Part 1: Design adapted competency model

3.4.2 The adapted competency model

3.4.2.1 The purpose of the AIS competency framework is to provide a set of generic competencies that are deemed necessary for AIS technical personnel. The training specification is used to determine which of the generic competencies should be included in the training. It is important to understand that not all the competencies in the AIS competency framework are applicable to all functions within the AIS; therefore, the training designer will select the most appropriate competencies from the generic list of competencies.

3.4.2.2 The combination of observable behaviours, standards and conditions are used to judge whether the required training performance has been achieved.

3.4.2.3 Table 3-2 illustrates the structure of an adapted competency model, including the performance criteria.

Table 3-2. Adapted competency model

Competency	Description	Performance criteria				
		Observable behaviour (OB)	Competency assessment			
			Final competency standard	Conditions		
Competency 1	Description 1	OB 1	(Standard expected from trainee in the conditions specified to be deemed competent, the expected standard may be different for each role)	(Conditions under which the trainee is trained in, ensure alignment with the functions the trainee will perform after training, therefore the conditions may be different for each role)		
		OB 2				
		OB n				
Competency 2	Description 2	OB 1				
		OB 2				
		OB n				
Competency n	Description n	OB 1				
		OB 2				
		OB n				

3.4.3 Selection and adaptation of observable behaviours

3.4.3.1 The AIS competency framework provides a comprehensive list of observable behaviours associated with each of the competencies. The observable behaviours that are appropriate in the local environment should be selected and, if necessary, adapted.

3.4.3.2 Training designers have the option to add, change or remove observable behaviours from the AIS competency framework, provided that a clear and justifiable reason is documented.

3.4.3.3 An example of an observable behaviour needing adaptation (or not included in an adapted competency model) is aeronautical information management expertise, such as developing operational requirements for aeronautical information management systems.

3.4.3.4 This observable behaviour would be applicable to system administrators empowered with the decision-making capability to determine what system requirements are needed to align with regulatory requirements. Therefore, if the application of the adapted competency model is for a data manager (that is, a person receiving and managing information), the observable behaviour could be adapted to read “Provides expert input for the development of operational requirements for aeronautical information systems”.

3.4.3.5 Competencies and observable behaviours are applicable to all environments, regardless of position or level of responsibility in the AIS organization. For example, the ICAO competency “8. Self-management and continuous learning” is associated with the observable behaviour “Improves job performance through self-evaluation and training” (see Appendix B).

3.4.4 Determining competency standards and conditions

3.4.4.1 Competency standards apply to all observable behaviours and relate to compliance with the standards and procedures, rules and regulations as described in the relevant documents, such as State regulations, AIP, standard operating procedures and formal arrangements. In some instances, there may be different standards associated with a specific observable behaviour.

3.4.4.2 Conditions refer to anything that may qualify performance. In AIS, the environment and conditions relate to the State operating guidelines, the system or equipment used, whether the performance takes place in a simulated or live operational environment, and the amount of assistance a trainee can expect to receive from an instructor or assessor. The training specification, as completed in Workflow 1, may be used to identify these conditions.

3.4.4.3 During the early stages of training, trainees can expect active coaching and teaching from the instructor. However, as the trainee progresses towards the final competency standard and gains more confidence in performing independently, the instructor takes on a more passive role and may only give occasional advice on how to improve efficiency, or intervene in instances where safety may be compromised. Consequently, a condition in the adapted competency model, that is, the description of the final competency standard, indicates that the trainee would be expected to perform independently without assistance from the instructor.

3.4.4.4 The examples in Tables 3-3 and 3-4 demonstrate different types of conditions that may be considered for the final competency standard and may be different for each trainee:

- a) Trainee A being trained to manage non-complex features:

Table 3-3. Example A of a completed adapted competency model for one element

<i>Competency</i>	<i>Description</i>	<i>Performance criteria</i>		
		<i>Observable behaviour (OB)</i>	<i>Competency assessment</i>	
			<i>Final competency standard</i>	<i>Conditions</i>
Awareness	Comprehends aeronautical data and aeronautical information requirements, monitors the aeronautical data and aeronautical information process(es) and detects anomalies and potential threats that can degrade the flow and the quality of data and information and affect its use	Validates and verifies that aeronautical data is compliant with quality requirements on reception.	Tasks limited to significant points (waypoints, navigational aids). Completion of tasks 100 per cent unassisted.	Operational environment Software available under normal operating conditions. Performs independently without assistance from the instructor.

b) Trainee B being trained to manage high-complexity features:

Table 3-4. Example B of a completed adapted competency model for one element

<i>Competency</i>	<i>Description</i>	<i>Performance criteria</i>		
		<i>Observable behaviour (OB)</i>	<i>Competency assessment</i>	
			<i>Final competency standard</i>	<i>Conditions</i>
Awareness	Comprehends aeronautical data and aeronautical information requirements, monitors the aeronautical data and aeronautical information process(es) and detects anomalies and potential threats that can degrade the flow and the quality of data and information and affect its use.	Validates and verifies that aeronautical data is compliant with quality requirements on reception.	<p>All tasks to be performed.</p> <p>Significant points and geographical features (such as waypoints, navigational aids, airspaces and airways).</p> <p>Completion of tasks 100 per cent unassisted.</p>	<p>Operational environment</p> <p>Software available under normal operating conditions.</p> <p>Performs independently without assistance from the instructor.</p>

3.5 WORKFLOW 2 – PART 2: DESIGN TRAINING AND ASSESSMENT PLANS

3.5.1 Purpose

The purpose of Workflow 2 – Part 2 (design CBTA – training and assessment plans) is to establish the training and assessment plans that will be used to deliver the training and assess the competence of trainees. Figure 3-4 may be used to aid the design process:

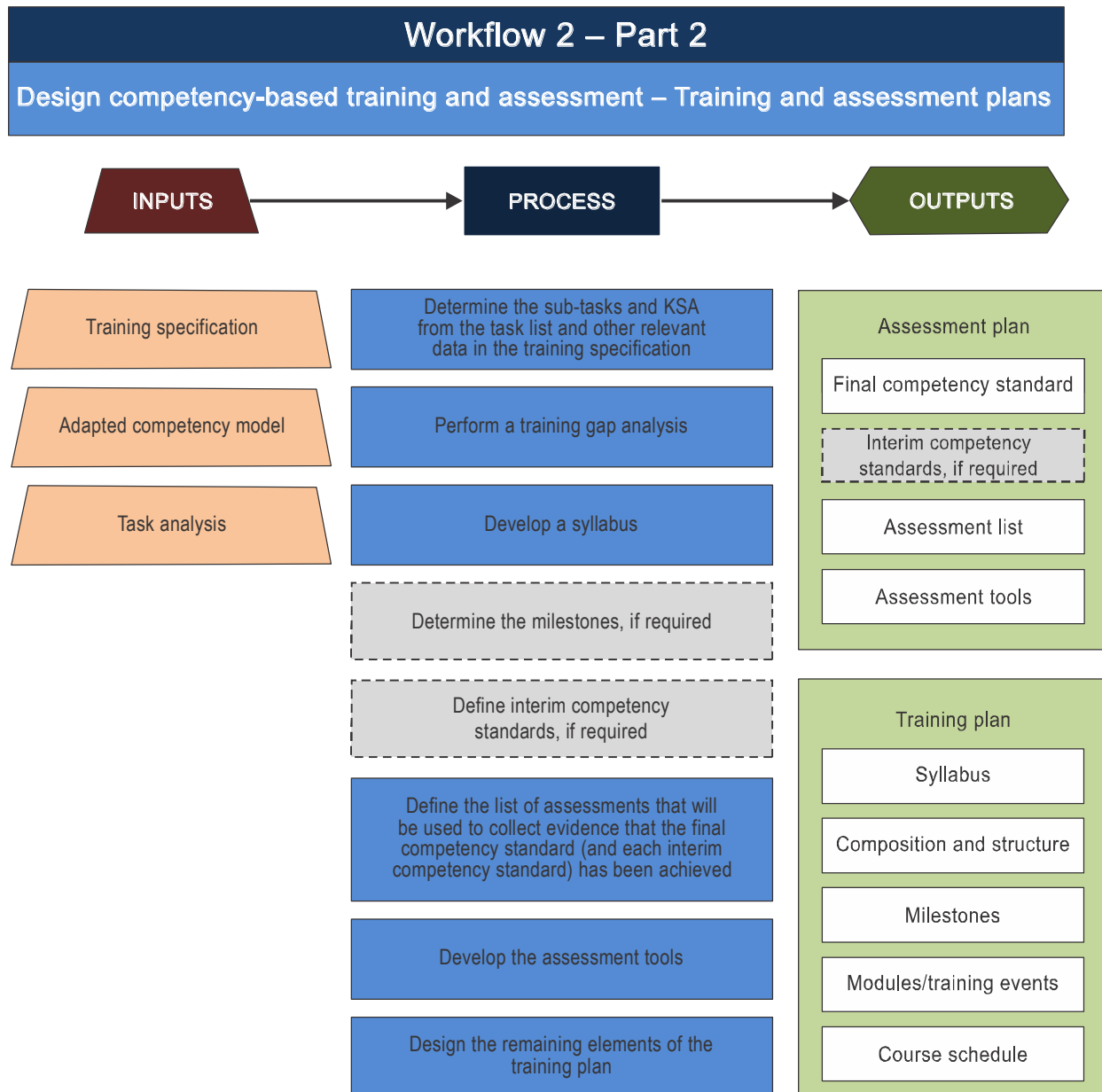


Figure 3-4. Workflow 2 – Part 2: Design training and assessment plans

3.5.2 Determining the sub-tasks and knowledge, skills and attitudes

3.5.2.1 To develop the training and assessment plans, it is necessary to determine the tasks and sub-tasks that the trainee will perform and the KSA required to do so. The task list has already been recorded in the training specification (as developed in Workflow 1). Therefore, the sub-tasks and KSA are determined based on the task list, in conjunction with the operational, technical, regulatory and organizational requirements.

3.5.2.2 It is not necessary to build a comprehensive list of KSA elements for each task; only the required elements are listed.

3.5.2.3 It is inevitable that there will be duplications of the KSA from task to task. A consolidated list should be prepared that contains the required tasks, sub-tasks and KSA, without duplication.

3.5.3 Performing a training gap analysis

The training gap analysis is used to compare the tasks, sub-tasks and KSA required against the trainee's level of task execution and KSA. The result of the gap analysis is a list of tasks, sub-tasks and KSA that will be used to develop the syllabus. It may not always be possible to accurately analyse the target population to be trained, because they are not yet known. A baseline level of tasks, sub-tasks and KSA is assumed to exist and the training is developed on this assumption. Clearly, once the target population is known, it must be verified that the assumption is still correct and, if not, adjustments should be made to the tasks, sub-tasks and KSA.

3.5.4 Developing a syllabus

3.5.4.1 As an element of the training plan, the syllabus is a list of tasks, sub-tasks and KSA that have been formulated into training objectives and structured in such a way that it will be possible to gauge the scale of the training. The syllabus can be used in the next step to determine if it will be necessary to introduce milestones.

3.5.4.2 Appendix F provides an example syllabus. The intent of the example syllabus is to provide guidance and it should be adapted based on a training gap analysis.

3.5.5 Determining the milestones

3.5.5.1 The duration or complexity of the training may require ongoing assessment to determine if the trainee is progressing at an acceptable pace towards competence; this can be achieved by dividing the training course into milestones.

3.5.5.2 Milestones are cohesive building blocks of learning that are organized into a logical sequence and that generally progress from the simple to the complex. Each milestone comprises both training and assessment(s) and builds on one another. A trainee would need to successfully complete the training and assessment for the first milestone before proceeding to the next.

3.5.5.3 The result of this process is a high-level description of the learning activities and environment for each milestone, their sequence and a complete description of the interim competency standard associated with each milestone.

3.5.5.4 Milestones could be determined by either including logical units of learning and/or the number of simulations, as well as on-the-job training (OJT) hours to be undertaken. This would mean that training taking place in the simulated unit environment would be the first milestone, and training as OJT hours would be considered in the consecutive milestones.

3.5.5.5 Figure 3-5 shows an example of a course that was divided into three milestones.

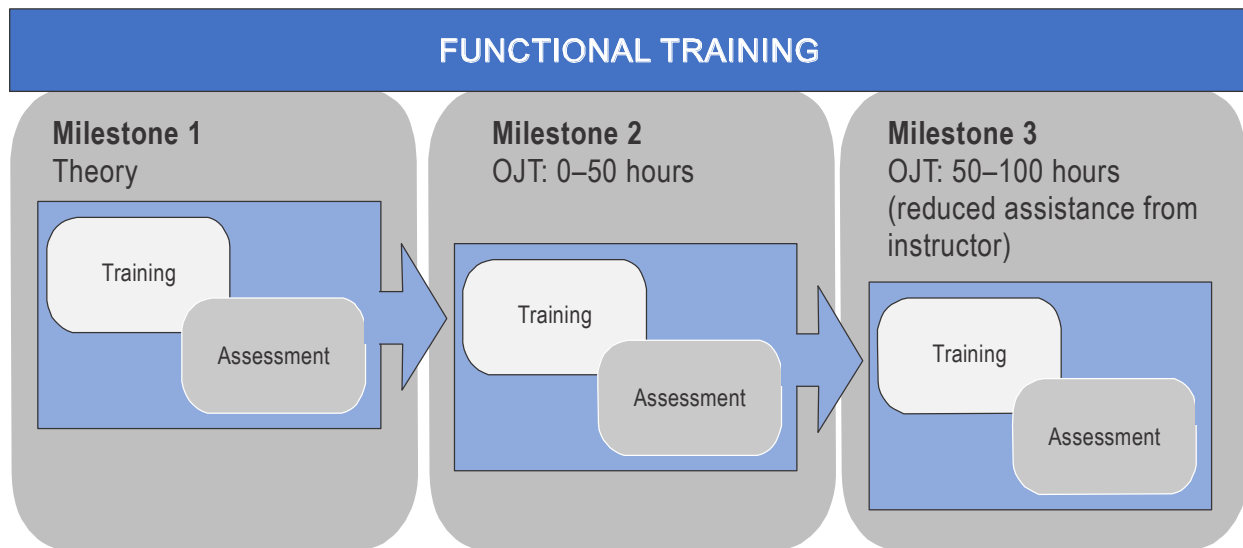


Figure 3-5. Examples of training milestones

3.5.6 Determine competency standards

On successful completion of an initial or unit training course, trainees will have achieved the competency standard for that phase of training. This means that they will have successfully completed all the required training and assessments that have been determined as necessary to demonstrate the competencies and meet the performance criteria as described in the adapted competency model. An interim competency standard can be determined by modifying the conditions and standards of the adapted competency model. The final competency standard is directly linked to the adapted competency model, without any modifications to the conditions and/or standards.

3.5.7 Determine interim competency standards

3.5.7.1 The complexity and the duration of the training would be the determining factors as to whether it would be necessary to introduce milestones and interim competency standard(s).

3.5.7.2 If a course has been divided into milestones, it may be necessary to define an interim competency standard for each milestone. Making significant modifications to the conditions of an adapted competency model to create an interim competency standard occurs more typically for training that will take place in a simulated environment. In a simulated environment, it is possible to modify conditions such as complexity. OJT during the functional training phase provides fewer opportunities to modify the conditions. The most typical condition to modify during OJT is the level of support provided by the instructor.

3.5.7.3 For practical assessments, determining an interim competency standard may be achieved by either modifying the adapted competency model, especially the conditions and/or standards, or stating the degree of achievement expected for each performance criteria.

3.5.7.4 An interim competency standard is achieved when all the required assessments (including any examinations or other methods of assessment) for that milestone have been successfully achieved. The number of assessment criteria required for each milestone and the methods that will be used are determined by the complexity of the training and any regulatory requirements.

3.5.7.5 Refresher training assumes that trainees' have already achieved competence and so it is unlikely that there would be a need to create interim competency standards.

3.5.8 Assessment methods

3.5.8.1 General

3.5.8.1.1 The syllabus is composed of tasks and sub-tasks, as well as the underlying KSA required to support them. However, when assessing if competence has been achieved, the adapted competency model, not the syllabus, is referenced. Therefore, the performance criteria are the means for the assessment to be conducted.

3.5.8.1.2 Clear performance criteria are used to observe the competence, which is established by the adapted competency model. There must be sufficient evidence to ensure that the trainee meets all the components of the competencies and behaviours specified by competency standards. The trainee undergoing assessment must demonstrate all competencies and their seamless interaction. Various assessment methods can be used during the assessment phase.

3.5.8.2 Practical assessments

The primary method for assessing performance is to conduct practical assessments because the focus is on an integrated performance of competencies. It may not be possible to observe a representative cross-section of all the competencies in a practical assessment. Practical assessments take place in either a simulated or operational environment. There are two types of practical assessment; formative assessments and summative assessments.

- *Formative assessments.* Instructors provide feedback to the trainees on how they are progressing towards the competency standards. This type of assessment enables the trainees to progressively build on competencies already acquired, identify strengths and weaknesses, promote learning and identify knowledge gaps. The frequency and number of formative assessments may vary depending on the duration of the training.
- *Summative assessments.* The instructing team works with the trainee to collect evidence and evaluate the progress of competence at defined points during and/or at the end of training. During summative assessments, the decision is made as to whether the trainee is “competent” or “not yet competent”.

3.5.8.3 Other assessment methods

The following methods are examples of suitable supplemental method for assessing competence. Other methods may be used.

- *Oral assessments.* An oral assessment is supplementary to a summative assessment. It provides the assessor with the opportunity to verbally target areas of performance that could not be observed in the practical environment and focuses on observed behaviours that may have been cause for concern during the practical assessment.
- *Examinations.* The instructing team can use examinations to evaluate theoretical knowledge and to a lesser extent the application of basic skills. Examinations may be written or completed with the aid of digital equipment and/or online tools.

3.5.9 Develop assessment tools

3.5.9.1 Overview

The following documents should be developed and designed to support practical assessments.

3.5.9.2 Evidence guide

3.5.9.2.1 An evidence guide contains a description for each performance criterion. It translates the performance criterion from the adapted competency model into practical examples of observations that assessors and instructors can expect to see. It is used to eliminate different interpretations among instructors and assessors and ensures that valid and reliable evidence is gathered. It details competencies, their associated observable behaviours and the expected performance that should be observed at the interim or final competency standard.

3.5.9.2.2 Appendix C provides an example of a completed evidence guide.

3.5.9.3 Competency checklist

3.5.9.3.1 A competency checklist details the competencies and performance criteria and is used to record achievements during each formative and summative assessment. The assessment plan details how many assessments should be completed for each milestone.

3.5.9.3.2 Appendix D provides an example of a competency checklist.

3.5.9.4 Competency assessment form

3.5.9.4.1 The competency assessment form is used to summarize the results of all the assessments that have been undertaken by a trainee (practical, oral and written), after which the assessor decides if either an interim competency standard or the final competency standard has been achieved. The number and method(s) of assessments are described in the assessment plan. The competency assessment form must correlate with the assessment plan.

3.5.9.4.2 Appendix E provides an example of a competency assessment form.

3.5.10 Assessment plan

3.5.10.1 The purpose of the assessment plan is to detail how competence will be determined. It supports the principles of assessment in a competency-based environment.

3.5.10.2 The assessment plan details:

- a) the final competency standard associated with the final milestone;
- b) the interim competency standards associated with each milestone, if required;
- c) the list of assessments (such as formative and summative assessments, examinations, oral assessments) required for each of the milestone(s) that has been defined;
- d) when these assessments should take place;
- e) the passing grade for oral assessments, examinations and/or projects;
- f) the minimum number of formative assessments to be undertaken prior to conducting summative assessments, if required;
- g) the number of observations required, at the interim and final milestone, to assess performance; and
- h) the tools used to collect evidence during practical assessment.

3.5.10.3 The example in Table 3-5 can be used to document the final competency standard to be achieved for a candidate to successfully complete the training.

Table 3-5. Example of an assessment plan template

<i>Formative assessments</i>	
<ol style="list-style-type: none"> 1. The requisite number of formative assessments has been completed. 2. The candidate is ready to undertake summative assessments when the formative assessments indicate that the candidate is demonstrating an integrated and consistent performance. 	
<i>Written examinations</i>	
<u>Subject</u>	<u>Passing grade</u>
Local procedure application	90 per cent
Data product specification processing	80 per cent
XYZ system data processing	90 per cent
<i>Summative assessments</i>	
The candidate must demonstrate a consistent performance of the competencies defined in the adapted competency model for the defined number of consecutive summative assessments.	A competent or not competent judgement is made for each assessment.

Note.— The oral assessment shall take place after the successful completion of summative assessments.

3.5.11 Training plan

3.5.11.1 Overview

The purpose of the training plan is to detail how the training will be conducted. It is made up of the following elements: syllabus, composition and structure, milestones, and modules, training events and sequence.

3.5.11.2 Syllabus

3.5.11.2.1 The syllabus contains the list of training objectives that need to be covered by the end of the course. The training objectives are derived from the tasks, sub-tasks and associated KSA identified in 3.5.2 and the training gap analysis as described in 3.5.3. A syllabus does not prescribe the order or sequence of learning; it simply lists the training objectives. To facilitate the process of assigning training objectives to the various milestones, modules and training events, it is useful to structure the syllabus into logical groups of subjects.

3.5.11.2.2 Appendix F provides a sample syllabus that covers the various phases of training and should be adapted to the training requirements of the AISP.

3.5.11.3 Composition and structure

This is a high-level description of what will be trained (composition) and how the various elements of training relate to each other (structure). If the course covers only one type of training, such as NOTAM encoding and decoding, then the composition is very simple. When a course is composed of more than one type of training, it must be explained how they will relate to each other in terms of structure and sequence.

3.5.11.4 Milestones

If it has been determined that milestones are necessary to structure the course, the assessment plan will already have defined the interim competency standards associated with each milestone and the final competency standard that needs to be achieved by the end of the final milestone. In this case, training objectives from the syllabus are assigned to each milestone.

3.5.11.5 Modules, training events and sequence

3.5.11.5.1 Depending on the number, type and complexity of the training objectives, it may be helpful to further divide the training into modules (within an entire course, or within all or some milestones, if milestones are required). An example of training events divided into modules under different milestones can be found in Figure 3-6.

3.5.11.5.2 Whichever sub-structure (course, milestones, modules) is deemed most appropriate, training events are developed to support the sub-structure. Training events are the smallest unit of learning and include classroom-based lessons, simulated exercises, web-based training exercises, case studies, etc. Training events contain the following information:

- a) the group of objectives to be taught together (that is, a training event);
- b) the number of periods needed to teach each group of objectives;
- c) the method(s) to be used (such as lessons, case studies, individual simulation, briefing, self-study);
- d) the media to be used (such as simulations, visual aids, textbook);
- e) the learning rate (that is, self-paced, time-restricted or real-time); and
- f) whether the training is delivered to individuals or conducted in groups.

3.5.11.5.3 Training events should be sequenced in a logical order of delivery, as should the assessment requirements. The training events are the template that the training designers use to create the training materials necessary to deliver the course.

3.5.11.6 Course schedule

The course schedule is a tool that indicates how the training events and assessments fit together into the total duration of the course. Each AISP must decide what requirements may affect a course schedule.

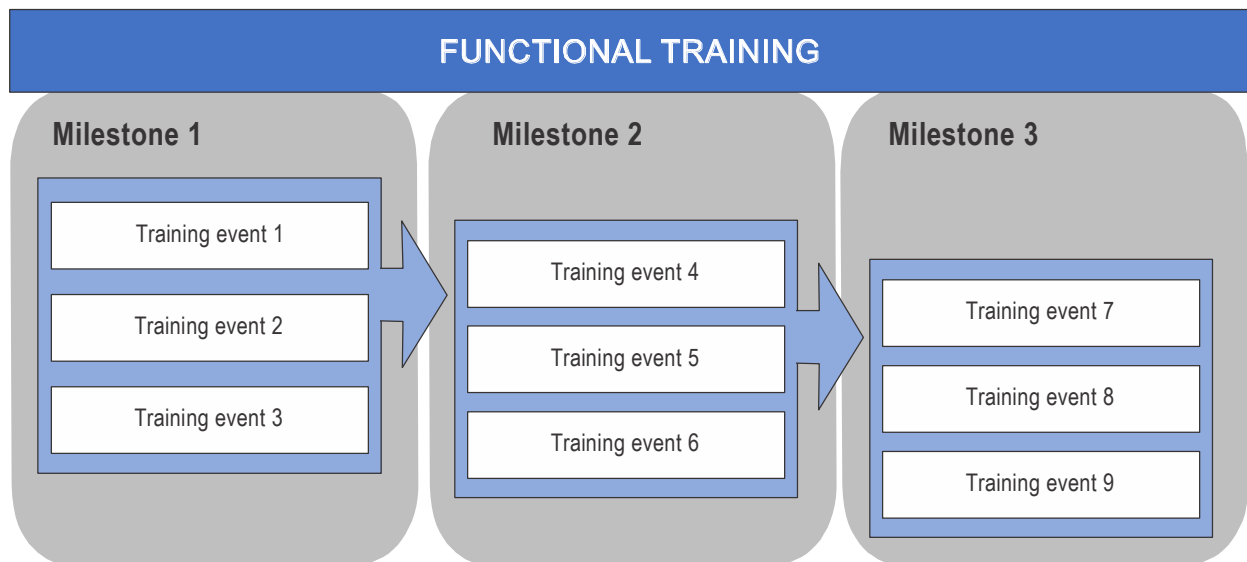


Figure 3-6. Training events within modules under milestones

3.6 WORKFLOW 3: DEVELOP THE TRAINING AND ASSESSMENT MATERIALS

3.6.1 During this step, shown in Figure 3-7, all the training and assessment materials are developed based on the adapted competency model, the training plan and the assessment plan. Training and assessment materials include, but are not limited to, training notes, exercise briefings, practical exercises, case studies, presentations, video clips, self-test quizzes, examinations, assessments and assessment tools.

3.6.2 On completion of this workflow, the outputs should include all training and assessment materials, schedules and any other training resources.

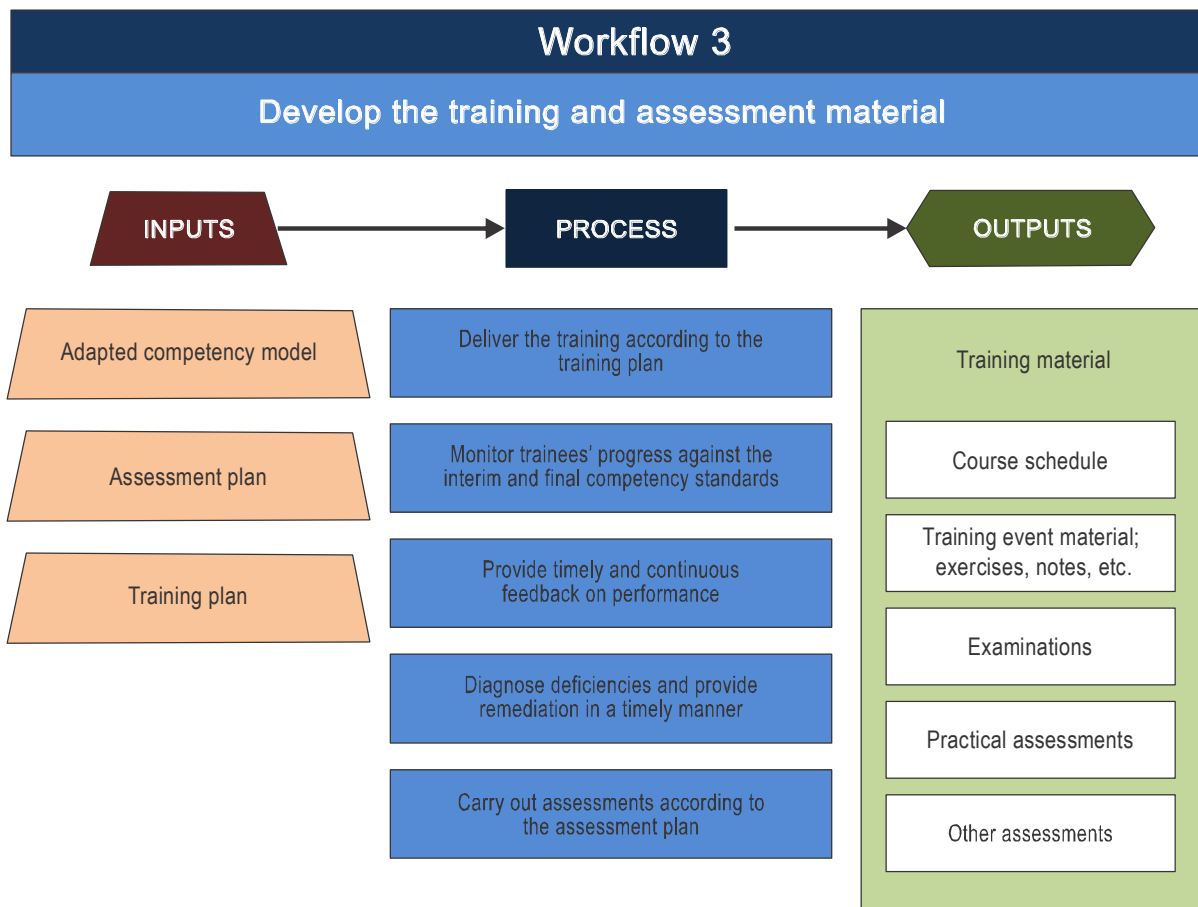


Figure 3-7. Workflow 3 – Develop training and assessment material

3.7 WORKFLOW 4: CONDUCT THE COURSE

3.7.1 During Workflow 4, conduct the course, the training will be delivered to the trainees in accordance with the established training plan, as shown in Figure 3-8.

3.7.2 When conducting the course, the trainees' progress is being monitored against the applicable competency standards, and timely feedback will be provided by the instructor.

3.7.3 Assessments are carried out throughout the course to ensure a continuous progression of the trainees towards competence.

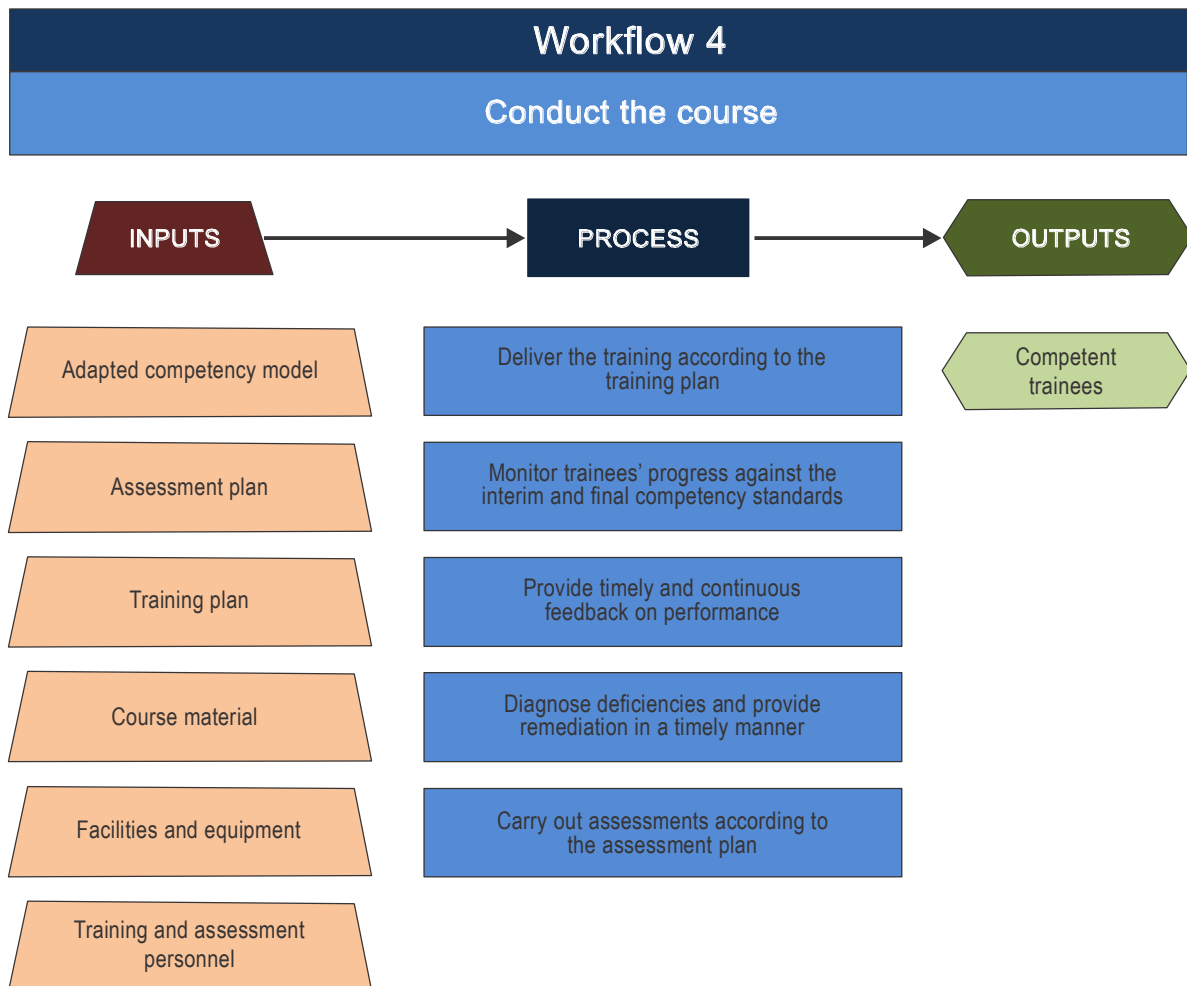


Figure 3-8. Workflow 4 – Conduct the course

3.8 WORKFLOW 5: EVALUATE THE COURSE

3.8.1 At the end of a period of training, feedback from trainees, instructors and assessors is gathered to determine how well the course met its objectives and supported the progression of learning towards competence. This evaluation may lead to changes or improvements being made to the course. Figure 3-9 illustrates the process.

3.8.2 The assessor will record the trainees' responses in relation to the adapted competency model using an assessment tool.

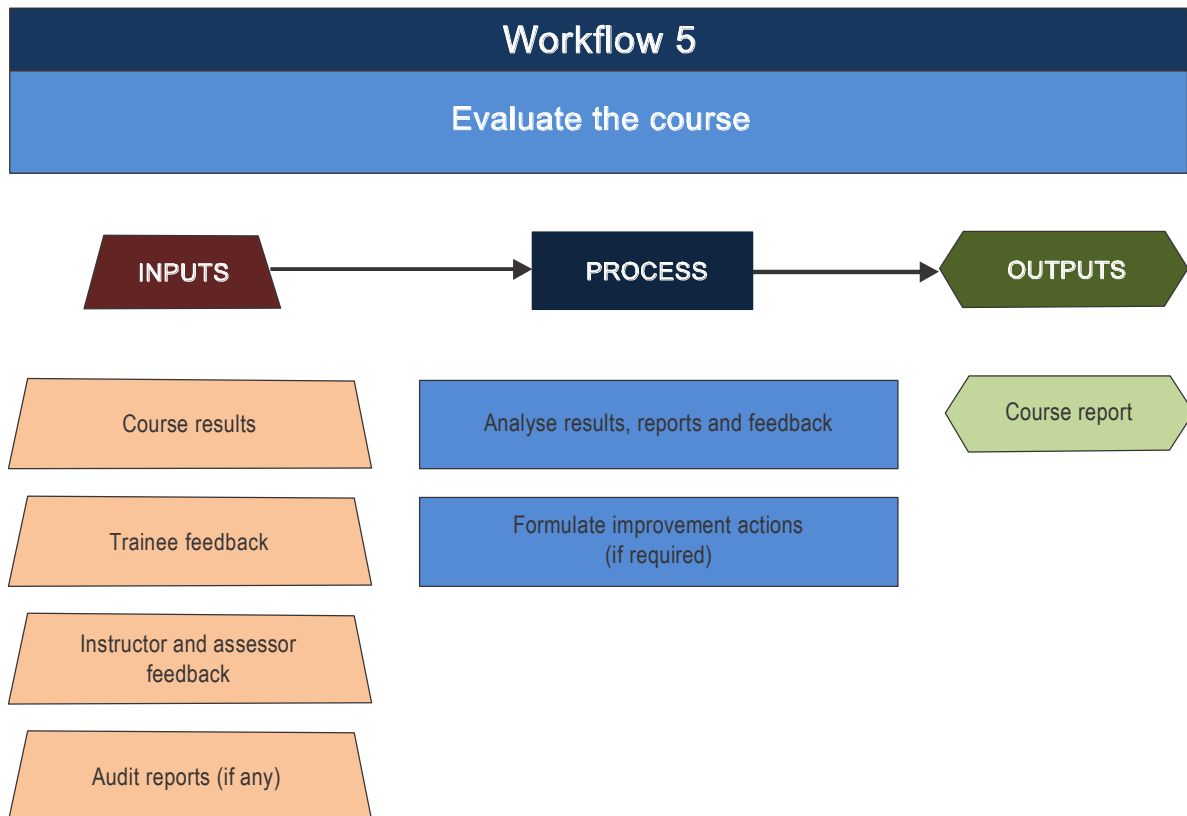


Figure 3-9. Workflow 5 – Evaluate the course

Chapter 4

AERONAUTICAL INFORMATION SERVICES TRAINING PHASES

4.1 GENERAL

4.1.1 AIS training is divided into different phases, as follows:

- a) initial training contains core knowledge required by AIS technical personnel and is usually conducted only once;
- b) functional training is conducted for specific AIS functions;
- c) advanced specialized training is provided to personnel responsible for more complex functions or systems; and
- d) refresher training is essential for the ongoing successful performance of duties within the AISP. Refresher training and assessment is conducted multiple times, as needed, to ensure that competencies are maintained, or performance issues addressed.

4.1.2 A trainee will progress from one phase to the next, once deemed competent at each phase. If the trainee failed an assessment, the trainer may suggest that the trainee repeat a previous training phase. Some training can occur concurrently; however, the trainee should not progress to the next training phase unless deemed competent in all required functions. The training progression is shown in Figure 4-1.

4.2 INITIAL TRAINING

4.2.1 AIS technical personnel who require initial training should meet any prerequisites determined by the AISP. Additional training may be necessary to ensure trainees meet all the entry prerequisites for initial training. Examples may include proficiency in software programs, English language proficiency and aviation basic topics. States are encouraged to review requirements for education and/or required experience in relation to each AIS function. For example, English language proficiency may be considered a prerequisite to enter initial training.

4.2.2 Initial training is the first phase of training where specific AIS topics and criteria are covered per Annex 15 – *Aeronautical Information Services*, PANS-AIM and related documents. The purpose of initial training is to provide basic knowledge and skills to newly hired individuals or those who have been recruited or transferred from non-AIS positions. Topics should include the regulatory framework, aeronautical data and aeronautical information management, such as:

- a) AIS scope, relevance and importance;
- b) responsibilities for a State, data originators, AIS, regulators, etc.;
- c) international and national legislation;

- d) safety and quality management systems;
- e) scope of aeronautical data and aeronautical information elements (based on the data catalogue); and
- f) aeronautical information products and services.

4.2.3 Appendix F is a sample syllabus including topics to consider for initial training and should be adapted to the training requirements of the AISP.

4.3 FUNCTIONAL TRAINING

4.3.1 Functional training may be conducted during or after initial training to ensure the acquired KSA are understood and applied. The functional training curriculum would be developed from the competency standards and learning objectives. The purpose is to provide subject matter content based on the AIS function, through OTJ training, theoretical training and continual feedback.

4.3.2 OTJ experience supports competency-based training, which is driven by performance rather than only acquisition of knowledge. It also provides training within the functions (data management, data publication, data visualization) to enable understanding and relationship between disciplines.

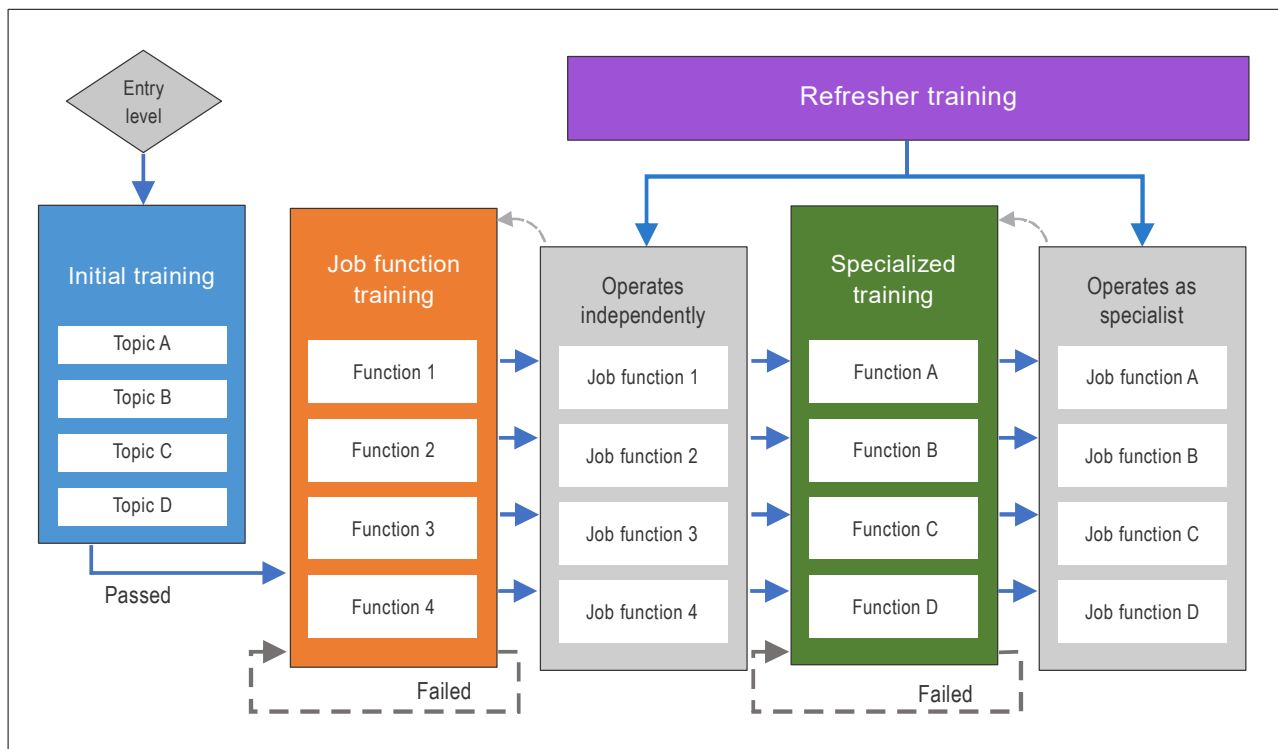


Figure 4-1. AIS training phases and progression

4.3.3 Functional training should be delivered by instructors in accordance with the training plan. It prepares the trainee to work independently, and ensures competencies are objectively assessed and documented. The functional training could be supplemented by simulation and theory instruction for instances that do not regularly occur.

4.3.4 Appendix F is a sample syllabus including topics to consider for functional training and should be adapted to the training requirements of the AISP.

4.4 SPECIALIZED TRAINING

4.4.1 The purpose of specialized training is to provide AIS technical personnel with advanced KSA to perform complex and unique functions. Examples of specialized training include aeronautical cartography and digital data set preparation.

4.4.2 Appendix F is a sample syllabus including topics to consider for specialized training and should be adapted to the training requirements of the AISP.

4.5 REFRESHER TRAINING

4.5.1 The main purpose of refresher training is to ensure existing competencies and KSA of personnel who perform AIS functions are reinforced or maintained, and to ensure new (or changed) regulations or requirements are being addressed. Refresher training should be provided on a routine basis and tailored according to the AIS function; it may also be used to improve performance. Examples of refresher training include:

- a) guidance, policy, procedures or requirements;
- b) hardware or software technologies;
- c) organizational structure;
- d) routine and non-routine situations;
- e) human factors, and
- f) best practices.

4.5.2 Appendix F is a sample syllabus including topics to consider for refresher training and should be adapted to the training requirements of the AISP.

Appendix A

EXAMPLE TRAINING SPECIFICATION

The following example of a training specification is applicable to AIS technical personnel responsible for receiving data change requests and capturing the information into an aeronautical database.

<i>Purpose</i>	
<i>What is the purpose of the training?</i>	To train AIS technical personnel responsible for the receipt and collation of aeronautical information.
<i>State the phase(s) of training.</i>	Initial training.
<i>What certification, if any, will the trainee achieve on successful completion of the training?</i>	Student AIS certificate
<i>Tasks</i>	
<i>Describe the tasks associated with the purpose of the training.</i>	<p>The trainee shall carry out the following tasks:</p> <ul style="list-style-type: none">– receive information from the data originator;– confirm that a formal arrangement exists with the data originator;– if no formal arrangement exists, reject the request and escalate for further analysis;– verify the information received in accordance with the formal arrangement;– seek clarification from the data originator on anomalies;– enter information into the aeronautical information database with a proposed change status;– compliment metadata with additional information;– ensure the information complies with data quality requirements;– conduct quality control actions to ensure the integrity of data elements; and– commit the proposed change to production status.

<i>Operational requirements</i>	
<i>Which procedures will be applied?</i>	Work instruction No. 747 – Collection of aeronautical data.
<i>Describe the operational environment required to successfully achieve the purpose of the training.</i>	<ul style="list-style-type: none"> – Office environment with access to software, equipment and reference material (regulations, standards, aeronautical information manuals and formal arrangements). – Workflow includes static data origination to data collation of aeronautical information in accordance with aeronautical information regulation and control (AIRAC).
<i>Describe the nature of the work to achieve the training outcome.</i>	<p>Type of work:</p> <ul style="list-style-type: none"> – receive aeronautical information from various data originators; – obtain static information; – timely processing of data changes based on criticality; and – perform tasks accurately (within operational error tolerances).
<i>Which non-routine situations should be resolved or overcome for a successful completion of the training?</i>	<p>The following non-routine situations should be overcome:</p> <ul style="list-style-type: none"> – software errors or warnings; – intense workload; – unclarified anomalies in information; – pressure from the data originator; and – simulation of a unique scenario or condition seldom encountered.
<i>Describe the working configuration.</i>	Trainee performs aeronautical data origination to data collation functions.
<i>Technical requirements</i>	
<i>List any specific operational (or simulated operation) systems and/or equipment that are necessary to achieve the training outcome.</i>	<ul style="list-style-type: none"> – “Our AIS” aeronautical information processing system – “Our XYZ” graphical interface system – “Our ABC” publishing system – Test and training environment of the operational system – Equipment (printers and plotters)

<i>Regulatory requirements</i>	
<i>Which rules, regulations, standards and guidance material are applicable?</i>	<ul style="list-style-type: none"> – National regulations ABC/2020 on the provision of aeronautical information services; – Annex 4 – <i>Aeronautical Charts</i> and Annex 15 – <i>Aeronautical Information Services</i>, the <i>Aeronautical Information Services Manual</i> (Doc 8126), the <i>Procedures for Air Navigation Services – Aeronautical Information Management</i> (PANS-AIM, Doc 10066) and the <i>Aeronautical Chart Manual</i> (Doc 8697); and – The <i>Manual on the Quality Management System for Aeronautical Information Services</i> (Doc 9839).
<p><i>Are there any regulatory requirements that will affect the following aspects of the training:</i></p> <p>a) <i>duration;</i></p> <p>b) <i>content;</i></p> <p>c) <i>assessment procedures;</i></p> <p>d) <i>course approval; or</i></p> <p>e) <i>any other?</i></p>	<ul style="list-style-type: none"> – The <i>Manual on Aeronautical Information Services Training</i> (Doc 9991); – 20 hours of simulation required prior to undertaking practical assessment;
<i>Organizational requirements</i>	
<i>Describe any organizational requirements that may affect the training.</i>	None.
<i>Other requirements</i>	
<i>List any other constraints.</i>	Safety and quality policies requirements.
<i>Simulation requirements</i>	
<i>List the simulation requirements that are necessary to achieve the training outcome, if any.</i>	None.

Appendix B

EXAMPLE AERONAUTICAL INFORMATION SERVICES ADAPTED COMPETENCY MODEL

The following example is applicable to AIS technical personnel responsible for receiving data change requests and capturing the information into an aeronautical database. Note that not all observable behaviours from the ICAO competency framework are applicable to every AIS function.

<i>No.</i>	<i>ICAO competency</i>	<i>Description</i>	<i>Observable behaviour (OB)</i>
1	Awareness	Comprehends aeronautical data and aeronautical information requirements, monitors the aeronautical data and aeronautical information process(es) and detects anomalies and potential threats that can degrade the flow and the quality of data and information and affect its use.	1.1 Maintains awareness of the aeronautical data and aeronautical information requirements based on the intended use of the information.
			1.2 Validates and verifies that aeronautical data is compliant with quality requirements on reception.
			1.3 Monitors the quality of aeronautical data and aeronautical information throughout the aeronautical data process from origination to distribution to internal and external stakeholders.
			1.4 Manages the aeronautical data and aeronautical information based on the user's context.
			1.5 Identifies and manages potential threats that can cause degradation of aeronautical data and aeronautical information and its flow (such as interruption of aeronautical data process) or degradation of the quality of the aeronautical data and aeronautical information.
			1.6 Maintains awareness of the latest international standards, recommended practices and procedures in aeronautical information management.

No.	ICAO competency	Description	Observable behaviour (OB)
2	Coordination	Comprehends and adheres to formal arrangements and, if required, coordinates with originators, personnel in different operational positions and with other affected stakeholders to ensure that the agreed requirements are met.	<p data-bbox="898 323 1438 485">2.1 Maintains awareness of the entities accountable for data or information origination and/or from which personnel receives aeronautical data and aeronautical information, as defined in the formal arrangement.</p> <p data-bbox="898 516 1438 611">2.2 Adheres to the formal arrangement with originators, operational units and other affected stakeholders.</p> <p data-bbox="898 642 1438 768">2.3 Monitors the requirements agreed in the formal arrangements and initiates appropriate action or improvement to achieve the agreed requirements.</p> <p data-bbox="898 800 1438 926">2.4 Coordinates with aeronautical data originators, personnel in different operational positions and with other affected stakeholders if anomalies in performance are detected.</p> <p data-bbox="898 957 1438 1052">2.5 Uses available tools to monitor and analyse the performance achieved and generates performance reports as required.</p>
3	Application of procedures	Identifies and applies data procedures in accordance with published operating instructions, regulations and standards.	<p data-bbox="898 1098 1438 1157">3.1 Identifies the correct operating instructions in the organization's Operations Manual.</p> <p data-bbox="898 1188 1438 1283">3.2 Follows the operating instructions and complies with regulations, standards and procedures.</p> <p data-bbox="898 1314 1438 1373">3.3 Performs the required quality procedures and proposes improvements.</p> <p data-bbox="898 1404 1438 1472">3.4 Correctly operates information systems and associated equipment.</p> <p data-bbox="898 1503 1438 1562">3.5 Applies relevant knowledge to develop or improve operating instructions.</p>
4	Communication	Communicates effectively (in oral and written forms) with all stakeholders involved in the aeronautical data process.	<p data-bbox="898 1612 1438 1707">4.1 Accurately interprets and processes aeronautical data and aeronautical information received.</p> <p data-bbox="898 1738 1438 1833">4.2 Asks questions to understand the content of aeronautical data and aeronautical information if it is ambiguous.</p>

No.	ICAO competency	Description	Observable behaviour (OB)
			<p>4.3 Uses appropriate vocabulary and expressions for communication with stakeholders.</p> <p>4.4 Presents appropriate and accurate information in a clear and concise manner with all media types (paper, electronic, digital).</p> <p>4.5 Ensures the recipient is ready and able to receive the information in verbal briefings.</p> <p>4.6 Listens actively and demonstrates understanding when receiving questions from internal or external stakeholders.</p> <p>4.7 Communicates effectively in non-standard situations.</p> <p>4.8 Notifies internal and external stakeholders effectively concerning errors in the data and products published.</p>
5	Workload management	Manages available resources efficiently to prioritize and perform all tasks independently under all circumstances.	<p>5.1 Plans, prioritizes and schedules all assigned information tasks.</p> <p>5.2 Manages time when carrying out assigned information tasks.</p> <p>5.3 Reviews, monitors and cross-checks actions.</p> <p>5.4 Verifies information tasks are completed to the expected outcome.</p> <p>5.5 Manages and recovers from interruptions, distractions, variations and failures.</p> <p>5.6 Offers and accepts assistance, delegates when necessary and asks for assistance early.</p> <p>5.7 Maintains self-control.</p> <p>5.8 Manages and adapts to the demands of a situation or increased workload.</p>
6	Teamwork	Operates as a team.	6.1 Carries out assigned actions and duties to support a team environment.

No.	ICAO competency	Description	Observable behaviour (OB)
			<p>6.2 Encourages team participation and cooperation.</p> <p>6.3 Addresses and resolves conflicts and disagreements.</p> <p>6.4 Shows respect and tolerance.</p> <p>6.5 Fosters an atmosphere of open communication to enable feedback to be provided and received to improve overall team performance.</p> <p>6.6 Shares experiences to continuously improve the aeronautical information process.</p>
7	Aeronautical information management expertise	Applies and improves technical knowledge and skills related to collection, processing, management, integration and provision of aeronautical data and aeronautical information.	<p>7.1 Demonstrates knowledge of information systems and technology to ensure accurate integration of aeronautical data and aeronautical information.</p> <p>7.2 Applies aeronautical data and aeronautical information lifecycle management policies, processes and procedures.</p> <p>7.3 Chooses the most appropriate equipment and software to efficiently manage aeronautical data and aeronautical information based on the operational criticality of the information.</p> <p>7.4 Develops aeronautical data and aeronautical information requirements for aeronautical information management systems.</p> <p>7.5 Develops system requirements for aeronautical information management systems.</p> <p>7.6 Ensures the data and information are accurately represented in the systems.</p>
8	Self-management and continuous learning	Demonstrates personal attributes that improve performance and maintain an active involvement in self-learning and self-development.	<p>8.1 Improves job performance through self-evaluation and training.</p> <p>8.2 Seeks, accepts and uses feedback to improve job performance.</p> <p>8.3 Takes responsibility for job performance by detecting and resolving errors in the context of the QMS.</p>

<i>No.</i>	<i>ICAO competency</i>	<i>Description</i>	<i>Observable behaviour (OB)</i>
			8.4 Engages in continuous improvement. 8.5 Keeps current on specialized technical knowledge and skills. 8.6 Recognizes trends and performance metrics for continuous improvement.

Appendix C

EXAMPLE EVIDENCE GUIDE

The following example is applicable to AIS technical personnel responsible for receiving data change requests and capturing the information into an aeronautical database. Note that not all observable behaviours from the ICAO competency framework are applicable to every AIS function.

No.	<i>ICAO competency</i>	<i>Description</i>	<i>Observable behaviour (OB)</i>	<i>Evidence to support observable behaviour</i>
1	Awareness	Comprehends aeronautical data and aeronautical information requirements, monitors the aeronautical data and aeronautical information process(es), and detects anomalies and potential threats that can degrade the flow and the quality of data and information and affect its use.	1.1 Maintains awareness of the aeronautical data and aeronautical information requirements based on the intended use of the information.	1.1.1 Accesses regulatory information and apply ICAO Annexes and SARPs, State requirements (that is, policies and directives). This may be a specific responsibility within the AISP.
				1.1.2 Applies standard operating procedures applicable to the data or information type required by the regulatory requirement (including ICAO Annexes and SARPs, State requirements (that is, policies and directives).
			1.2 Validates and verifies that aeronautical data is compliant with quality requirements on reception.	1.2.1 Analyses the criticality of the aeronautical data and aeronautical information in the aviation community for the safety of operations.
				1.2.2 Utilizes validation and verification processes in the standard operating procedure to verify accuracy, resolution, completeness, format and timeliness.
			1.3 Monitors the quality of aeronautical data and aeronautical information throughout the aeronautical data process from origination to distribution to internal and external stakeholders.	1.3.1 Applies quality assurance and quality check processes to each product or service (accuracy, resolution, completeness, format and timeliness) during the aeronautical data chain to be compliant with data quality requirements.
				1.3.2 Monitors information for anomalies (internal and external) when processing products and services and discards unrelated information.
				1.3.3 Is aware of change management processes and reporting of non-conformances, as well as reporting of improvement suggestions for processes, products or services.
			1.4 Manages the aeronautical data and aeronautical information based on the user's context.	1.4.1 Refers to the aeronautical data catalogue for the compilation of aeronautical information products and services to ensure user requirements are met.
			1.5 Identifies and manages potential threats that can cause degradation of aeronautical data and	1.5.1 Adheres to existing contingency procedures when threats (such as system outages) are identified to mitigate erroneous information being processed and adapt to changing situations.

No.	ICAO competency	Description	Observable behaviour (OB)	Evidence to support observable behaviour
			aeronautical information and its flow (such as interruption of aeronautical data process) or degradation of the quality of the aeronautical data and aeronautical information.	1.5.2 Considers acquiring data from alternate sources or supply accurate data when the situation is unconventional and no documented procedure exists (if authorized to and if the situation warrants).
			1.6 Maintains awareness of latest international standards, recommended practices and procedures in aeronautical information management.	1.6.1 Accesses current versions of the ICAO Annexes and SARPs, State requirements (that is, policies and directives).
2	Coordination	Comprehends and adheres to formal arrangements and, if required, coordinates with originators, personnel in different operational positions, and with other affected stakeholders to ensure that the agreed requirements are met.	2.1 Maintains awareness of the entities accountable for data or information origination and from which personnel receives aeronautical data and aeronautical information, as defined in the formal arrangement.	2.1.1 Confirms formal arrangements exist between the AIS operator and the aeronautical data originators to ensure authenticity of data originator.
			2.2 Adheres to the formal arrangement with originators, operational units and other affected stakeholders.	2.2.1 Operates within the requirements of the formal arrangements between the AIS operator and the data originators, operational units and affected stakeholders (timeliness, criticality, integrity, error reporting, etc.). 2.2.2 Seeks clarification from affected parties on any deviations from the formal arrangements.
			2.3 Monitors the requirements agreed in the formal arrangements and initiates appropriate action or improvement to achieve the agreed requirements.	2.3.1 Monitors formal arrangements and initiates corrective and improvement actions when issue(s) or new requirements are identified.
			2.4 Coordinates with aeronautical data originators, personnel in different operational positions and with other affected stakeholders if anomalies in performance are detected.	2.4.1 Coordinates between and advises both data originators and other affected stakeholders of detected anomalies pertaining to aeronautical data and aeronautical information in a timely manner. 2.4.2 Utilizes the appropriate means to coordinate information.
			2.5 Uses the available tools to monitor and analyse the performance achieved and generates performance reports as required.	2.5.1 Captures the data used to monitor and analyse organizational performance metrics against formal arrangement requirements (timeliness, accuracy, completeness, integrity, etc.).

No.	ICAO competency	Description	Observable behaviour (OB)	Evidence to support observable behaviour
3	Application of procedures	Identifies and applies data procedures in accordance with published operating instructions, regulations and standards.	3.1 Identifies the correct operating instructions in the organization's Operations Manual.	3.1.1 Accesses the operating instruction based on the information received (operating instructions based on ICAO Annexes and SARPs, State requirements (that is, policies and directives)).
			3.2 Follows the operating instructions and complies with regulations, standards and procedures.	3.2.1 Performs job functions in the order defined by operating instructions in a timely manner.
				3.2.2 Adheres to operating instructions.
			3.3 Performs the required quality procedures and proposes improvements.	3.3.1 Conducts quality assurance and quality check processes to each function.
				3.3.2 Submits work for quality control review and applies corrections found during the processing cycle.
				3.3.3 Proposes opportunities for improvement, when identified.
				3.3.4 Monitors work to self-identify errors.
				3.3.5 Performs continuous monitoring to recognize erroneous information (internal and external) in processing and makes corrective actions.
				3.3.6 Reports errors (internal and external) to improve the quality and safety of the products and/or services.
			3.4 Correctly operates information systems and associated equipment.	3.4.1 Accesses automated software to perform function, as per assigned permission controls.
				3.4.2 Performs tasks using prescribed software and technology for successful completion.
				3.4.3 Monitors equipment, equipment alarms, displays and operational statuses.
				3.4.4 Reports equipment and system malfunctions.
3.5 Applies relevant knowledge to develop or improve operating instructions.	3.5.1 Provides technical expertise to develop or improve operating instructions.			
4	Communication	Communicates effectively (in oral and written forms) with all stakeholders involved in the aeronautical data process.	4.1 Accurately interprets and processes aeronautical data and aeronautical information received.	4.1.1 Interprets aeronautical data and aeronautical information accurately.
				4.1.2 Gives priority to urgent information to ensure timely processing.
			4.2 Asks questions to understand the content of aeronautical data and aeronautical information if it is ambiguous.	4.2.1 Asks relevant questions when seeking clarification.
			4.3 Uses appropriate vocabulary and expressions for communication with stakeholders.	4.3.1 Conveys messages concisely.
				4.3.2 Accurately reads, interprets, constructs and responds to messages in English.

No.	ICAO competency	Description	Observable behaviour (OB)	Evidence to support observable behaviour
				4.3.3 Communicates professionally and in a positive manner.
			4.4 Presents appropriate and accurate information in a clear and concise manner in all media (paper, electronic, digital).	4.4.1 Presents accurate data and information without having to repeat communication.
			4.5 Ensures the recipient is ready and able to receive the information in verbal briefings.	4.5.1 Verifies that correct information is transmitted and seeks affirmation that information is received from the recipient.
			4.6 Listens actively and demonstrates understanding when receiving questions from internal or external stakeholders.	4.6.1 Listens actively and accurately records information when received. 4.6.2 Interfaces with internal and external users regarding technical and AIS issues.
			4.7 Communicates effectively in non-standard situations.	4.7.1 Uses escalation in communication to resolve identified deviations.
			4.8 Notifies internal and external stakeholders effectively concerning errors in the data and products published.	4.8.1 Coordinates and advises both internal and external stakeholders pertaining to matters of significance of aeronautical information products and services in a timely manner.
5	Workload management	Manages available resources efficiently to prioritize and perform all tasks independently under all circumstances.	5.1 Plans, prioritizes and schedules all assigned information tasks.	5.1.1 Plans, leads, conducts or participates with work tasks as assigned. 5.1.2 Prioritizes workload to meet the demands of the function.
			5.2 Manages time when carrying out assigned information tasks.	5.2.1 Applies experience when conducting work activities to successful completion within time constraints.
			5.3 Reviews, monitors and cross-checks actions.	5.3.1 Monitors and evaluates the processing of AIS activities (per function).
			5.4 Verifies information tasks are completed to the expected outcome.	5.4.1 Conducts verification activities required in the operating instructions to ensure the quality of AIS products and services is maintained.
			5.5 Manages and recovers from interruptions, distractions, variations and failures.	5.5.1 Develops strategies to self-manage work adversities to create and maintain a professional atmosphere.
			5.6 Offers and accepts assistance, delegates when necessary and asks for assistance early.	5.6.1 Communicates openly with colleagues; builds effective relationships. 5.6.2 Recognizes when assistance is required and asks questions.
			5.7 Maintains self-control.	5.7.1 Monitors self-improvement to address performance metrics.

No.	ICAO competency	Description	Observable behaviour (OB)	Evidence to support observable behaviour
			5.8 Manages and adapts to the demands of a situation or increased workload.	5.8.1 Monitors and self-assesses performance in intense situations or increased workload.
6	Teamwork	Operates as a team.	6.1 Carries out assigned actions and duties to support a team environment.	6.1.1 Works collaboratively to carry out assigned tasks, projects or other work activities.
			6.2 Encourages team participation and cooperation.	6.2.1 Creates a professional atmosphere that promotes open dialogue among team members.
			6.3 Addresses and resolves conflicts and disagreements.	6.3.1 Actively listens to recommendations from team members.
			6.4 Shows respect and tolerance.	6.4.1 Creates a professional atmosphere to promote mutual respect and tolerance.
			6.5 Fosters an atmosphere of open communication to enable feedback to be provided and received to improve overall team performance.	6.5.1 Provides and receives constructive feedback for improvement of job performance.
			6.6 Shares experiences to continuously improve the aeronautical information process.	6.6.1 Provides knowledge and experience to team members for the benefit of AIS organization.
7	Aeronautical information management expertise	Applies and improves technical knowledge and skills related to collection, processing, management, integration and provision of aeronautical data and aeronautical information.	7.1 Demonstrates knowledge of information systems and technology to ensure accurate integration of aeronautical data and aeronautical information.	7.1.1 Uses information systems and technologies to integrate aeronautical data and aeronautical information into products and services.
			7.2 Applies aeronautical data and aeronautical information lifecycle management policies, processes and procedures.	7.2.1 Performs tasks, aligned with policies, processes and procedures throughout the lifecycle management of the data chain (collection, storage, processing, distribution).
			7.3 Chooses the most appropriate tools and software to efficiently manage aeronautical data and aeronautical information based on the operational criticality of the information.	7.3.1 Determines applicable automated software, including appropriate technology, to perform tasks for successful completion.
			7.4 Develops aeronautical data and aeronautical information requirements for aeronautical information management systems.	7.4.1 Identifies gaps in the data and contributes to the development of information requirements in alignment with the data catalogue.
			7.5 Develops operational requirements for aeronautical information management systems.	7.5.1 Identifies gaps in operational equipment and software and contributes to the development of system requirements.

No.	ICAO competency	Description	Observable behaviour (OB)	Evidence to support observable behaviour
			7.6 Ensures the data and information are accurately represented in the systems.	7.6.1 Conducts quality assurance for each data element contained in the aeronautical data and aeronautical information management systems.
8	Self-management and continuous learning	Demonstrates personal attributes that improve performance and maintain an active involvement in self-learning and self-development.	8.1 Improves job performance through self-evaluation and training.	8.1.1 Performs regular self-assessments. 8.1.2 Develops and maintains individual performance and training plans. 8.1.3 Uses refresher training to address knowledge gaps or weaknesses.
			8.2 Seeks, accepts and uses feedback to improve job performance.	8.2.1 Acts on constructive feedback to improve job performance.
			8.3 Takes responsibility for job performance by detecting and resolving errors in the context of the QMS.	8.3.1 Initiates corrective actions to correct self-reported errors.
			8.4 Engages in continuous improvement.	8.4.1 Conducts continuous monitoring of service quality and opportunities for improvement.
			8.5 Keeps current on specialized technical knowledge and skills.	8.5.1 Attends refresher training and continuous learning opportunities. 8.5.2 Identifies and enrolls in specialized technical training.
			8.6 Recognizes trends and performance metrics for continuous improvement.	8.6.1 Conducts self-management and establishes areas of self-improvement.

Appendix D

EXAMPLE COMPETENCY CHECKLIST

The following example shows the competency checklist for awareness and coordination only. A complete list would include all the competencies and performance criteria (PC) listed in the adapted competency model to include in the interim and/or final competency standard. The evidence guide describes the level of performance required for each competency standard. An overall assessment of being competent at the assessed competency standard can only be made when all performance criteria have been achieved.

The grading of a formative assessment supports the learning progress. It is intended to be used for diagnostic purposes only and the information is subsequently captured in an aeronautical database.

Competency checklist

Trainee's name:	<i>Charles Brown</i>
Trainee's role:	<i>Aeronautical Data Specialist</i>
Date: DD/MM/YYYY	<i>02/02/2022</i>
Competency standard	<i>Final</i>
Instructor's or assessor's name:	<i>Tom Smith</i>

<i>Awareness:</i>		<i>Grading</i>			
		1	2	3	4
Comprehends aeronautical data and aeronautical information requirements, monitors the aeronautical data and aeronautical information process(es) and detects anomalies and potential threats that can degrade the flow and the quality of data and information and affect its use.		(NC)	(NC)	(C)	(C)
1.1	Maintains awareness of the aeronautical data and aeronautical information requirements based on the intended use of the information.			X	
1.2	Validates and verifies that aeronautical data is compliant with quality requirements on reception.				X
1.3	Monitors the quality of aeronautical data and aeronautical information throughout the aeronautical data process from origination to distribution to internal and external stakeholders.				X
1.4	Manages the aeronautical data and aeronautical information based on the user's context.			X	

1.5	Identifies and manages potential threats that can cause degradation of aeronautical data and aeronautical information and its flow (such as interruption of aeronautical data process) or degradation of the quality of the aeronautical data and aeronautical information.				X
Comments: _____ _____ _____					

<i>Coordination:</i> Comprehends and adheres to applicable formal arrangements and if required coordinates with originators, personnel in different operational positions and with other affected stakeholders to ensure that the agreed requirements are met.		<i>Grading</i>			
		1 (NC)	2 (NC)	3 (C)	4 (C)
2.1	Maintains awareness of the entities accountable for the origination of data or information and/or from which personnel receives aeronautical data and aeronautical information, as defined in the formal arrangement.			x	
2.2	Adheres to the applicable formal arrangement with originators, operational units and other affected stakeholders.			x	
2.3	Monitors the requirements agreed in the formal arrangements and initiates appropriate action or improvement to achieve the agreed requirements.		x		
2.4	Coordinates with aeronautical data originators, personnel in different operational positions and with other affected stakeholders if anomalies in performance are detected.			x	
2.5	Uses available tools to monitor and analyse the performance achieved and generates performance reports as required.		x		
Comments: _____ _____ _____					

Overall grading of the assessed performance: 1) Not competent (NC) 2) Competent in most situations (NC) 3) Competent (desired rating) (C) 4) Above the required competence (C)	2
Signature: Trainee	Date:
Signature: OJT instructor	Date:
Signature: Manager	Date:

Appendix E

EXAMPLE COMPETENCY ASSESSMENT FORM

This example of a competency assessment form includes various assessment methods; it is for the assessor to determine which will be used during assessment.

Competency assessment form

Trainee's name:	<i>Charles Brown</i>
Trainee's role:	<i>Aeronautical Data Specialist</i>
Date: DD/MM/YYYY	<i>02/02/2022</i>
Competency standard	<i>Final</i>
Instructor's or assessor's name:	<i>Tom Smith</i>

Formative assessments

Number of assessments:		Date of recommendation for summative assessment:	
------------------------	--	--	--

Summative assessments

<i>Number</i>	<i>Date undertaken</i>	<i>Assessor(s)</i>	<i>Result</i>

Summary of results

		<i>Grading</i>			
Overall assessment		1 (NC)	2 (NC)	3 (C)	4 (C)
1.	Awareness				
2.	Coordination				
3.	Application of procedures				
4.	Communication				
5.	Workload management				
6.	Teamwork				
7.	Aeronautical information management expertise				
8.	Self-management and continuous learning				
Comments: _____ _____ _____					
Conclusion (competent/not yet competent):					

Written examinations

<i>Examination</i>	<i>Date undertaken</i>	<i>Pass mark required</i>	<i>Result</i>
Local procedures			
Data product specification			
XYZ system			

Oral assessment:

<i>Date of assessment:</i>	<i>Assessor:</i>	<i>Result:</i>
Comments: <hr/> <hr/> <hr/> <hr/>		

Overall assessment outcome:

Overall assessment <i>Recommendation: (competent/not yet competent)</i>			
Signature: Trainee		Date:	
Signature: OJT instructor		Date:	
Signature: Manager		Date:	

Appendix F

SAMPLE SYLLABUS

As per the *Aeronautical Information Services Manual* (Doc 8126, 7th edition, Part I, 3.4), an AIS provider must ensure that job descriptions, training programmes, training plans and training records are developed, maintained and continuously improved based on the ICAO competency framework. The following sample syllabus shows all the topics for the various phases of training and different training audiences. The example should be adapted based on a training gap analysis.

<i>Reference to Doc 8126</i>	<i>Phase</i>	<i>Training topic</i>	<i>High level objective</i>	<i>Relevance to AIS and use case</i>	<i>Applicability</i>
Part I: Regulatory framework for aeronautical information services	Initial	States responsibilities	Understand the State safety oversight system (SSO) consisting of the critical elements (CEs), overview of all CEs.	Understanding of the overall regulatory framework and where AIS fits in the bigger scheme.	Oversight staff Managerial staff AIS technical staff
		(CE1) Aviation legislation	Have an appreciation of the international aviation legislation applicable to AIS (that is, ICAO framework) and the electronic filing of differences (EFOD)	All AIS staff need to be aware and able to accurately apply relevant international standards (such as Annexes 4 and 15, PANS-AIM, etc.).	Oversight staff Managerial staff AIS technical staff
		(CE2) Specific operating regulations	Have an appreciation of the specific State operating regulations regarding formal arrangements, AIS, QMS, etc.		Oversight staff Managerial staff AIS technical staff
		Organization of AIS	Understand the responsibilities and functions (core, non-core) of an AIS.	Importance of understanding accountabilities and role boundaries to know where decision making and judgement can be applied autonomously. May relate to authorization for specific systems, sites or documentation access.	Oversight staff Managerial staff AIS technical staff

Reference to Doc 8126	Phase	Training topic	High level objective	Relevance to AIS and use case	Applicability
			Understand the organization of an AIS regarding mode of operation, organizational setup, resources, QMS and safety considerations (safety management system (SMS)).		Oversight staff Managerial staff AIS technical staff
			Understand the importance of QMS implementation for an AIS organization.		Oversight staff Managerial staff AIS technical staff
			Recognize the aeronautical information products and services.	Trainees will be required to assist in the production and maintenance of some or all of these products, therefore it is essential that they understand the structure, content and usage of each product in detail.	Oversight staff Managerial staff AIS technical staff
			Understand the personnel requirements and the competency framework.		Oversight staff Managerial staff AIS technical staff
			Recognize the key-control elements, such as AIRAC, coordination. Understand the need of control and update through AIRAC cycle.		Oversight staff Managerial staff AIS technical staff
			Understand automation concept regarding workflow, software and tools.		Oversight staff Managerial staff AIS technical staff
		AIM	Understand the AIM concept, the need for transition from AIS to AIM (roadmap), the need for quality assured data in ATM, the key issues for the AIM environment (that is, focus on formal agreements, data quality, QMS, digitalization, feedback mechanism, authentication of sources	Domain awareness promotes better understanding of the context of AIM within the broader aviation and ATM contexts, providing trainees with knowledge of why concepts and technologies need to develop.	Oversight staff Managerial staff AIS technical staff

<i>Reference to Doc 8126</i>	<i>Phase</i>	<i>Training topic</i>	<i>High level objective</i>	<i>Relevance to AIS and use case</i>	<i>Applicability</i>
			and security, change management considerations, implementation of AIM).		
		Data originators responsibilities	Understand the responsibilities of a data originator regarding data quality requirements and formal arrangements.	Domain awareness promotes better understanding of the context of AIM within the broader aviation and ATM contexts, providing trainees with knowledge of why concepts and technologies need to develop.	Oversight staff Managerial staff AIS technical staff
		Human factors	Understand human factors in an AIM environment.		Oversight staff Managerial staff AIS technical staff
		Security and safety	Understand the security and safety of aeronautical information.		Oversight staff Managerial staff AIS technical staff
Part II: Processing aeronautical data	Initial	Overview of the aeronautical data process	Understand the overview of the aeronautical data process, that is, AIS data management: collection, processing and distribution.		Oversight staff Managerial staff AIS technical staff
		Scope of aeronautical data	Understand the scope of aeronautical data, the use of data catalogue, the data quality requirements and the reference systems.		Oversight staff Managerial staff AIS technical staff
		Quality assurance and control	Understand quality assurance, control techniques and methods such as error reporting, corrective actions and feedback mechanism.		Oversight staff Managerial staff AIS technical staff
		Rules of the air			AIS technical staff
		Navigation	Understand aeronautical charts, air navigation, radio navigation, magnetic declination, as well as true, magnetic, grid and the World Geodetic System – 1984 (WGS-84).		AIS technical staff

<i>Reference to Doc 8126</i>	<i>Phase</i>	<i>Training topic</i>	<i>High level objective</i>	<i>Relevance to AIS and use case</i>	<i>Applicability</i>
		AD and heliport, runway, apron-taxiway, communication facilities.	Understand physical characteristics of AD and HP, runways and facilities at an aerodrome.		AIS technical staff
		ATS airspace, special activities airspace, aerial sporting activities, other regulated airspace, ATC sectors.	Understand the airspace classification and use.		AIS technical staff
		ATS route, waypoint, en-route holding.	Understand ATS route structures.		AIS technical staff
		Procedure, fix, procedure holding, helicopter procedure, notes on charts.	Understand procedural data.		AIS technical staff
		Radio NAVAID, GNSS, aeronautical ground lights, special navigation systems.	Understand navigational aids.		AIS technical staff
		Obstacles	Understand obstacles.		AIS technical staff
		Topographical and geographical data.	Understand topographical information.		AIS technical staff
		Terrain data	Understand terrain data.		AIS technical staff
		NOTAM	Understand NOTAM.		AIS technical staff
	Functional	Collection	Understand the data quality requirements, agreements and collection criteria (survey requirements, etc.).	Appreciation of land (aerodrome) surveying techniques used for data measurement and collection. Aids understanding of the data collection phase and interpretation of data once received into AIS.	AIS technical staff
		Processing	Understand the processing techniques: verification, validation, assembling of data and integrating validated data.		AIS technical staff
		Distribution	Understand the distribution methods (paper and electronic), timelines, metadata, secure transfer and data product specification (of product).		AIS technical staff

<i>Reference to Doc 8126</i>	<i>Phase</i>	<i>Training topic</i>	<i>High level objective</i>	<i>Relevance to AIS and use case</i>	<i>Applicability</i>
		Automation	Understand the benefits and basic principles in the operational environment of an AIS.		AIS technical staff
			Recognize components of an automated AIM system.		AIS technical staff
		Specialized software	Use of software, tools and applications applicable to job role.	To be able to demonstrate basic proficiency and understanding of all required software, tools and applications. Learning to be consolidated through the OJT phase.	AIS technical staff
Part III: Aeronautical information in a standardized presentation and related services	Initial	Aeronautical information products in a standardized presentation.	Recognize and understand the aeronautical information products in a standardized presentation (legacy products) of an AIS in terms of content, format, purpose, etc., that is, AIP, AIP amendments, AIP supplements and AIC.		AIS technical staff
		Services	Recognize and understand the AIS (legacy) service: pre-flight information service and post-flight information service.		AIS technical staff
	Specialized	eAIP	Structure of eAIP.		AIS technical staff
		NOTAM	NOTAM, trigger NOTAM, SNOWTAM, ASHTAM.		AIS technical staff
		Aeronautical charts	Overview of aeronautical charts.		AIS technical staff
			Projections		AIS technical staff
			Geodesy		AIS technical staff
	Specialized software	Use of software, tools and applications applicable to job role (cartographic and geographic information software (GIS) software and systems).	To be able to demonstrate basic proficiency and understanding of all required software, tools and applications. Learning to be consolidated through the OJT phase.	AIS technical staff	

<i>Reference to Doc 8126</i>	<i>Phase</i>	<i>Training topic</i>	<i>High level objective</i>	<i>Relevance to AIS and use case</i>	<i>Applicability</i>
Part IV: Digital aeronautical information products and related services (under development)	Specialized	Digital exchange of aeronautical information	Understand aspects of digital exchange of aeronautical information such as the need of global interoperability, aeronautical data and information exchange models (AIXM) and OGC standards (XML, GML, UML).	<p>To understand the key modelling rules (cardinality, temporality, metadata, UUID).</p> <p>To understand the AIXM and be able to describe syntactic and semantic business rules.</p> <p>To be able to describe the features and attributes of the model.</p> <p>To understand how and why AIXM has been developed and how it relates to other aviation exchange formats.</p> <p>Understanding of the open standards used in the AIXM model and how they provide business and formatting rules.</p>	AIS technical staff
			Understand the concept of SWIM and how it is applied to AIS.		
		Digital data sets	Understand aspects of digital data sets such as rules of constructions, data product specification, metadata requirements, validation and verification techniques of data sets and updates.		AIS technical staff
		Recognize and understand the aeronautical information products as digital data sets: AIP data set, terrain data set, obstacle data set, aerodrome mapping data set, instrument flight procedure data set and the future possible data sets such as digital NOTAM.	<p>To be able to describe the eTOD areas and how they are used and applied in AIS products.</p> <p>To be able to process, verify, validate and distribute ETOD data in accordance with local requirements.</p>		AIS technical staff
		Distribution services	Understand the distribution of aeronautical data and information in a digital environment.		AIS technical staff

<i>Reference to Doc 8126</i>	<i>Phase</i>	<i>Training topic</i>	<i>High level objective</i>	<i>Relevance to AIS and use case</i>	<i>Applicability</i>
		Specialized software	Use of software, tools and applications applicable to job role.	To be able to demonstrate basic proficiency and understanding of all required software, tools and applications. Learning to be consolidated through the OJT phase.	AIS technical staff
Part I: Regulatory framework for aeronautical information services, Chapter 2	Specialized	(CE3) State system and functions	Understand the State system and functions.		Oversight staff
		(CE4) Qualified technical personnel	Understand the requirement for technical personnel proficiencies.		Oversight staff
		(CE5) Technical guidance, tools and provision of safety critical information	Understand the implications of technical guidance, tools and provision of safety critical information.		Oversight staff
		(CE6) Licensing, certification, authorization and approval obligations	Recognise and identify the need for licensing, certification, authorization and approval obligations.		Oversight staff
		(CE7) Surveillance obligations	Understand surveillance obligations.		Oversight staff
		(CE8) Resolution of safety concerns	Recognize and resolve safety concerns.		Oversight staff
		Specialized software	Overview of software, tools and applications used in AIS.		Oversight staff
Part I, Appendix A: Aeronautical information services competency framework	Specialized	Competency-based training and assessment	Understand CBTA.		Managerial staff Oversight staff
			ICAO adapted training framework for AIS.	Requirement for publication of AIS products in a standardized presentation.	Managerial staff

ISBN 978-92-9265-994-3



9 789292 659943