



ICAO

Doc 9868

PROCEDURES FOR AIR NAVIGATION SERVICES

Training

Third Edition, 2020



This edition incorporates all amendments approved by the Council prior to 8 June 2020 and supersedes on 5 November 2020, all previous editions of Doc 9868.

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AMENDMENTS

Amendments are announced in the supplements to the *Products and Services Catalogue*; the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

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FOREWORD

1. HISTORICAL BACKGROUND

1.1 The *Procedures for Air Navigation Services — Training* (PANS-TRG) are the result of the evolution of the work initiated by the Flight Crew Licensing and Training Panel (FCLTP) on the implementation of the training required for the pilot licences and ratings found in Annex 1 — *Personnel Licensing*, including the multi-crew pilot licence (MPL).

1.2 The FCLTP, at its first meeting (Montréal, 8 to 19 December 2003), identified a clear need for licensing and training material that, although too detailed to take the form of Standards, was of sufficient importance to provide universal benefit to States. The need called for material that had to be harmonized and subjected to a formal consultation and approval process and that called for a higher level of adherence on the part of States than that required of guidance material. The FCLTP determined that the establishment of the PANS-TRG would be the appropriate document for use by all States.

1.3 The first amendment to the PANS-TRG was issued in 2011, following the work undertaken by the IATA Training and Qualifications Initiative on the development of a competency-based approach to the training and assessment of aircraft maintenance mechanics/technicians/engineers (AMMTEs), including those personnel with licensed or authorized privileges.

1.4 There is industry-wide consensus that, in order to reduce aircraft hull loss and fatal accident rates, a strategic review of recurrent training for airline pilots is necessary. Consequently, procedures for evidence-based training (EBT), developed by the IATA Training and Qualifications Initiative, were introduced in Amendment 2 to the PANS-TRG issued in 2013 and are intended as a means of assessing and training key areas of flight crew performance in a recurrent training system. In addition, qualifications of the instructor were expanded.

1.5 Between 2006 and 2010, aeroplane accidents resulting from a loss of control in flight (LOC-I) event were the leading cause of fatalities in commercial aviation. Recognizing the need to identify and effectively implement mitigating strategies, the prevention of aeroplane upsets quickly became an ICAO priority. Following extensive studies of the LOC-I phenomena, in collaboration with civil aviation authorities (CAAs), aviation accident investigative bodies, LOC-I focus groups, industry associations, original equipment manufacturers and subject matter experts from around the world, it became readily apparent that deficiencies in current training practices were contributing factors in most aeroplane upset-related accidents. Consequently, Amendment 3 to the PANS-TRG improved the existing ICAO Standards and Recommended Practices (SARPs) and supporting guidance material by introducing aeroplane upset prevention and recovery training (UPRT) requirements.

1.6 In 2015, the Next Generation of Aviation Professionals Task Force developed competency frameworks for air traffic controllers (ATCOs) and air traffic safety electronics personnel (ATSEP) to support the progressive implementation of competency-based training and assessment practices for air traffic management (ATM) personnel. This second edition of the PANS-TRG has been restructured and divided into different parts dealing with each category of personnel.

1.7 Amendment 5 was initially developed by the ICAO Competencies Task Force which was established in 2014 to review and clarify the existing competency-related definitions and concepts in ICAO provisions and organize them in a conceptual framework that would illustrate the relationships between the concepts.

1.8 In 2016, the Remotely Piloted Aircraft System Panel (RPASP) developed competency frameworks for remote pilots, RPAS instructors and remote pilot licence (RPL) examiners to complement SARPs being incorporated into Annex 1, Chapter 2, in a new subpart B. RPAS provisions were introduced into PANS-TRG in Amendment 6.

1.9 In 2018, the Secretariat, with the assistance of the Competency-based Training and Assessment Task Force, developed Amendment 7 to align the existing material in the PANS-TRG with Amendment 5 to the PANS-TRG and to update some references and procedures. Notable changes include the introduction of new ICAO competency frameworks.

2. SCOPE AND PURPOSE

2.1 The PANS-TRG is complementary to the SARPs. The PANS-TRG generally addresses competency-based training and assessment programmes that stakeholders may choose to implement.

2.2 The PANS-TRG's purpose is to support the training and qualification of personnel conducting activities affecting safety and for whom there are detailed SARPs in Annexes or procedures in PANS with requirements for such training and qualification.

2.3 The PANS-TRG specifies, in greater detail than in the SARPs, the actual procedures to be applied by training organizations when providing training for aeronautical personnel. This edition contains procedures for the development and implementation of various competency-based training and assessment programmes designed to meet the Annex 1 requirements for pilots, including the MPL, the RPL¹, the type rating and pilot instructors, and the AMMTE licence, as well as those flight crew training programmes developed under the EBT concept, which provides an alternative means of satisfying the recurrent training requirements of Annex 6 — *Operation of Aircraft, Part I — International Commercial Air Transport — Aeroplanes*. It also details the methodologies to successfully introduce aeroplane UPRT training at the commercial pilot (aeroplane) and MPL levels, as well as providing UPRT in a flight simulation training device at the commercial air transport pilot and type rating level to support the UPRT provisions promulgated in Annex 1 and Annex 6, Part I. The PANS-TRG also specifies procedures for the harmonized implementation of training procedures for ATM personnel and flight operations officers/flight dispatchers.

3. STATUS

3.1 The Procedures for Air Navigation Services (PANS) do not have the same status as SARPs. While the latter are *adopted* by Council in pursuance of Article 37 of the Convention on International Civil Aviation, and are subject to the full procedure of Article 90, the PANS are *approved* by the Council and recommended to Contracting States for worldwide application.

3.2 While the PANS may contain material that may eventually become SARPs when it has reached the maturity and stability necessary for adoption as such, they may also comprise material prepared as an amplification of the basic principles in the corresponding SARPs and designed particularly to assist the user in the application of those SARPs.

4. IMPLEMENTATION

The implementation of the PANS-TRG is the responsibility of Contracting States; they are applied in the actual training only after, and in so far as, States have enforced them. However, with a view to facilitating their processing towards implementation by States, they have been prepared in language that will permit direct use by the personnel of approved training organizations (ATOs) and others associated with the development and implementation of a training programme for the MPL, RPL, flight crew recurrent training, aeroplane UPRT, the AMMTE licence and ATM personnel.

¹ RPL applicable as of 3 November 2022.

5. PUBLICATION OF DIFFERENCES

5.1 The PANS do not carry the status afforded to Standards adopted by the Council as Annexes to the Convention and, therefore, do not fall under the obligation imposed by Article 38 of the Convention to notify differences in the event of non-implementation. Attention of States is drawn, however, to the provisions of Annex 15 related to the publication in their Aeronautical Information Publications of lists of significant differences between their procedures and the related ICAO procedures.

5.2 The ICAO course development methodology is based on the instructional systems design (ISD) model used for much of the competency-based training and assessment material in this document. It is, however, acknowledged that there are a variety of ISD models that may be equally appropriate and that States may wish to apply in the development of competency-based training and assessment. It may also be the case that no single methodology has all the elements needed and that a number of methodologies will have to be drawn upon for the design of a particular course. In addition, methodological prescriptions are counter-productive, as all training methodologies should display the flexibility and adaptability needed to accommodate changes in training circumstances, goals and technology. For this reason, differences in the systems approach methodologies and models used for the design of competency-based training and assessment need not be published, so long as the methodologies contain the ISD elements that govern the three basic procedural steps of a needs analysis, design and production, and evaluation.

6. CONTENTS OF THE DOCUMENT

Part I — General procedures

6.1 Chapter 1 — Definitions and acronyms

This chapter contains a list of terms and their technical meanings as used in this document. In some cases, the terms are defined in other ICAO documents.

6.2 Chapter 2 — General provisions for competency-based training and assessment

6.2.1 Developments in the late 1950s and 1960s in the application of systems engineering methodologies, such as ISD and the systems approach to training (SAT), to the design of training curricula resulted in the implementation of structured, performance-based training programmes. Competency-based training and assessment also evolved from later developments in mastery learning and criterion-referenced testing, whereby knowledge and skills had to be demonstrated at levels that met the entry-level occupational requirements, and assessments had to be based on observable behaviours or outcomes. The 1970s saw the widespread use of competency-based principles in both vocational and technical education and training in the United States which, by the 1980s and 1990s, had spread to Europe and to other parts of the world.

6.2.2 This chapter outlines the general principles and procedures to be followed in the design and implementation of a competency-based approach to training and assessment. Attachment A provides general considerations that should be taken into account when implementing competency-based training and assessment programmes including the relationship between competencies and tasks. Attachment B describes knowledge, skills and attitudes. Attachment C provides a generic methodology to design competency-based training and assessment based on the “analyse, design, develop, implement and evaluate (ADDIE)” principles.

6.3 Chapter 3 — Qualifications of course developers and instructors

Annex 1 contains Standards for the issuance of the flight instructor rating and for granting authorizations to flight instructors and flight simulation training device instructors. This chapter and its attachment contain the qualifications to be held, and the competencies to be demonstrated by instructors and course developers employed in a competency-based

training and assessment programme. In competency-based programmes, instructor competencies are made explicit, and instructors have to demonstrate these competencies throughout the training process and in their knowledge of the subject matter and training course content.

Part II — Training and assessment for aircraft operational personnel

6.4 Section 1 — Flight crew training and assessment

6.4.1 Chapter 1 — ICAO Competency Framework for Aeroplane Pilots

This chapter provides the procedures for establishing a competency-based training and assessment programme for aeroplane pilots, including an ICAO competency framework and a list of pilot tasks by phases of flight. The training programmes cover the various licences, ratings and recurrent training (the instructor rating or authorization and a designated pilot examiner require additional competencies).

6.4.2 Chapter 2 — Competency-based training and assessment for the multi-crew pilot licence (MPL)

This chapter outlines the principles and procedures that are applicable to the development and implementation of an MPL course and are to be followed in addition to those outlined in Part I, Chapter 2, using an adapted competency model based on the ICAO competency framework for aeroplane pilots. It provides guidelines for the implementation of an MPL training programme and an MPL training scheme. The attachments to this chapter contain guidance material on: the structure of the MPL training programme; examples of training specifications; and the tasks to be performed by MPL examiners and inspectors.

6.4.3 Chapter 3 — Evidence-based training (EBT)

This chapter is intended to provide guidance to CAAs, operators and ATOs in the recurrent training of pilots and remote pilots.

6.4.4 Chapter 4 — Upset prevention and recovery training (UPRT)

This chapter is intended to provide procedures to CAAs, operators and ATOs related to the delivery of UPRT for aeroplane pilots. This training is required for the MPL, the type-rating and the training of commercial air transport pilots, and is highly recommended for the CPL(A).

6.4.5 Chapter 5 — Competency-based training and assessment of flight crew personnel for the type rating

This chapter outlines the principles and procedures that are applicable to the development and implementation of a competency-based training and assessment programme for the type rating, in the aeroplane category.

6.4.6 Chapter 6 — Threat and error management

This chapter describes the threat and error management model and provides the procedures applicable to all pilots.

6.4.7 Chapter 7 — The ICAO pilot instructor and evaluator competency framework

This chapter provides the procedures for establishing a competency-based training and assessment programme for pilot instructors and evaluators, including an ICAO competency framework.

6.4.8 Chapter 8 — Competency-based training and assessment for the remote pilot licence

Chapter 8 outlines the principles and procedures that are applicable to the development and implementation of a remote pilot competency-based training and assessment programme.

6.4.9 Chapter 9 — Other flight crew members

[Reserved]

6.4.10 Chapter 10 — Flight validation pilots

[Reserved]

6.5 Section 2 — Cabin crew

[Reserved]

6.6 Section 3 — Flight operations officers/flight dispatchers

This section provides the procedures for establishing a competency-based training and assessment programme for flight operations officers/flight dispatchers, including an ICAO competency framework.

Part III — Training and assessment for aircraft maintenance personnel**6.7 Chapter 1 — Competency-based training and assessment for aircraft maintenance personnel**

This part outlines the principles and procedures for the development and implementation of a competency-based training and assessment programme for aircraft maintenance personnel in order to focus training and assessment on how an AMTEM is expected to competently perform on the job. The goal of competency-based training and assessment is to provide a competent workforce for personnel working in aircraft maintenance including those with certification privileges. The *Manual on Training of Aircraft Maintenance Personnel* (Doc 10098) contains guidance material on the design and development of an aircraft maintenance personnel training programme as well as examples of training objectives. Implementation of competency-based training and assessment programmes for AMTEM personnel is optional. Annex 1, Appendix 2, 3.1 enables the use of such competency-based training and assessment programmes as an alternative means of compliance with the Annex 1 experience requirements.

6.8 Chapter 2 — Competency-based training as applicable to maintenance licences and privileges

This Chapter provides material on the implementation of a competency-based approach to training and assessment for personnel working in aircraft maintenance, including those with certification privileges. This material is complementary to those provided in Part I, Chapter 2. Furthermore, the material will be useful to Licensing Authorities responsible for approving training programmes at approved maintenance organizations (AMOs) and approved training organizations (ATOs) for maintenance personnel.

6.9 Chapter 3 — The ICAO AMTEM developer, instructor and assessor qualification framework

[Reserved]

Part IV — Training and assessment for air traffic management personnel

6.10 Chapter 1 — General provisions for competency-based training and assessment for air traffic management (ATM) personnel

This chapter outlines the general principles and procedures to be followed in the design and implementation of competency-based training and assessment for ATM personnel. Implementation of competency-based training and assessment programmes for ATM personnel is optional.

6.11 Chapter 2 — Competency-based training and assessment for air traffic controllers (ATCOs)

This chapter outlines the principles and procedures that are applicable to the development and implementation of ATCO competency-based training and assessment and to be followed, in addition to those outlined in Part I, Chapter 2, by training organizations or air navigation services providers (ANSPs) opting for a competency-based approach. This chapter also contains the ICAO competency framework for Air Traffic Controllers. The use of such a competency framework is not an obligation but is recommended in order to achieve the best performance in ATCO training. The *Manual on Air Traffic Controller Competency-based Training and Assessment* (Doc 10056) contains guidance material on the design and development of an ATCO training programme as well as examples of training objectives.

6.12 Chapter 3 — Competency-based training and assessment for ATC on-the-job training instructors (OJTIs)

This chapter outlines the principles and procedures that are applicable to the development and implementation of OJTI competency-based training and assessment and to be followed in addition to those outlined in Part I, Chapter 2 of PANS-TRG by training organizations or air navigation services providers (ANSPs) opting for a competency-based approach. This chapter also contains ICAO competency framework for ATC on-the-job-training instructors (OJTIs). The use of such a competency framework is not an obligation but is recommended to achieve the best performance in ATC on-the-job-training instructors (OJTIs) training.

6.13 Chapter 4 — Competency-based training and assessment for air traffic safety electronics personnel (ATSEP)

This chapter outlines the principles and procedures that are applicable to the development and implementation of ATSEP competency-based training and assessment and to be followed in addition to those outlined in Chapter 1 by training organizations or ANSPs opting for a competency-based approach. Chapter 4 also contains the ICAO competency framework for the ATSEP. The use of such a competency framework is not an obligation but is recommended to achieve the best performance in ATSEP training. The *Manual on Air Traffic Safety Electronics Personnel Competency-based Training and Assessment* (Doc 10057) contains guidance material on the design and development of an ATSEP training programme as well as examples of training objectives.

Part V — Training and assessment for aerodrome personnel

[Reserved]

Part VI — Training and assessment for other aviation personnel

[Reserved]

Table A. Amendments to the PANS-TRG

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject(s)</i>	<i>Approved Applicable</i>
1st Edition (2006)	Flight Crew Licensing and Training Panel (2005)	<i>Procedures for Air Navigation Services — Training</i> (PANS-TRG)	19 July 2006 23 November 2006
1	Secretariat with the assistance of the Next Generation of Aviation Professionals (NGAP) Task Force and the International Air Transport Association (IATA) Training and Qualifications Initiative (ITQI)	New Chapter 4, supported by additional definitions, containing procedures to facilitate the implementation of competency- based training and assessment for aircraft maintenance personnel.	13 May 2011 25 August 2011
2	Secretariat with the assistance of the Next Generation of Aviation Professionals (NGAP) Task Force and the International Air Transport Association (IATA) Training and Qualifications Initiative (ITQI)	New Chapter 5 containing procedures supporting the implementation of the concept of evidence-based training (EBT), consisting of: a) the applicability, background and philosophy of EBT; and b) reference to guidance material providing the detailed means of implementation. The amendment also expands the qualifications of instructors in the current Chapter 5.	4 January 2013 2 May 2013
3	Secretariat	Amendment concerning the introduction of provisions regarding upset prevention and recovery training (UPRT) for aeroplane pilots.	23 April 2014 13 November 2014
2nd Edition (2016)	Secretariat; Next Generation of Aviation Professionals (NGAP) Air Traffic Management (ATM) Group	Amendment concerning restructuring and inclusion of competencies for air traffic controllers (ATCOs) and air traffic safety electronics personnel (ATSEP).	14 August 2015 10 November 2016
4			
5	ICAO Competencies Task Force	Revised definitions for terms related to competencies, a description of how competency-related concepts are interlinked and a generic methodology to design competency-based training and assessment.	13 July 2017 5 November 2020
6	Fifth and sixth meetings of the Remotely Piloted Aircraft Systems Panel (RPASP/5 and RPASP/6)	Regulatory structure for the issuance of remote pilot licences and the provision of a global framework for the regulation of remotely piloted aircraft systems (RPAS) licensing	6 August 2018 3 November 2022
7 (Third Edition)	ICAO Competency-based Training and Assessment Task Force (CBTA-TF) and the Secretariat	Amendment concerning: new definitions; introduction of air traffic control on-the-job training instructors provisions; and minor updates to existing provisions.	8 June 2020 5 November 2020

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Procedures for Air Navigation Services

TRAINING

Part I

GENERAL PROCEDURES

I-(i)



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Part I

GENERAL PROCEDURES

This part contains three chapters:

Chapter 1 contains the definitions and acronyms and their technical meanings as used in this document. In some cases, the terms are defined in other ICAO documents.

Chapter 2 outlines the general provisions for competency-based training and assessment and outlines the general principles and procedures to be followed in the design and implementation of a competency-based approach to training and assessment. Attachment A provides general considerations that should be taken into account when implementing competency-based training and assessment programmes including the relationship between competencies and tasks. Attachment B describes knowledge, skills and attitudes. Attachment C provides a generic methodology to design competency-based training and assessment based on the ADDIE principles.

Chapter 3 contains the qualifications to be held by course developers and instructors employed in a competency-based training and assessment programme.

Chapter 1

DEFINITIONS AND ACRONYMS

1.1 DEFINITIONS

When the following terms are used in this document, they have the following meanings:

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.

Air operator certificate (AOC). A certificate authorizing an operator to carry out specified commercial air transport operations.

Aircraft operating manual. A manual, acceptable to the State of the Operator, containing normal, abnormal and emergency procedures, checklists, limitations, performance information, details of the aircraft systems and other material relevant to the operation of the aircraft.

Note.— The aircraft operating manual is part of the operations manual.

Appropriate airworthiness requirements. The comprehensive and detailed airworthiness codes established, adopted or accepted by a Contracting State for the class of aircraft, engine or propeller under consideration.

Approved maintenance training organization (AMTO). An approved training organization performing training for aircraft maintenance technicians/engineers/mechanics.

Approved training organization (ATO). An organization approved by and operating under the supervision of a Contracting State in accordance with the requirements of Annex 1 to perform approved training.

Assessment. The determination by an instructor, assessor or evaluator as to whether a candidate meets a required competency standard under given conditions, by collecting evidence from observable behaviours. Assessment takes place during instruction and evaluation.

Assessment (evidence) guide. A guide that provides detailed information 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.

ATA chapters. A common industry referencing standard for aircraft technical documentation.

Note.— The competency frameworks of Part III, Chapter 1 use references to the ATA chapters numbering, due to its widespread use in civil aviation.

Basic training. Training which is generic in nature but essential in the role of particular activities.

Certify as airworthy (to). To certify that an aircraft or parts thereof comply with current airworthiness requirements after maintenance has been performed on the aircraft or parts thereof.

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.

Configuration deviation list (CDL). A list established by the organization responsible for the type design with the approval of the State of Design which identifies any external parts of an aircraft type which may be missing at the commencement of a flight, and which contains, where necessary, any information on associated operating limitations and performance correction.

Criterion-referenced test. A test, the measurement of which is compared with an objective standard (and not against another measurement).

Dispatch deviation procedures guide (DDPG). Manual to identify any procedure to dispatch an aircraft with allowable systems/components inoperative or missing.

Note.— Large aircraft manufacturers may choose to produce operating and maintenance procedures in documents such as dispatch deviation procedure guides, for use by operators.

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.

Error management. The process of detecting errors and responding to them with countermeasures that reduce or eliminate the consequences of errors and mitigate the probability of further errors or undesired states.

Note.— See Part II, Section 1, Chapter 6 and Circular 314 — Threat and Error Management (TEM) in Air Traffic Control for a description of undesired states.

Evaluator. A person authorized to conduct the formal and final summative assessment of a trainee's performance.

Event. A combination of a task or a sub-task and the conditions under which the task or sub-task is to be performed.

Facilitation technique. An active training method, which uses effective questioning, listening and a non-judgemental approach and is particularly effective in developing skills and attitudes, assisting trainees to develop insight and their own solutions and resulting in better understanding, retention and commitment.

Generic standard shop practices manual. Manual that has been developed by an operator or by an approved maintenance organization that provides guidance and direction to shop personnel with respect to all aspects of in-house procedures as applied to the various maintenance and maintenance support activities that has been accepted or approved by the regulator for the scope of activities for that organization.

Generic standard storage practices manual. Manual that has been developed by an operator or by an approved maintenance organization that provides guidance and direction to maintenance support personnel engaged in the storage and preservation of aircraft parts, components and other materials used in aircraft maintenance activities. The scope of the manual forms part of the organization's accepted or approved maintenance programme as indicated by the regulator.

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.

Human performance. Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.

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.

Instructional systems design (ISD). A formal process for designing training which includes analysis, design and production, and evaluation.

Large aeroplane. An aeroplane of a maximum certificated take-off mass of over 5 700 kg.

Maintenance. The performance of tasks on an aircraft, engine, propeller or associated part required to ensure the continuing airworthiness of an aircraft, engine, propeller or associated part including any one or combination of overhaul, inspection, replacement, defect rectification, and the embodiment of a modification or repair.

Maintenance defect reporting sheet. Used by aircraft maintenance personnel to report any defects and malfunctions being found during aircraft inspections.

Maintenance organization's procedures manual. A document endorsed by the head of the maintenance organization which details the maintenance organization's structure and management responsibilities, scope of work, description of facilities, maintenance procedures and quality assurance or inspection systems.

Maintenance programme. A document which describes the specific scheduled maintenance tasks and their frequency of completion and related procedures, such as a reliability programme, necessary for the safe operation of those aircraft to which it applies.

Maintenance record. Record that sets out the details of the maintenance carried out on an aircraft, engine, propeller or associated part.

Maintenance release. A document which contains a certification confirming that the maintenance work to which it relates has been completed in a satisfactory manner, in accordance with appropriate airworthiness requirements.

Master minimum equipment list (MMEL). A list established for a particular aircraft type by the organization responsible for the type design with the approval of the State of Design containing items, one or more of which is permitted to be unserviceable at the commencement of a flight. The MMEL may be associated with special operating conditions, limitations or procedures.

Minimum equipment list (MEL). A list which provides for the operation of aircraft, subject to specified conditions, with particular equipment inoperative, prepared by an operator in conformity with, or more restrictive than, the MMEL established for the aircraft type.

Modification. A change to the type design of an aircraft, engine or propeller.

Note.— A modification may also include the embodiment of the modification which is a maintenance task subject to a maintenance release. Further guidance on aircraft maintenance – modification and repair is contained in the Airworthiness Manual (Doc 9760).

Monitoring. A cognitive process to compare an actual to an expected state.

Note.— Monitoring is embedded in the competencies for a given role within an aviation discipline, which serve as countermeasures in the threat and error management model. It requires knowledge, skills and attitudes to create a mental model and to take appropriate action when deviations are recognized.

Non-destructive testing (NDT). An inspection technique used to test the condition of materials, components and systems used in aircraft, powerplants, associated systems, and components to examine these articles for condition and defects without causing damage to the item being inspected.

Note.— NDT methods may include but are not limited to ultrasonic, magnetic-particle, liquid penetrant, radiographic, eddy-current testing and structural health monitoring.

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.

Pilot flying (PF). The pilot whose primary task is to control and manage the flight path. The secondary tasks of the PF are to perform non-flight path related actions (radio communications, aircraft systems, other operational activities, etc.) and to monitor other crewmembers.

Pilot monitoring (PM). The pilot whose primary task is to monitor the flight path and its management by the PF. The secondary tasks of the PM are to perform non-flight path related actions (radio communications, aircraft systems, other operational activities, etc.) and to monitor other crewmembers.

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

Remote pilot station (RPS)¹. The component of the remotely piloted aircraft system containing the equipment used to pilot the remotely piloted aircraft.

Remotely piloted aircraft (RPA)*. An unmanned aircraft which is piloted from a remote pilot station.

Remotely piloted aircraft system (RPAS)*. A remotely piloted aircraft, its associated remote pilot stations, the required command and control links and any other components as specified in the type design.

Repair. The restoration of an aircraft, engine, propeller or associated part to an airworthy condition in accordance with the appropriate airworthiness requirements, after it has been damaged or subjected to wear.

¹ Applicable as of 3 November 2022.

Scenario (event-set). Relatively independent segment of training made up of several events.

Serviceability of an aircraft part. An approved part is serviceable when it meets approved design data applicable to that part and has been manufactured and subsequently maintained in accordance with the requirements of the State of Design, Manufacture or Registry, as applicable.

Small aeroplane. An aeroplane of a maximum certificated take-off mass of 5 700 kg or less.

Special standard practices/maintenance procedures manual. Manual establishing standard practices for selected processes to be applied by aircraft and component maintenance personnel for the proper handling (identification, application, working procedures, use of tools and quality standards) of standard aeronautical hardware; e.g. welding, NDT.

Standard parts. Parts, such as fasteners, which are considered as approved parts when in accordance with a national or industry accepted standard and when referenced in the type design of the particular aircraft.

Standard practices manual. Manual establishing standard practices to be applied by aircraft and component maintenance personnel for the proper handling (identification, application, working procedures, use of tools, and quality standards) of standard aeronautical hardware.

Standard wiring practices manual (SWPM). Manual establishing standard practices for processes in relation to any wiring used in aeronautical equipment to be applied by aircraft and component maintenance personnel for proper handling (identification, application, working procedures, use of tools and quality standards).

Threat. Events or errors that occur beyond the influence of an operational person, increase operational complexity and must be managed to maintain the margin of safety.

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

Threat management. The process of detecting threats and responding to them with countermeasures that reduce or eliminate the consequences of threats and mitigate the probability of errors or undesired states.

Note.— See Part II, Section 1, Chapter 6 and Circular 314 — Threat and Error Management (TEM) in Air Traffic Control for a description of undesired states.

Training for a particular maintenance rating. Training aimed at developing the set of particular competencies required to perform maintenance tasks on a type of equipment and in specific environments.

Note.— Such types of equipment include but are not limited to:

- a) a specific aircraft or a broad category of aircraft;
- b) an airframe or aircraft structure;
- c) engines;
- d) aircraft systems or components; and
- e) avionics systems or components.

Training for specialty rating. Training aimed at developing the set of particular competencies required to perform maintenance tasks on a specific type of equipment and in specific environments.

Note.— Such types of equipment include but are not limited to:

- a) a specific aircraft or a broad category of aircraft;
- b) an airframe or aircraft structure;
- c) engines;
- d) aircraft systems or components; and
- e) avionic systems or components.

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.

1.2 ACRONYMS

AD	Airworthiness directive
ADDIE	Analyse, design, develop, implement and evaluate
AMM	Aircraft maintenance manual
AMTEM	Aircraft maintenance technician/engineer/mechanic
AMO	Approved maintenance organization
AMTO	Approved maintenance training organization
ANSP	Air navigation services provider
APU	Auxiliary power unit
ATC	Air traffic control
ATCO	Air traffic controller
ATM	Air traffic management
ATO	Approved training organization
ATSEP	Air traffic safety electronics personnel
BITE	Built-in test equipment
CAA	Civil aviation authority

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CBTA	Competency-based training and assessment
CE	Competency element
CMM	Component maintenance manual
CPL(A)	Commercial pilot licence (aeroplane)
CRM	Crew resource management
CRS	Certificate of return to service
DDPG	Dispatch deviation procedures guide
EBT	Evidence-based training
FIM	Fault isolation manual
FOO	Flight operations officer/flight dispatcher
FSTD	Flight simulation training device
ICAs	Instruction for continued airworthiness
IOE	Initial operating experience
ISD	Instructional systems design
KSA	Knowledge, skills and attitudes
LOC-I	Loss of control in flight
LOSA	Line operations safety audit
LWTR	Licence without type rating (an aircraft maintenance technician/engineer/mechanic licence)
MEL	Minimum equipment list
MM	Maintenance manual
MMEL	Master minimum equipment list
MOPM	Maintenance organization's procedures manual
MPL	Multi-crew pilot licence
MRM	Maintenance resource management
NDT	Non-destructive testing
OB	Observable behaviour
OEM	Original equipment manufacturer

OJT	On-the-job training
OJTI	On-the-job training instructor
PC	Performance criteria
QA	Quality assurance
QS	Quality system
RPA ²	Remotely piloted aircraft
RPAS*	Remotely piloted aircraft system
RPL*	Remote pilot licence
RPS*	Remote pilot station
SARPs	Standards and Recommended Practices
SMPM	Special maintenance procedures manual
SMS	Safety management system
SOP	Standard operating procedure
SPM	Standard practices manual
SRM	Structural repair manual
SWPM	Standard wiring practices manual
TEM	Threat and error management
TR	Type rating (on an aircraft maintenance technician/engineer/mechanic licence)
UPRT	Upset prevention and recovery training

² Applicable as of 3 November 2022.

Chapter 2

GENERAL PROVISIONS FOR COMPETENCY-BASED TRAINING AND ASSESSMENT

2.1 INTRODUCTION

2.1.1 The goal of competency-based training and assessment is to provide a competent workforce for the provision of a safe and efficient air transportation system. In order to focus training and assessment on how an aviation professional is expected to competently perform on the job, a description of this performance in the particular operational and environmental context is needed. The adapted competency model, with its associated performance criteria, provides a means of assessing whether trainees achieve the desired performance.

2.1.2 The provisions in this chapter:

- a) describe the relationships between key concepts in competency-based training and assessment;
- b) outline the general principles and procedures to be followed in the design and implementation of competency-based training and assessment; and
- c) are applicable to all subsequent chapters of this document.

2.1.3 The ICAO competency frameworks in Parts II to IV of this document, as well as those in ICAO manuals, are generic models. Organizations implementing competency-based training and assessment in a given aviation discipline shall adapt the corresponding competency frameworks provided in Parts II to IV to reflect their specific local environment and requirements. Additional considerations to be taken into account when implementing a competency-based training and assessment approach can be found in Attachment A to this chapter.

2.2 PRINCIPLES OF COMPETENCY-RELATED TRAINING AND ASSESSMENT

2.2.1 Relevant competencies are clearly defined for a particular role within an aviation discipline.

2.2.2 There is an explicit link between competencies and training, required performance on the job, and assessment.

2.2.3 Competencies are formulated in a way that ensures they can be trained for, observed and assessed consistently in a wide variety of work contexts for a given aviation profession or role.

2.2.4 Trainees successfully demonstrate competency by meeting the associated competency standard.

2.2.5 Each stakeholder in the process including the trainee, instructor, training organization, operator, service provider and regulator has a common understanding of the competency standards.

2.2.6 Clear performance criteria are established for assessing competence.

2.2.7 Evidence of competent performance is valid and reliable.

2.2.8 Instructors' and assessors' judgements are calibrated to achieve a high degree of inter-rater reliability.

2.2.9 Assessment of competencies is based on multiple observations across multiple contexts.

2.2.10 To be considered competent, an individual demonstrates an integrated performance of all the required competencies to a specified standard.

2.3 ASSUMPTIONS

In this document, it is assumed that:

- a) all tasks performed by an aviation professional require the application of a relevant set of competencies;
- b) competencies are defined for each aviation function/profession/role (pilots, cabin crew, air traffic controllers, air traffic safety electronics personnel, designated medical examiners, dispatchers, etc.) and applied to the individual; and
- c) aviation professionals apply a set of competencies in a given role throughout their career (e.g. private, commercial, multi-crew and airline transport pilots will demonstrate the same set of competencies but with different degrees of performance).

2.4 STRUCTURE OF AN ICAO COMPETENCY FRAMEWORK

2.4.1 In ICAO, a competency framework is structured as shown in Table I-2-1.

Table I-2-1. Structure of an ICAO competency framework

<i>ICAO competency</i>	<i>Description</i>	<i>Observable behaviour (OB)</i>
ICAO Competency 1	Description 1	OB 1
		OB 2
		OB n
ICAO Competency 2	Description 2	OB 1
		OB 2
		OB n
ICAO Competency n	Description n	OB 1
		OB 2
		OB n

2.4.2 The subsequent parts of this document contain ICAO competency frameworks for the different aviation disciplines. For example, one of the competencies for an air traffic controller in the ICAO competency framework is “communication” and can be described and broken down in observable behaviours as shown in Table I-2-2.

Table I-2-2. Example of a competency in an ICAO competency framework

<i>ICAO competency</i>	<i>Description</i>	<i>Observable behaviour (OB)</i>
Communication	Communicate effectively in all operational situations	Selects communication mode that takes into account the requirements of the situation
		Speaks clearly, accurately and concisely
		Uses appropriate vocabulary and expressions to convey clear messages
		Uses standard radiotelephony (RT) phraseology
		Adjusts speech techniques to suit the situation
		Demonstrates active listening and provides feedback
		Uses plain language when RT phraseology does not exist or the situation requires it
		Uses eye contact, body movements and gestures that are consistent with verbal messages

2.5 STRUCTURE OF ADAPTED COMPETENCY MODELS

The purpose of competency-based training and assessment is to train and assess the capacity of an individual to perform at the standard expected in an organizational workplace. Therefore, organizations electing to implement competency-based training and assessment in a discipline covered in this document shall adapt the corresponding ICAO competency framework to suit their context by developing an adapted competency model to include the elements in Table I-2-3.

Table I-2-3. Elements of an adapted competency model

<i>Adapted competency</i>	<i>Description</i>	<i>Performance criteria</i>		
		<i>Observable behaviour (OB)</i>	<i>Competency assessment</i>	
Adapted competency 1	Description 1	OB 1	Final competency standard	Conditions
		OB 2		
		OB n		
Adapted competency 2	Description 2	OB 1		
		OB 2		
		OB n		
Adapted competency n	Description n	OB 1		
		OB 2		
		OB n		

2.6 COMPONENTS OF A COMPETENCY-BASED TRAINING AND ASSESSMENT PROGRAMME

2.6.1 A training specification describes the purpose of training, the task list and the requirements that shall be fulfilled when designing the training.

2.6.2 An adapted competency model is 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.

2.6.3 An assessment plan provides the process and tools for gathering valid and reliable evidence at different stages during training.

2.6.4 A training plan describes the training required to achieve the competencies. It includes but is not limited to a syllabus (including knowledge, skills and attitudes (KSA), milestones, lesson plans and schedules). See Attachment B to this chapter for a description of KSA.

2.6.5 Training and assessment materials and resources (i.e. human, material and organizational resources) include everything needed to implement training and assessment plans.

2.6.6 Figure I-2-1 illustrates the various components needed to build a competency-based training and assessment programme.

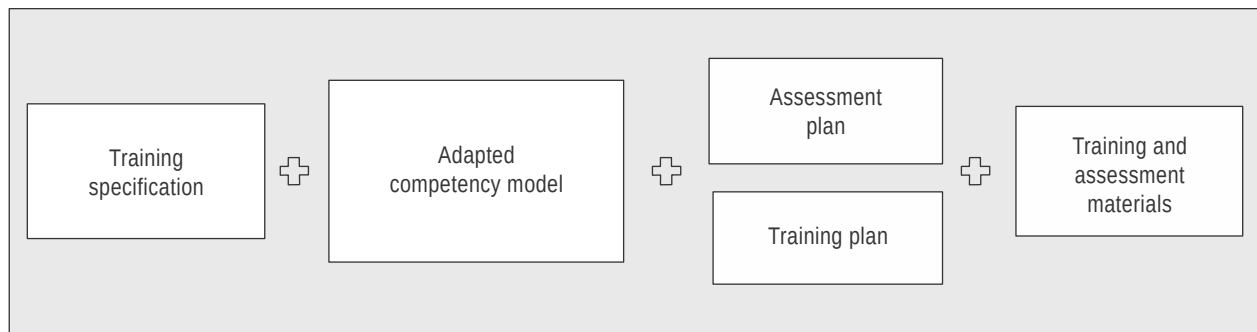


Figure I-2-1. Competency-based training and assessment components

2.7 INSTRUCTIONAL SYSTEMS DESIGN

It is recognized that there are several valid instructional systems design (ISD) models that may be used to design competency-based training and assessment. They can serve as a basis to derive the components of competency-based training and assessment as described above. The analyse, design, develop, implement and evaluate (ADDIE) framework is generic to all ISD models. See Attachment C to this chapter for a detailed description of an ADDIE methodology.

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Attachment A to Chapter 2

GENERAL CONSIDERATIONS RELATED TO COMPETENCY-BASED TRAINING AND ASSESSMENT

1. Benefits of competency-based training and assessment

The main benefit of a competency-based approach to training and assessment is its potential to encourage and enable individual aviation professionals to reach their highest level of operational capability while ensuring a basic level of competence as a minimum standard.

2. Challenges

The evolution in the understanding of how people learn and the growing complexity resulting from the introduction of new technologies and operating methods present continuous challenges to the approach to training, especially within limited timeframes and budgets. Some of these challenges are to:

- a) ensure that what is trained is relevant to the job;
- b) achieve a more effective ratio between learning opportunities and checking/assessment. This implies a shift towards more learning opportunities;
- c) ensure the integration of knowledge, skills and attitudes (KSA) needed to perform effectively;
- d) ensure that the full potential of training tools and methodologies is exploited;
- e) support continuous learning and performance improvement over the span of an aviation professional's career;
- f) achieve transfer of KSA across contexts and operational situations; and
- g) establish sufficient, well-trained and competent teachers/instructors.

Competency-based training and assessment can be used to address many of these challenges.

3. Relationship between competencies and tasks

3.1 Traditional approaches to training development involve the decomposition of jobs into tasks. For each task there is a related objective, an assessment and associated elements in a training plan. A limitation of this approach is that each task must be taught and assessed. In complex systems or when jobs evolve rapidly, it may not be possible to teach and assess each task. Moreover, learners may demonstrate the ability to perform tasks in isolation without being competent in their job.

3.2 Competency-based training and assessment is based on the concept that competencies are transferable. In the design of a competency-based training and assessment programme, a limited number of competencies are defined. Typically, an activity will involve several competencies and competencies apply across a variety of activities and contexts. In the design of training and assessments, tasks and activities are incorporated because they are good candidates for facilitating, developing or assessing a competency or competencies. Specific tasks may be used to develop specific competencies. Lack of specific competencies may be identified as root causes of the failure of the performance of a task.

4. Best practices that support competency-based approaches to training and assessment

To gain the maximum value and achieve efficiencies, competency-based approaches should incorporate training best practices as follows:

- a) organizations encourage and support learning in formal and informal settings at different stages in an aviation professional's work life;
- b) training programmes focus on the quality of what trainees do and achieve during training rather than on the prescribed amount of time aviation professionals spend training;
- c) training focuses on accommodating an individual trainee's needs and provides flexibility; and
- d) the highest quality and level of consistency of instruction is provided and particular attention is given to coaching, facilitation and mentoring.

Attachment B to Chapter 2

KNOWLEDGE, SKILLS AND ATTITUDES

1. General

In order to display certain observable behaviours and demonstrate the achievement of performance criteria, aviation professionals call on relevant knowledge, skills and attitudes (KSA) appropriate to a specific role and context. This ability will vary depending on the level of experience and expertise of the aviation professional.

2. Knowledge

2.1 Knowledge is specific information required to enable a learner 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.

2.2 Knowledge is an outcome of the learning process, whether learning occurs in formal or informal settings. There are different types of knowledge: declarative (e.g. facts and raw data), procedural (e.g. categorized/ contextualized and application of conditional if-then rules), strategic (e.g. synthesis, inference to guide resource allocation for decision making, problem solving and behavioural action), and adaptive (e.g. generalization, innovation and invention).

3. Skills

3.1 A skill is an ability to perform an activity or action. It is often divided into three types: motor, cognitive and metacognitive skills.

3.2 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.

3.3 A cognitive skill is any mental skill used in the process of acquiring knowledge, such as reasoning, perception and intuition.

3.4 A metacognitive skill relates to the ability of learners to monitor and direct their own learning processes (“thinking about thinking”); for example, planning how to approach a given learning task, monitoring comprehension and evaluating progress toward the completion of a task.

4. Attitudes

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

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Attachment C to Chapter 2

DESIGN OF COMPETENCY-BASED TRAINING AND ASSESSMENT

1. General

This attachment provides a step-by-step guide for organizations intending to establish competency-based training and assessment that is specific to their environment and requirements. It makes use of the ICAO competency framework and the ADDIE model.

2. Overview of competency-based training and assessment workflows

2.1 The five competency-based training and assessment workflows using the ADDIE model are presented in Figure I-2-C-1:

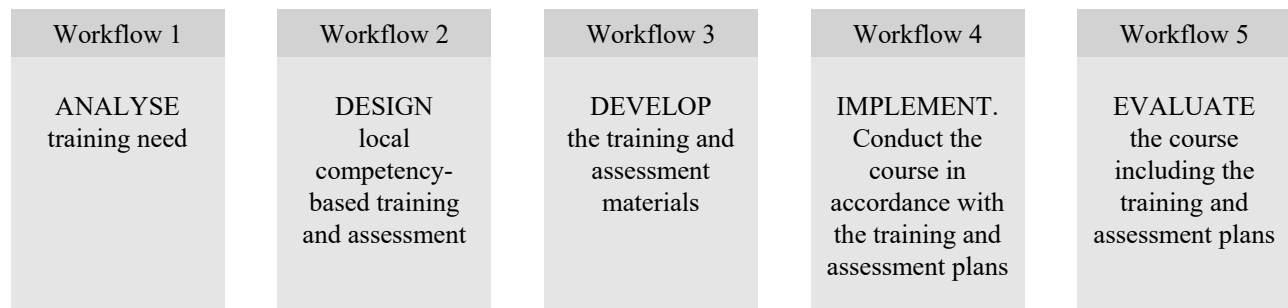


Figure I-2-C-1. Competency-based training and assessment workflows

2.2 The workflows relate to the components of competency-based training and assessment programmes presented in Figure I-2-1. Workflows 1 and 2 establish the training specification, adapted competency model, assessment plan and training plan that will be used to develop and conduct the training course (as outlined in Workflows 3 and 4). Workflow 5 reviews the effectiveness of the training and assessment conducted and recommends improvements, as appropriate.

2.3 This attachment focuses on Workflows 1 and 2. An overview of the remaining workflows is also provided (see sections 5, 6 and 7 of this attachment). A stepped approach is used for Workflows 1 and 2 and details:

- the inputs required;
- the process to be worked through; and
- the outputs achieved on completion of each process.

Note.— The output of Workflow 1 becomes one of the inputs for Workflow 2.

3. Workflow 1: Analyse training need

3.1 The need to develop training may be triggered in various ways; however, the training designer typically receives some form of training request that provides details on what should be trained and why it is necessary.

3.2 The first step in the development of a competency-based training and assessment programme is to conduct a training needs analysis (see Figure I-2-C-2). During training needs analysis, the purpose of the training is considered in relation to the local operational, technical, regulatory and organizational requirements on the training course that will eventually be delivered. A training specification is developed that details the requirements that need to be fulfilled when designing the training.

Workflow 1

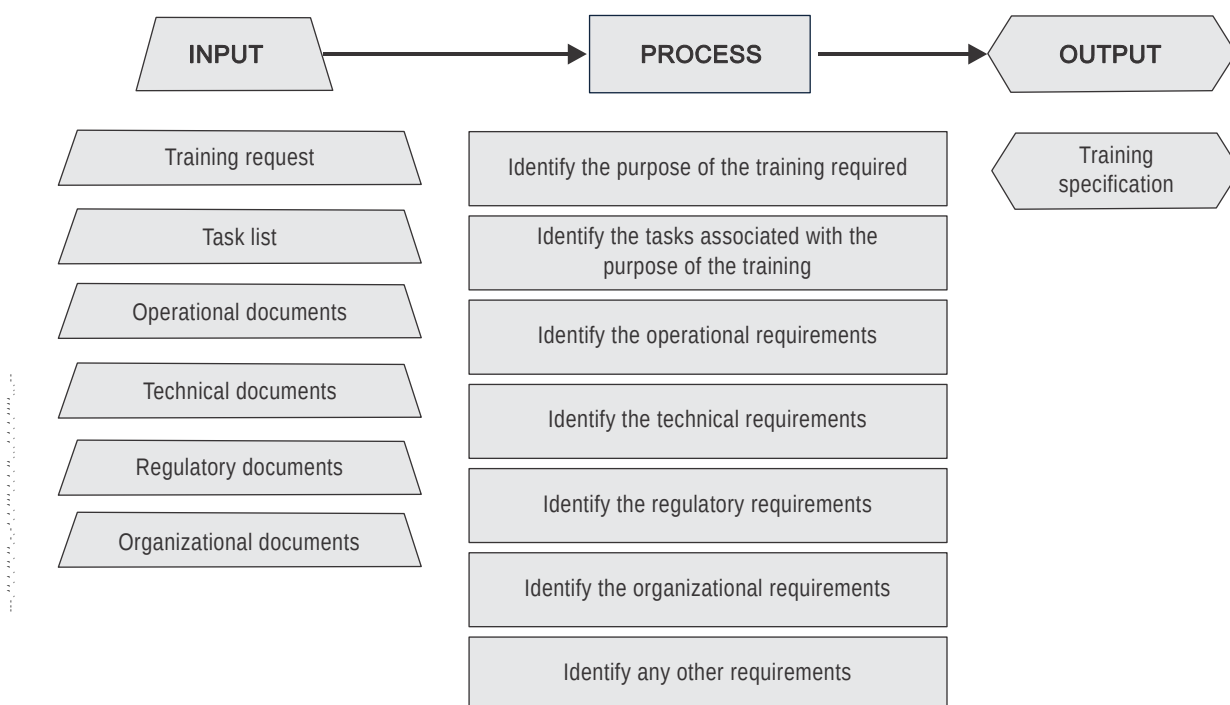


Figure I-2-C-2. Workflow 1 — Analyse training need

3.3 The training specification should provide sufficient detail to answer the questions below.

3.3.1 Purpose

3.3.1.1 What is the purpose of the training?

Note.— This is taken directly from the training request. There is considerable variation in the amount of detail that is provided in a training request but typically it will indicate the purpose of the training as a minimum.

3.3.1.2 What is(are) the phase(s) of training (e.g. initial, unit, refresher, recurrent and/or conversion training)?

3.3.1.3 What qualification, if any, will the trainee achieve on successful completion of the training?

Note.— In some instances a formal qualification will be achieved at the end of the training (e.g. aerodrome control rating or validation on XYZ sector). In other instances this is not the case (e.g. after routine refresher training).

3.3.2 Tasks

What are the tasks associated with the purpose of the training?

Note.— For the purposes of defining the training specification, only a task list is required. This task list may be extracted from an existing job and task analysis or may be taken from the operations manual that has listed the various roles and responsibilities in the operations environment. In some instances, this task list may need to be developed.

3.3.3 Operational requirements

3.3.3.1 Which operational procedures will be applied?

3.3.3.2 In what operational environment will the training take place?

3.3.3.3 Which non-routine situations are necessary for successful completion of the training?

3.3.3.4 What is the configuration of the working environment?

3.3.4 Technical requirements

What specific operational (or simulated operation) systems and/or equipment are necessary to achieve the purpose of the training?

3.3.5 Regulatory requirements

3.3.5.1 Which rules and regulations are applicable?

3.3.5.2 Are there any regulatory requirements that will affect the following aspects of the training design:

a) duration;

b) content;

- c) assessment procedures;
- d) course approval; or
- e) other (equipment, qualifications of instructors, trainee-to-instructor ratios, etc.)?

Note 1.— This is recorded in the training specification to ensure that such issues are considered during the training design.

Note 2.— Typical regulatory requirements may include minimum number of hours of experience in the operational environment under supervision (e.g. Annex 1 — Personnel Licensing), minimum list of knowledge subjects to be covered, etc.

3.3.6 Organizational requirements

What organizational requirements may impact training?

Note.— In some instances, an organization may wish to achieve additional objectives that are required to be included or emphasized in the training (e.g. strategic objectives such as reducing delays or customer focus).

3.3.7 Other requirements

What other requirements may impact training?

Note.— This question captures any other requirements that may not have been covered in the previous questions (e.g. more than one language to be used).

3.3.8 Simulator equipment

What simulation requirements, if any, are necessary to achieve the training outcome?

Note.— Either state the type of simulator (e.g. part-task trainer, hi-fidelity simulator or operational controller working position emulator) or the simulator/manufacturer name.

4. Workflow 2 — Design local competency-based training and assessment

4.1 The purpose of Workflow 2 is to:

- a) establish an adapted competency model that addresses the training specification identified in Workflow 1;
- b) design an assessment plan that will be used to assess the competence of trainees; and
- c) design the training plan that will enable the development and delivery of the training course.

4.2 Workflow 2 is shown in two parts:

- a) Part 1 deals with the design of the adapted competency model; and
- b) Part 2 deals with the design of the assessment and training plans.

Note.— The processes for developing the assessment and training plans are iterative. The outputs, however, are separate. Consequently, Workflow 2, Part 2 incorporates processes and outputs for the assessment and the training plans.

4.3 Workflow 2, Part 1 — Design the adapted competency model

4.3.1 To design an adapted competency model, the appropriate ICAO competency framework is adapted to meet the organizational competency requirements using the information contained in the training specification. Figure I-2-C-3 illustrates the design process.

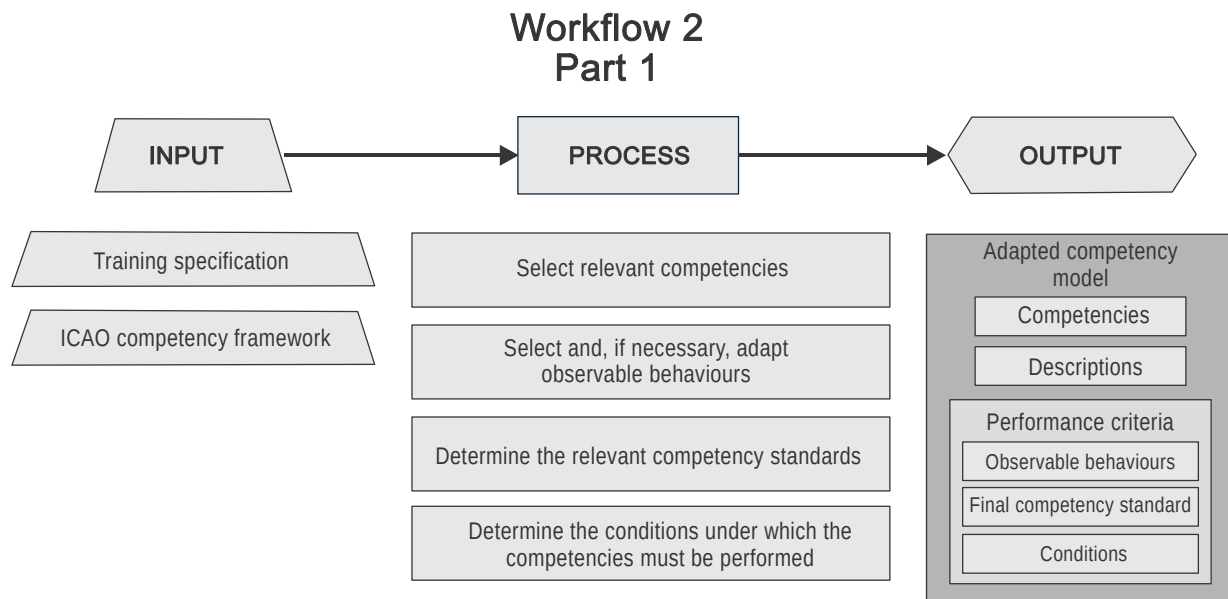


Figure I-2-C-3. Workflow 2, Part 1 — Design the adapted competency model

4.3.2 Selection of the competencies

ICAO competency frameworks provide a set of generic competencies that are necessary to perform in a given aviation discipline. Therefore, it is anticipated that the vast majority of adapted competency models will contain similar lists of competencies. Should it be decided to add or remove a competency, there should be a clear and justifiable reason to do so.

4.3.3 Selection and adaptation of the observable behaviours

ICAO competency frameworks provide 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.

4.3.4 Determining competency standards

Competency standards apply to all observable behaviours and relate to the standards and procedures, and rules and regulations, contained in such documents as national regulations, operations manuals, policies and procedures manuals. In some instances, there may be specific standards associated with a particular observable behaviour.

4.3.5 Determining conditions

4.3.5.1 The training specification completed in Workflow 1 may be used to identify some of the conditions that are specific to the environment in which performance will be demonstrated. Most of the conditions will apply generically to all of the observable behaviours that have been identified as part of the adapted competency model. However, in very few instances, specific conditions may be associated with some observable behaviours.

4.3.5.2 The conditions for the adapted competency model and the final competency standard are the same. As part of the progression towards the final competency standard, it may be necessary to establish interim competency standards. How the conditions are modified to establish interim competency standards is covered in 4.4.1.4.

4.3.5.3 There are different types of conditions that may be considered for the final competency standard: conditions relating to context (nature and complexity of the operational and environmental context); conditions relating to tools and systems or equipment; and conditions relating to the level of support or assistance a trainee can expect from the instructor or assessor.

4.3.5.4 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.

4.3.5.5 Consequently, for this condition in the adapted competency model (i.e. the description of the final competency standard), the trainee would be expected to be performing independently without assistance from the instructor.

4.4 Workflow 2, Part 2 — Design the assessment and training plans

4.4.1 Issues to consider before developing assessment and training plans

When developing the assessment and training plans, it is important to consider:

- a) the principles of competency-based assessment;
- b) typical assessment methods;
- c) the concept of milestones; and
- d) final competency standard and interim competency standards.

The relationship between the adapted competency model and the training and assessment plans should also be understood (see 4.5).

4.4.1.1 Principles of assessment in a competency-based environment

In a competency-based environment the following principles apply:

- a) *Clear performance criteria are used to assess competence.* The adapted competency model establishes these performance criteria.
- b) *An integrated performance of the competencies is observed.* The trainee undergoing assessment must demonstrate all competencies and their seamless interaction with each other.
- c) *Multiple observations are undertaken.* To determine whether or not a trainee has achieved the interim and/or final competency standard, multiple observations must be carried out.
- d) *Assessments are valid.* All of the competencies that comprise the adapted competency model must be assessed. There must be sufficient evidence to ensure that the trainee achieves the competency and meets the interim competency standards and/or the final competency standard. The trainee must not be asked to provide evidence for or be assessed against activities that are outside the scope of the adapted competency model.
- e) *Assessments are reliable.* All assessors should reach the same conclusion when performing an assessment. All assessors should be trained and monitored to achieve and maintain an acceptable level of inter-rater reliability.

4.4.1.2 Assessment methods

4.4.1.2.1 The primary method for assessing performance is the conduct of practical assessments which should serve to verify the integrated performance of competencies. It may be necessary to supplement practical assessments with other forms of evaluation. The supplemental evaluations may be included as a result of regulatory requirements and/or a decision that these methods are necessary to confirm that competence has been achieved.

4.4.1.2.2 Practical assessments take place in either a simulated or operational environment. There are two types of practical assessment: formative assessments and summative assessments. Formative and summative assessments are conducted based on 4.6.6 and 4.6.7.

4.4.1.2.2.1 *Formative assessments*

4.4.1.2.2.1.1 Formative assessments are a part of the learning process. Instructors provide feedback to the trainees on how they are progressing toward the interim or final competency standard. This type of assessment enables the trainees to progressively build on competencies already acquired and should aid learning by identifying gaps as learning opportunities. If trainees receive feedback or are assessed only at the end of the training, they will have no opportunity to use that information to improve their performance. The frequency and number of formative assessments may vary depending on the duration of the training and the syllabus structure and its assessment plan (see 4.6).

4.4.1.2.2.1.2 Formative assessments should serve to:

- a) motivate trainees;
- b) identify strengths and weakness; and
- c) promote learning.

4.4.1.2.2.2 *Summative assessments*

4.4.1.2.2.2.1 Summative assessments provide a method that enables the instructor/assessor to work with a trainee to collect evidence of the competencies and performance criteria to be demonstrated with respect to the interim or final competency standard(s). Summative assessments are carried out at defined points during the training and/or at the end of training. During summative assessments, the decision is either “competent” or “not competent” with respect to the interim or final competency standard(s). However, this can be further developed into a more refined grading system with a scale of judgements to improve feedback for the trainee and training personnel.

4.4.1.2.2.2.2 Summative assessments that are conducted during the course to evaluate the progress of the trainee are typically carried out by the instructing team. It may be advantageous if the instructors conducting these assessments were different from the instructors who routinely work with the trainee. Summative assessments conducted at the end of training and that lead to the issue of a licence and/or rating have both legal and safety implications. Therefore, the personnel carrying out these assessments should have the necessary competencies to assess objectively and meet the authority’s requirements. Such personnel should be provided with the tools necessary to collect evidence in a systematic and reliable manner in order to ensure inter-rater reliability.

4.4.1.2.3 The list of methods below that supplement practical assessments is not intended to be restrictive. Any suitable supplemental method for assessing competence may be used. Other methods may include projects and group assignments.

4.4.1.2.3.1 *Oral assessment*

4.4.1.2.3.1.1 Oral assessment is a method that may be used to supplement a summative assessment. Practical assessment has some limitations including:

- a) it may not be possible to observe a representative cross-section of all the competencies and/or the operation; and
- b) it is not feasible to enter into discussions with the trainees while they are undertaking the practical assessment.

4.4.1.2.3.1.2 The oral assessment provides the assessor with the opportunity to target those areas of performance that could not realistically be observed in the practical environment (e.g. emergencies or seasonal issues) and to refocus on actions observed during the practical assessment that may have been cause for concern.