



ICAO

Doc 10106

Manual on Flight Operations Officers/Flight Dispatchers Competency-based Training and Assessment

First Edition (Revised), 2021



Approved by and published under the authority of the Secretary General

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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

The *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868) was developed initially by the Flight Crew Licensing and Training Panel (FCLTP) to implement the training required for the pilot licences and ratings found in Annex 1 — *Personnel Licensing*, including the multi-crew pilot licence (MPL). Subsequent amendments have included provisions for aircraft maintenance mechanics/technicians/engineers (AMMTes), air traffic control officers (ATCOs), air traffic safety electronics personnel (ATSEP) and flight operations officers/flight dispatchers.

This manual provides guidance on applying the competency-based training methodology, as outlined in the PANS-TRG, to the development of training courses for flight operations officers (FOO)/flight dispatchers.

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GLOSSARY

ACRONYMS

The following abbreviations are used in this document:

ACAS	Airborne collision avoidance system
ACMI	Aircraft, crew, maintenance, and insurance
ACM	Aircraft flight manual
AD	Aerodrome
ADIRU	Air data inertial reference unit
AIP	Aeronautical information publication
AMMTE	Aircraft maintenance mechanic/technician/engineer
AOC	Air operator certificate
APV	Approach procedure with vertical guidance
ARM	Aircraft recovery manual
ASTEP	Air traffic safety electronics personnel
AT	Auto-throttle
ATC	Air traffic control
ATCO	Air traffic control officer
ATM	Air traffic management
ATO	Approved training organization
CAT	Category
CBTA	Competency-based training and assessment
CDL	Configuration deviation list
CG	Centre of gravity
CT	Classroom training
CTA	Classroom training and assessment
DGR	Dangerous goods regulations
DRM	Dispatch resource management
EBT	Evidence-based training
EFB	Electronic flight bag
EGT	Exhaust gas temperature
EPR	Engine pressure ratio
ETA	Estimated time of arrival
ETOPS	Extended range operations by twin-engined aeroplane
ETP	Equal time point
EVS	Enhanced vision system
FANS	Future air navigation systems
FCLTP	Flight Crew Licensing and Training Panel
FCOM	Flight crew operating manual
FCTM	Flight crew training manual
FD	Flight dispatcher (advanced competency level, operator/role specific)
FOD	Foreign object debris
FOO	Flight operations officer (basic competency level, not operator/role specific)
FM	Flight manual
FMA	Flight mode annunciator
FMS	Flight management system

FPL	Flight plan
GBAS	Ground-based augmentation system
HOT	Hold-over time
HPL	Human performance and limitations
HUD	Head-up display
ICAO	International Civil Aviation Organization
IDG	Integrated drive generator
IFR	Instrument flight rules
IGV	Inlet guide vane
IRS	Inertial reference system
KPI	Key performance indicator
LMS	Learning management system
LO	Learning objective
NCAA	National Civil Aviation Authority
MEL	Minimum equipment list
MMEL	Master minimum equipment list
MMO	Maximum Mach operating speed
MPL	Multi-crew pilot licence
MSA	Minimum sector altitude
NAV	Navigation
NAVAIDS	Navigational aids
OAT	Outside air temperature
OB	Observable behaviour
OCC	Operations control centre
OCO	Operations control officer (advanced competency level, operator/role specific)
ODM	Operating data manual
OM-A	Operations manual, Part A
OM-B	Operations manual, Part B
OPS ENG	Operations engineer (advanced competency level, operator/role specific)
PACOTS	Pacific Organized Track System
RAIM	Receiver autonomous integrity monitoring
RAT	Ram air turbine
RI	Remote interaction
ROC	Rate of climb
RWY	Runway
SMS	Safety management system
SOP	Standard operating procedure
SBAS	Satellite-based augmentation system
TAS	True air speed
TEM	Threat and error management
TO/LDG	Take-off and landing
VSI	Vertical speed indicators
VFR	Visual flight rules
WBM	Weight and balance manual

DEFINITIONS

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.

Flight operations officer/flight dispatcher. A person designated by the operator to engage in the control and supervision of flight operations, whether licensed or not, suitably qualified in accordance with Annex 1, who supports, briefs and/or assists the pilot-in-command in the safe conduct of the flight.

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

Operational Control. The exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of the flight.

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.

PUBLICATIONS

(referred to in this manual)

Annexes to the Convention on International Civil Aviation

Annex 1 — Personnel Licensing

Annex 3 — Meteorological Service for International Air Navigation

Annex 19 — Safety Management

Procedures for Air Navigation Services (PANS)

Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444)

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

Manuals

Manual of Procedures for Operations Inspection, Certification and Continued Surveillance (Doc 8335)

Human Factors Training Manual (Doc 9683)

Safety Management Manual (SMM) (Doc 9859)

Chapter 1

INTRODUCTION

1.1 PURPOSE

This manual provides guidance to operators and training organizations to develop flight operations officer (FOO)/flight dispatchers competency-based training and assessment programmes. The manual supports the provisions outlined in the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868).

1.2 CONTEXT

1.2.1 Annex 6 — *Operation of Aircraft*, Part I — *International Commercial Air Transport — Aeroplanes*, specifies that the responsibility for the operational control of a flight be designated only to the pilot-in-command and to a FOO/flight dispatcher if the operator's approved method of control and supervision of flight operations requires the use of FOO/flight dispatcher personnel.

1.2.2 The *Manual of Procedures for Operations Inspection, Certification and Continued Surveillance* (Doc 8335) further clarifies that a system of operational control requiring the services of a FOO/flight dispatcher should be considered, due to the nature and extent of the duties and responsibilities involved in the supervision of flights.

1.2.3 Approval of the method of control and supervision of flight operations is required by the State of the Operator. In this context, the duties of the FOO/flight dispatcher are listed in Annex 6, Part I, 4.6.

1.2.4 The FOO/flight dispatcher may or may not be licensed depending on the requirements of the State of the Operator. Annex 6, Part I requires that licensing be done in accordance with Annex 1 — *Personnel Licensing*, which describes the requirements for the issue of the licence.

1.2.5 Section 3 of the PANS-TRG outlines the general provisions for competency-based training and assessment for FOOs/flight dispatchers and requires that licensed personnel achieve the final competency standards acceptable to the appropriate authority and in compliance with Annex 1.

1.2.6 The intent of this manual is to provide additional and specific details on the development of a competency-based training programme to meet the requirements in PANS-TRG, enabling the suitable training and qualification of FOOs/flight dispatchers, in line with the Standards and Recommendations of Annex 6, Part I and Annex 1 as described above.

1.3 INTRODUCTION TO COMPETENCY-BASED TRAINING AND ASSESSMENT

1.3.1 Aviation is an evolving field. The constant search for improved efficiency, driven by the need to reduce operating costs while maintaining safety and financial security, results in the greater use of technology and automation. As technology advances, the tools used to perform operational control tasks may change, but the basic requirements

remain the same. The increased availability of ever-larger amounts of operational data results in the potential to make better decisions but also introduces the risk of data overload and the need for focus and filtering. Interdependencies between different elements of the operation increase with the added complexity of the system, meaning that decisions taken are likely to have a greater impact over a longer time period. These decisions are often made under intense time pressure, adding to the risk.

1.3.2 As systems evolve and become more complex, the need emerges to provide training which produces personnel with the flexibility and adaptability to cope with both day-to-day challenges and longer-term changes.

1.3.3 With conventional training programmes, the focus is function-based. A trainee is taught how to complete the required tasks for their role, such as creating a flight plan or a network risk analysis. The training is closely linked to the system in use at the time and focusses on the functional aspects of the task. Such a system is limited by:

- a) the inability of trainees to work outside of defined tasks;
- b) the inability to anticipate and, therefore, train for all possible situations;
- c) a lack of training resources or recurrent training to ensure the individual can keep up to date with evolving systems and procedures; and
- d) the inability to prepare the individual to deal with a required but infrequent activity.

1.3.4 Due to the limitations highlighted above, it is beneficial to develop programmes that focus on the abilities required to do the job, rather than focussing on the completion of specific tasks or the acquisition of specific knowledge. This allows individuals to handle unexpected or infrequent events using the same abilities. These abilities are referred to as competencies.

1.3.5 Competencies describe abilities that can be learned or developed. They define what can be *done* versus what is *known*, placing the emphasis on the individual to adapt and utilize their abilities in any scenario. An example of a competency might be problem solving and decision making, which would be defined as “accurately identifies risks and resolves problems. Uses appropriate decision-making techniques”, as indicated in Chapter 5, Table 5-2.

1.3.6 Competencies allow people to formulate solutions for complex and difficult situations, including first time experiences. FOOs/flight dispatchers must deal with these situations effectively and in a safe and secure manner.

1.3.7 Competency-based training underpins the ability to deal with scenarios that could not have been anticipated or trained for explicitly. It also moves the emphasis away from the individual being provided with specific training for a set of tasks which define their expected role. It promotes greater accountability, focus on self-improvement and a professional approach to work that emphasises performance.

1.4 DEVELOPING A COMPETENCY-BASED TRAINING AND ASSESSMENT PROGRAMME

1.4.1 Figure 1-1 presents an overview of competency-based training and assessment workflows. The workflows relate to the components of competency-based training and assessment programmes.

1.4.2 Workflows 1 and 2 establish the training specification, adapted competency model, assessment plan and training plan. Workflows 3 and 4 develop and conduct the training course. Workflow 5 reviews the effectiveness of the training and assessment conducted and recommends improvements, as appropriate.

1.4.3 Detailed descriptions of each workflow are provided in Chapters 3 to 7 of this manual.

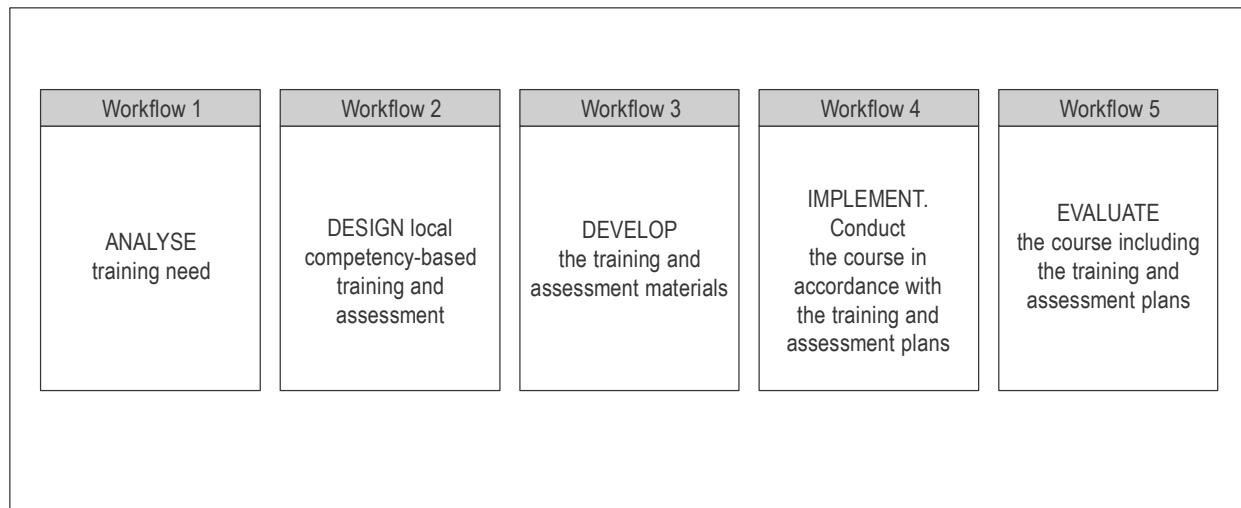


Figure 1-1. Competency-based training and assessment workflows

Chapter 2

TARGET AUDIENCE

2.1 OPERATIONAL CONTROL, RESPONSIBILITIES AND DEVELOPMENT

2.1.1 The responsibilities in operational control combine many factors such as regulations, standards, operational and commercial targets. The aircraft operator can individually delegate different areas of responsibility and roles to specific positions or functions. It is not realistic to define a worldwide standard set and title of responsibilities for specific positions or functions.

2.1.2 Since data handling and analysis of valid information becomes more important with the development of decision support systems, the operational control roles responsible for the data flow management will have a greater influence on the result of the risk management process as these systems develop.

2.1.3 Due to the dynamic environment, the processes, procedures and tools needed for operational control change frequently. The individuals involved must understand the relevant factors of influence on the general and flight-specific operational risks. They should also demonstrate a greater flexibility in the application of their competencies in this context.

2.1.4 As an example, an operator defines a working position for a short and long distance flight planning. Another position executes operations control for general operational and commercial risk management, problem solving and decision making in the network and on specific flights. For workload balance and after the introduction of advanced tools, this operator may delegate short-range flight planning tasks to the operations control position during night shifts. This allocation of tasks to different working positions might be limited because of inadequate basic competencies.

2.2 BASIC COMPETENCE FOR ALL ROLES IN OPERATIONAL CONTROL

2.2.1 All personnel involved in the system of operational control must be competent and qualified to ensure flight safety at a basic level, independent from the advanced operator and role specific qualification program. This manual describes the basic competency level provided during the initial flight operations officer training.

2.2.2 The basic qualification covers the relevant generic factors of the risk management process in operational control. Additional training should cover the operator and role-specific elements based on tasks defined in the operator's training manual.

2.2.3 Unless the advanced operator and role-specific qualification is achieved, the initial FOO training alone does not qualify for responsibilities in operational control duties.

2.2.4 The title "flight operations officer" distinguishes the individual of the basic qualification level from the higher role- and operator-related qualification level. The operator would typically name the job title, for example flight dispatcher or operations controller, according to the specific primary tasks delegated to this function.

2.2.5 A FOO should not be authorized for flight dispatch without operator- and role-specific training. Flight dispatcher and all other functions and roles in operational control require a successful initial FOO qualification and an operator- and role-specific qualification.

2.3 FROM FLIGHT OPERATIONS OFFICER TO FLIGHT DISPATCHER

2.3.1 While FOO qualification can be understood as a basic licence level, additional operator and role-specific qualification can be understood as a rating level, as shown in Figure 2-1.

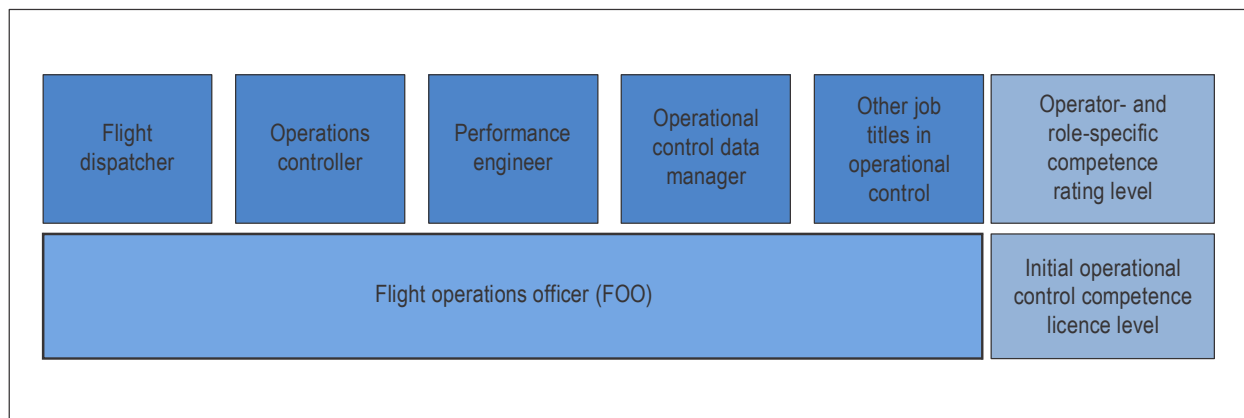


Figure 2-1. Operator- and role-specific qualifications

2.3.2 Examples of operator-specific roles involved in operational control duties include:

- flight dispatcher: provides flight planning services, dispatch release and in-flight support;
- performance engineer: provides technical support in relation to aircraft performance and flight planning services;
- operational data manager: integrates navigation and operator data and policies for the application of flight planning, electronic flight bag (EFB) and flight management system;
- operations and network controller: allocating operational risk management processes in the network, specific areas and flights. The operations and network controller is responsible for the initiation of problem-solving and decision-making processes by integrating safety, operational risks, direct operating costs and customer experience; and
- operational engineer: integrates Aeronautical information publication (AIP), operator and aircraft data into a database to be used for performance calculations, flight planning and aircraft allocation. The operational engineer is responsible for data and policies integrated in flight planning applications, EFB and flight management systems (FMS).

2.3.3 Not all roles in the operations control centre (OCC) are delegated to the full set of operational control duties. For example, resource control for flight crews (crew control) or aircraft and maintenance resource (maintenance control) are not fully inside the scope of the definition of operational control.

2.3.4 For roles outside the scope of the FOO competency-based training and assessment (CBTA) manual, specific training programs and manuals should be developed. Workflow 1, further described in Chapter 3, should be applied for the determination of role-specific training specifications. However, essential elements of the FOO CBTA program could be integrated for simplification and standardization. During the development of specific training programs, interfaces between the different roles in the operational control process should be strengthened.

2.3.5 Smaller aircraft operators must allocate more roles per staff than larger operators. Smaller OCCs need to qualify, in terms of percentage, more people on the FOO initial competency standards because of their higher integration level of operational control-related tasks. Larger OCCs do not need to qualify the same percentage of staff according to FOO standards. Large OCCs have more specific roles and interfaces, resulting in higher risks for the data and information flow as well as problem solving and decision-making processes. With an increase in staff, essential operational control-related tasks should be integrated in the appropriate role-related training specification.

2.3.6 Without an understanding of the essential tasks in operational control, the quality of the operator problem-solving and decision-making process would be limited. This may consequently endanger flight safety due to low quality risk-management processes.

Chapter 3

WORKFLOW 1 — ANALYSE TRAINING NEEDS

3.1 TRAINING NEEDS ANALYSIS

The first step in the development of a competency-based training and assessment (CBTA) programme is to conduct a training needs analysis, as shown in Figure 3-1. During this analysis, the future purpose of the training is considered in relation to the local, national, operational, technical, regulatory and organizational requirements. A training specification lists the requirements to be fulfilled when designing the training.

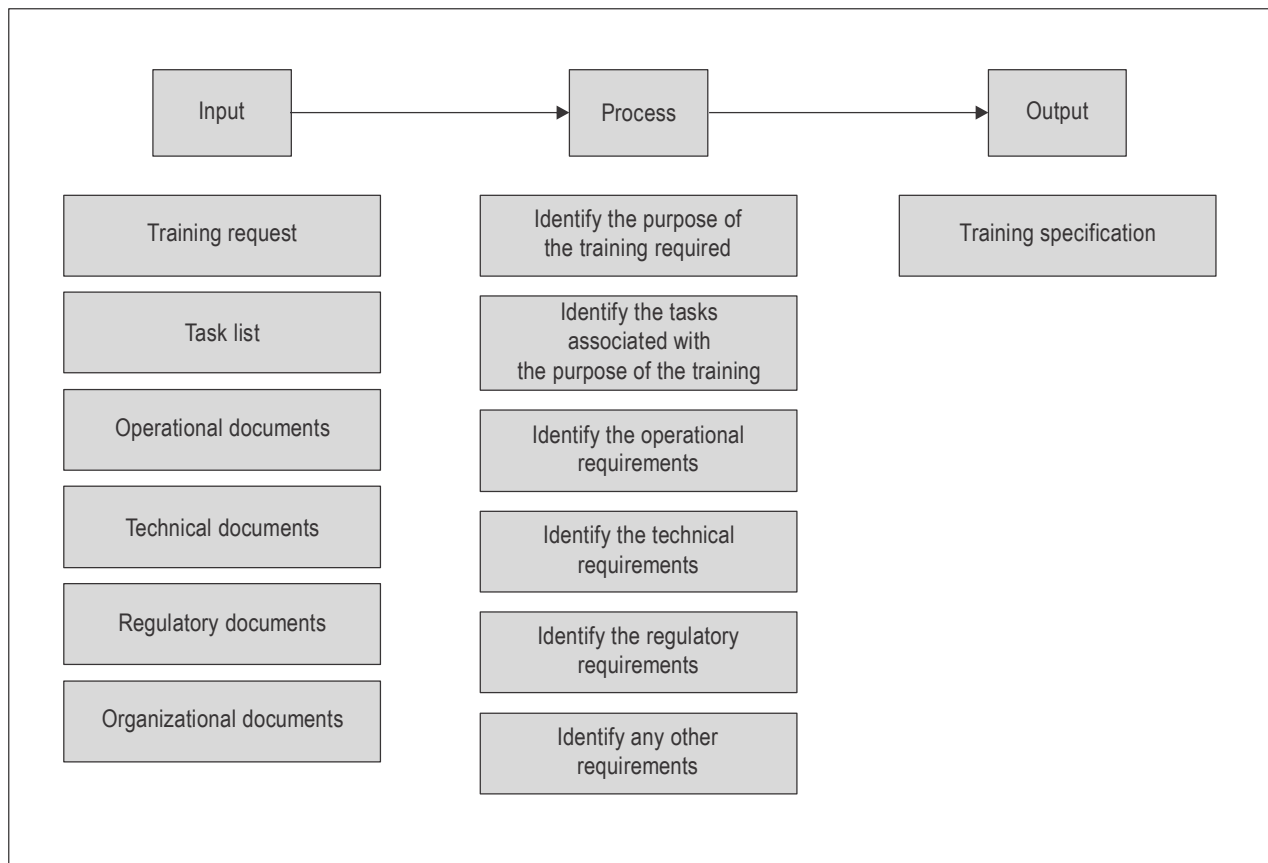


Figure 3-1. Analyse training needs and define training specifications

3.2 TRAINING TARGETS

3.2.1 Competency-based training and assessment should be based on meaningful and realistic tasks demonstrated during operational control duties. Unrealistic tasks will reduce the effectivity of the trainee target competency and will negatively influence the quality of operational risk management executed by the flight operation officer/flight dispatcher. The application of irrelevant tasks will also negatively affect the motivation of the instructor and trainees and may have an adverse impact on the results of the realistic task applications, which are still important for an acceptable training outcome. This training result risk is controlled by outlining clear training standards, strong oversight of the process of training need analysis, defining competency targets and selecting adequate training methods and resources (instructor, material and infrastructure).

3.2.2 This continuous improvement process should be organized by the stakeholder responsible for the oversight of operational control standards in flight operation and the National Civil Aviation Authority (NCAA). In coordination with the AOC holder and training organizations from the same region, the competency targets and criteria relevant for the actual and the future requirements should be discussed and standardized.

3.3 RESPONSIBILITIES

3.3.1 The national or regional civil aviation authority should be the responsible stakeholder to assure the attainment of training targets and flow of actual data, information and material from the aircraft operator to the approved training organization.

3.3.2 This process needs three stakeholders with clear responsibilities:

- a) the local or national aircraft operator defines the competency targets as tasks and observable behaviour;
- b) the training organization defines the training methods and assessment standards on the basis of tasks and observable behaviour; and
- c) the NCAA keeps oversight, initiates the training need analysis and competency definition, monitors the training and assessment standards and executes organization and process audits.

3.3.3 The transfer from actual and real (evident) operational control processes should be the basis for the development of adequate tasks and learning objectives for training improvement. Operationally evident criteria, i.e. incidents, abnormal situations, accidents, flight safety reports of certified aircraft operator should influence the training and assessment programmes for basic and recurrent training.

3.3.4 The processes for the transfer of tasks, competency indicator, data and information from the aircraft operator to the approved training organization is crucial for the quality of CBTA.

3.4 TRAINING AND ASSESSMENT SPECIFICATION

3.4.1 The training specification should provide sufficient detail to answer the following questions.

What is the purpose of the training?

3.4.2 The competency development of personnel responsible for the exercise of relevant tasks in aircraft operational control duties.

What are the types of training (e.g. initial, refresher, advanced, recurrent and conversion training)?

3.4.3 CBTA elements defined for the initial FOO/flight dispatcher (FD) training should also be used for other types of training. Any recurrent training should be based on tasks defined for the Training Phase 2 (Chapter 5, 5.5 refers), but allocated to role- and operator-specific standard procedures, policies and data.

What qualification will the trainee achieve upon successful completion of the flight operations officer (FOO) initial training?

3.4.4 The initial qualification needs to be general and not role or operator specific. This general qualification level is called the flight operations officer (FOO). After this initial training, the specific aircraft operator is responsible for the advanced training of the FOO, to qualify the trainee to become, for example, an aircraft dispatcher, operations and network controller, operations data manager, operations engineer or aircraft performance engineer.

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

3.4.5 The local or national aircraft operators are responsible to define the typical tasks for a general FOO qualification. The tasks are one of two elements of the competency target description and should ensure the understanding of the operational control context as a whole. A task list may be extracted from an existing job and task analysis or may be taken from an aircraft operations manual that lists the various roles and responsibilities in the operational environment. To organize the input and to structure the tasks, a working group with representatives from local or national aircraft operators should be initiated under the supervision of the NCAA.

Note.— Appendix B provides a generic list of Flight operations officer (FOO) tasks developed by the ICAO CBTA Task Force.

Which operational procedures and generic set of operational manuals should be applied? Which configuration of the working environment has an influence on target competencies? Which non-routine situations are necessary for the successful completion of the training?

3.4.6 Parallel to the list of tasks, the aircraft operator working group should clarify these questions.

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

3.4.7 For the optimum solution to this question, close contact between the aircraft operator and approved training organizations (ATO) is recommended. These questions can then be answered by the ATO since they are responsible for the definition of training standards, methods, material and instructor for training and assessment.

Which rules and regulations are applicable?

3.4.8 Are there any regulatory requirements that will affect assessment procedures, course approval, minimum training standards in relation to instructor qualification and material, training or equipment standards?

3.4.9 Are there other regulatory aspects, such as student reporting, certification requirements, training documentation, feedback system and quality control?

3.4.10 Typical regulatory requirements may include a minimum number of hours of experience in the operational environment before the start of training. The pre-selection criteria and the minimum initial or general competence of students is checked by entry-level tests. Specific criteria for entry level tests are described in Chapter 4.

What organizational requirements may affect training?

3.4.11 This might include a minimum number of students to cover the requested or intended staff capacity, any scheduling criteria affecting the course design, i.e. distance learning and remote student and instructor interaction to allow part time training parallel to other duties. This question should be answered by the ATO, depending on market demand.

3.4.12 Independent from the pre-qualification of students, a training that focuses immediately on “tasks” is unrealistic. Specific aeronautical knowledge and some minor skills are prerequisites. Based on the local or national education system, prerequisite learning objectives must describe specific general and aeronautical knowledge.

Note.— Appendix A provides a generic list of prerequisite learning objectives developed by the ICAO CBTA Task Force.

What other requirements may affect training?

3.4.13 Any other requirements that may not have been covered in the previous questions, such as the language to be used in the training.

Chapter 4

WORKFLOW 2 — DESIGN LOCAL/NATIONAL COMPETENCY MODEL

4.1 INTRODUCTION

4.1.1 The purpose of Workflow 2 is to establish an adapted competency model that addresses the training specification identified in Workflow 1 and to design a training and assessment plan that will be used to develop and assess the competence of trainees.

4.1.2 Workflow 2 is divided into two parts:

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

4.1.3 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. The integration of training and assessment is an integral element of CBTA.

4.2 WORKFLOW 2, PART 1 — DESIGN THE ADAPTED COMPETENCY MODEL

4.2.1 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 4-1 shows the elements of Workflow 2, Part 1.

Note.— The Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868) provides the competency framework as defined by the Competency-based Training and Assessment (CBTA) Task Force.

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

4.2.3 Generally, the training specification completed in Workflow 1 may be used to identify conditions specific to an environment in which performance will be demonstrated. Most of the conditions will apply generically to all of the identified observable behaviours, as part of the adapted competency model.

4.2.4 Occasionally, specific conditions may be associated with some observable behaviours. 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.

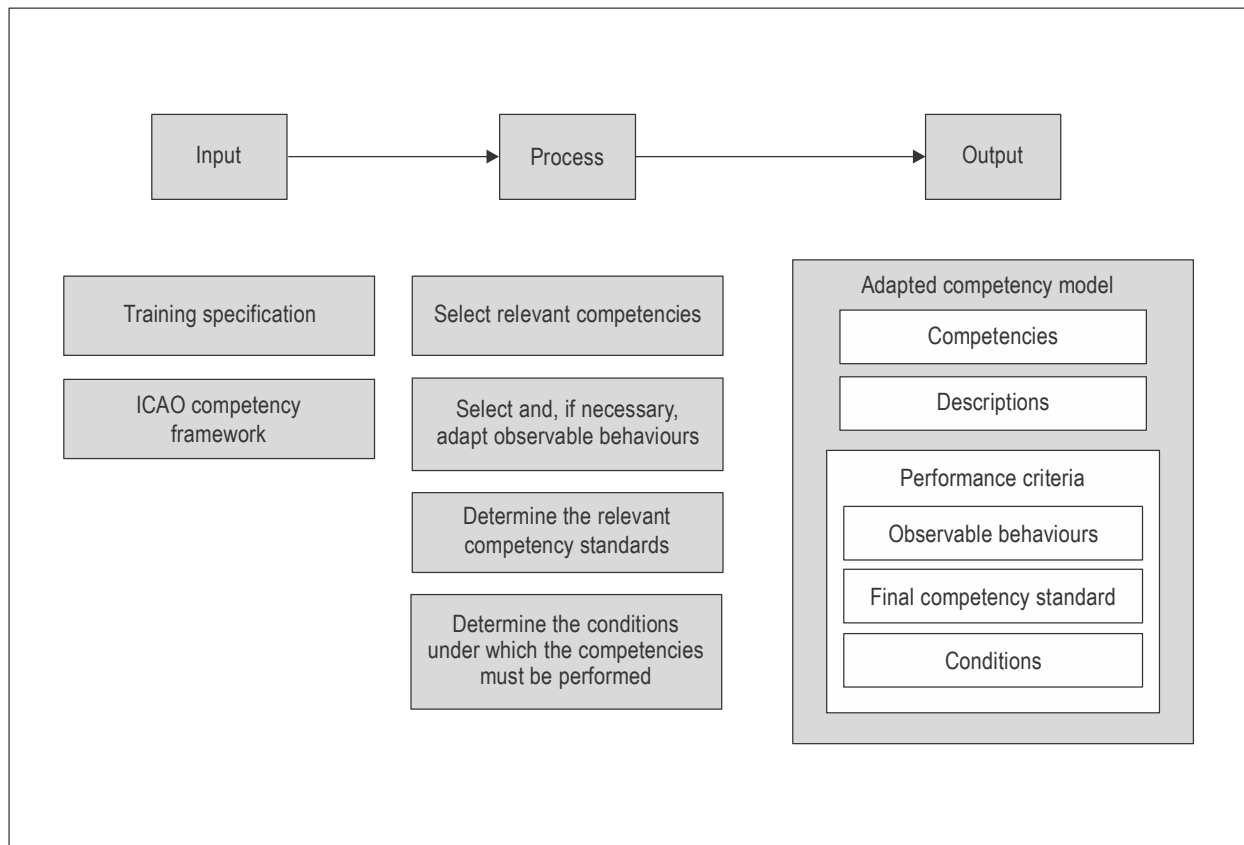


Figure 4-1. Workflow 2, Part 1 — Design the adapted competency model

4.2.5 There are different types of conditions that may be considered for the final competency standard including, but not limited to:

- a) conditions relating to context, which are defined as the nature and complexity of the operational and environmental context; and
- b) tools and systems or equipment to be used during the assessment and conditions relating to the level of support or assistance a trainee can expect from the instructor or assessor.

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

4.3 WORKFLOW 2, PART 2 — DESIGN OF THE ASSESSMENT AND TRAINING PLANS

4.3.1 Overview

4.3.1.1 The training concept should be based on the training targets defined by the aircraft operator under supervision by the National Civil Aviation Authority, the regulators framework and the technical requirements.

4.3.1.2 To assure operational relevance, the operator should integrate experience and consequences from incidents and accidents into this competency target description. The tasks and the prerequisite learning objectives should, as a consequence, be updated frequently and influence the assessment and training plan of the ATO. The oversight of this crucial CBTA process by the regional or National Civil Aviation Authority should be controlled, structured and organized within a State or region.

4.3.1.3 An ATO should generate training schedules providing flexibility. Flexibility is a prerequisite for individual student competency development and competency control (assessment, documentation, allocation of exercises and communication) which becomes a prerequisite for the training planning.

4.3.1.4 The training syllabus and schedule should not fix the timescale for each module or subject for all groups of students or individuals, but rather should show all mandatory items and scheduling options. Due to the nature of the CBTA concept, the training and assessment planning are integrated into one process under the responsibility of an ATO.

4.3.1.5 Additional inputs for training and assessment planning and scheduling include:

- a) the division between classroom training and distance learning or remote interaction;
- b) the distribution of basic material and exercises, if online and/or paper based;
- c) the scheduling and training-related communication; and
- d) the quality and competencies of training resources, i.e. instructors and material.

4.3.1.6 When developing the training and assessment plan, the following practical issues should also be considered:

- a) methods of assessment and documentation of individual student competencies;
- b) methods for communication and material distribution used by the learning management system (LMS);
- c) definition of training standards for instructors and the methods of qualification; and
- d) integration of training and assessments standards (see Chapter 5).

4.3.1.7 The development of a training and assessment plan, as shown in Figure 4-2, should be based on the identification of relevant FOO tasks, developed in Workflow 1. Appendix B contains a sample task list for reference. Where necessary this list should be supplemented by additional FOO tasks received from the operator in the respective region under supervision of the National Civil Aviation Authority responsible for oversight and supervision.

4.3.1.8 The definition of an adequate minimum entry competency level before starting the tasks should be established. The minimum entry level should be defined on the basis of general education and competencies. According to this minimum entry level and the given general education of students, a definition of prerequisite learning objectives (LOs) should be generated. Appendix A contains a sample list of prerequisite learning objectives for reference.

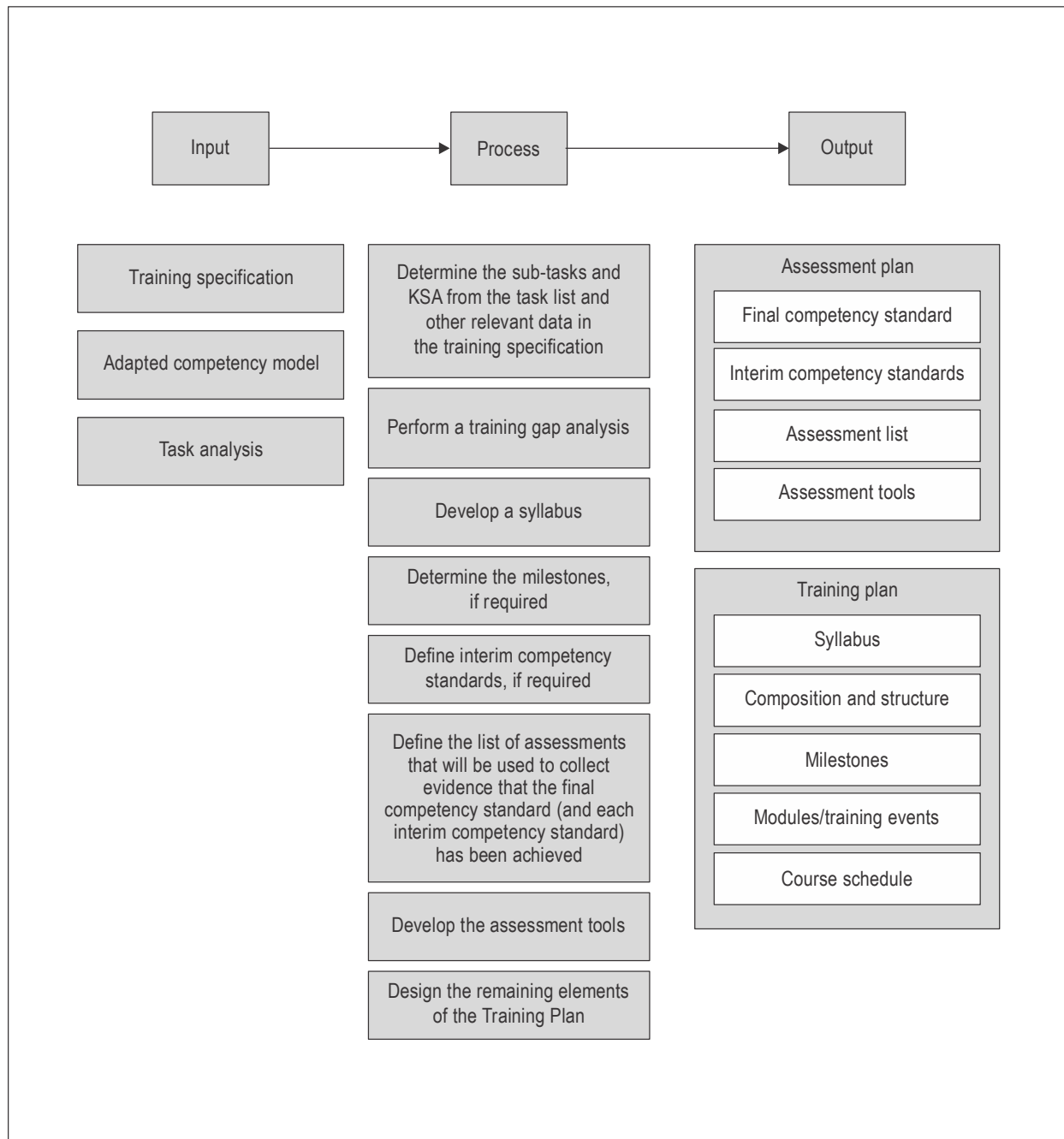


Figure 4-2. Workflow 2, Part 2 — Develop the assessment and training plan

4.3.1.9 Where required, additional prerequisite learning objectives should be included in cooperation with the stakeholder responsible for the definition of tasks (aircraft operator) and for oversight (NCAA).

4.3.1.10 The adequate minimum entry competency level before starting with the learning objectives in Training Phase 1 (Chapter 5, 5.4 refers) should also be defined. This general competency level should be evaluated during an entry level test as described in Workflow 3.

4.3.1.11 Learning objectives should be allocated to training modules in Training Phase 1, as required.

4.3.1.12 FOO tasks should be allocated to training modules in Training Phase 2, as required.

4.3.1.13 Descriptions of assessment methods and training and assessment progress documentation for each module should also be developed.

4.3.2 Allocation of tasks

4.3.2.1 The following schematic provides a sample workflow from the task family to the sub-tasks as provided in Appendix B, developed under the responsibility of the AOC and under the supervision of the NCAA.

4.3.2.2 ATOs should allocate the sub-tasks of specific training modules and develop exercises. In Figure 4-3, the PANS-TRG has been used to provide target competence criteria.

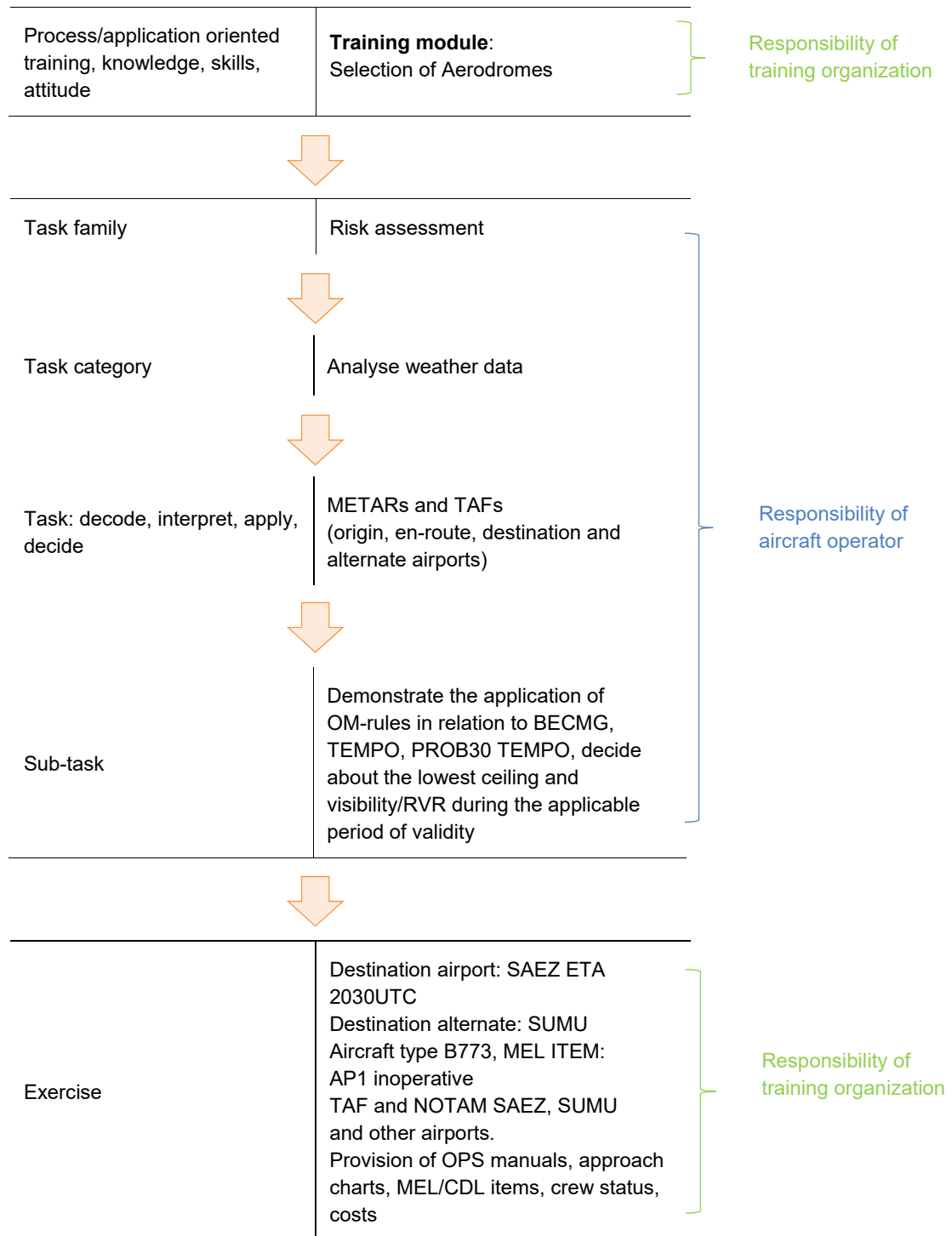


Figure 4-3. ATO responsibility and allocation of tasks using criteria from Appendix B

4.3.3 Training planning and scheduling

4.3.3.1 Workflow 2, Part 1 provides a process description to design the locally- or nationally-adapted competency model. A classical training approach, without a competency model, would reduce the training to a function-oriented knowledge transfer including some hard application skills. Such a training concept could be easily planned and scheduled, but the result would not align with the target competencies based on knowledge combined with soft skills and attitude. Integrating knowledge, skills (soft and hard) and attitudes from the competency model better describes the target competency and allows for a more detailed training and accurate evaluation of such competencies during the training and assessment phase. The training, planning and scheduling should support this concept; classical scheduling with fixed time scales would not be appropriate.

4.3.3.2 A fixed schedule training plan could be combined with the objectives of a competency-based training and assessment. Although, despite fixed schedules being easy to plan and maintain, the average rate of competency development in relation to the time required would be less effective than it could be. CBTA planning and scheduling should allow for a flexible training plan, as well as high training standards and a good communication between the instructor, the student and the training administration.

4.3.3.3 The description of a flexible and high standard CBTA in an ATO training manual should focus on how to achieve the target competencies rather than the provision of a fixed syllabus and a standard schedule.

4.3.3.4 A flexible training plan should integrate the student capability for self-learning, the individual capacity available for learning and the individual- or group-related provision of classroom training, distance learning and remote interaction between instructor and students.

4.3.3.5 It should be accepted that a combination of classroom training and individual elements could provide good results. Generally, the level of combination and integration depends on regional and cultural aspects.

4.3.4 Communication and interaction

4.3.4.1 Remote interactions using online chat functions, telephone-based team meetings, document sharing and video conferences could allow for training sessions of a higher quality and availability, if well-structured and organized. Without these methods, individual and flexible CBTA planning and course delivery would be difficult. ATOs should try to integrate individual training elements gradually if they are not using these techniques.

4.3.4.2 The training organization should provide guided discussions and learning forums. Sharing material and exercises in connection with discussions and group work will further develop competencies in communication, problem solving and decision making, teamwork and leadership. Without group work or any other form of interaction, important competencies cannot be trained and assessed.

4.3.4.3 Parallel to the organized group work, students should have the option to organize their own learning groups independently.

4.3.5 Platform

4.3.5.1 The provision of material, communication, schedules and other information on a standard platform would be beneficial when organizing the training process.

4.3.5.2 The learning platform can be a fully integrated LMS or a relatively simple homepage with download functions for material and basic tools for communication.

4.3.5.3 Independent of the chosen solutions, the following requirements should be fulfilled by such a platform:

- a) provision of material in analogue, printed or digital form, i.e. documents, pictures, charts, videos and web-based training;
- b) amendments to and revisions of material is seamless;
- c) information and material can be downloaded or distributed;
- d) availability of chat or forum functions for communication and feedback between the training administration, instructors and students;
- e) ability to book modules and training sessions by the student and the oversight for all stakeholder of allocated and open learning and assessment events; and
- f) appropriate reporting tools of individual student learning progress, assessment and grading, communication of results and recommendations.

4.3.6 Scheduling requirements

4.3.6.1 Knowledge can be exercised in the classroom during remote interactions with the instructor and instructor independent self-studies. More instructor and student interaction is required for the development of skills and attitude. This interaction should be performed in classrooms and remotely, if applicable. The ability of the instructor to provide mentorship and individual student support is important for competence development during remote interaction. Running CBTA with remote interaction and distance learning does not significantly reduce the resource capacity required by the instructor for classroom training.

4.3.6.2 The training organization needs to find the right balance of in class and remote interaction, based on the ability and motivation of students for self-study and the capability of the training organization.

4.3.6.3 Table 4-1 presents a sample CBTA training capacity plan showing training volume planning after the definition of training modules and the allocation of resources, and Table 4-2 presents a summary of the resource requirements.

Table 4-1. Sample CBTA training capacity plan

<i>Learning objectives</i> <i>Module, Phase 1</i>	Σ	Σ <i>Student units</i> <i>(45 min each)</i>	<i>Classroom</i> <i>training/</i> <i>assessment</i> <i>Q&A</i>	<i>Remote</i> <i>interaction</i> <i>assessment</i>	<i>Remote</i> <i>interaction</i> <i>training</i>	<i>Self-study</i>	<i>OCC</i> <i>interaction</i>
FOO CBTA Introduction		6	6	0	0	0	0
Human Perf. and Limitations (HPL)		32	14	1	2	18	0
Principles of Flight (POF)		32	14	1	2	18	0
Aircraft Systems (TEC)		32	14	1	2	18	0

<i>Learning objectives</i> <i>Module, Phase 1</i>	Σ	Σ Student units (45 min each)	<i>Classroom</i> <i>training/</i> <i>assessment</i> Q&A	<i>Remote</i> <i>interaction</i> <i>assessment</i>	<i>Remote</i> <i>interaction</i> <i>training</i>	<i>Self-study</i>	<i>OCC</i> <i>interaction</i>
Air Law (LAW)		38	14	1	3	24	0
Mass & Balance (M&B)		32	14	1	2	18	0
Meteorology (MET)		38	14	1	3	24	0
Navigation (NAV)		38	14	1	3	24	0
Operational Procedures (OPR)		38	14	1	3	24	0
Performance (PEF)		32	14	1	2	18	0
Phase 1 Final Exam		6	6	0	0	0	0
Σ		324	138	9	22	186	0
Σ Student days	54	54	% Applicability of Training Events				0
Σ Student days min., if high performer	36	60%					
Σ Instructor days, one student	28,2		23,0	1,5	3,7		0,0

<i>Tasks</i> <i>Module, Phase 2</i>	Σ	Σ Student units (45 min each)	<i>Classroom</i> <i>training</i> Q&A	<i>Classroom</i> <i>assessment</i>	<i>Remote</i> <i>interaction</i> <i>training</i>	<i>Self-study</i>	<i>OCC</i> <i>interaction</i>
Performance T/O and LDG (PEFLS)		21	12	3	2	6	6
Perf. Cruise & Special Perf. (PEFHS)		21	12	3	2	6	
Selection of Aerodromes (SELA)		27	12	3	2	12	
Flight Planning and Monitoring (FPL & FM)		34	13	3	2	18	
Operational Procedures (OPSSTD)		29	14	3	2	12	6

Tasks Module, Phase 2	Σ	Σ Student units (45 min each)	Classroom training Q&A	Classroom assessment	Remote interaction training	Self-study	OCC interaction
DOC, Customer, Network (COMCL)		27	12	3	2	12	
Phase 2 Final Exam		6	0	6	0	0	
Σ		165	75	24	12	66	12
Σ Student days	30	28					2
Σ Student days min., if high performer	12						
Σ Instructor days, one student	20		12,5	4	2		1

Table 4-2. Resource requirements

Students per course	Total instructor days Phases 1 and 2, 10 students	Instructor days vs. student days Phase 1	Instructor days vs. student days Phase 2	Number of units, 45 min each, per day	Number of students simultaneously in OCC interaction
10	76	52%	66%	6	2

4.3.6.4 The training volume is based on the assumption that all students successfully pass an entry-level test providing an adequate and harmonized competency at the beginning of the training. A lower or uneven general competency level of students at the beginning can result in an unexpected and uncontrolled extension of the training volume and duration.

4.3.6.5 The number of students per assessment event is limited, as the instructor or evaluator needs to assess the competency with dialog-oriented and written exams without multiple choice. The ATO should provide elements of questions and answers by remote interaction to reduce the time required in the classroom.

4.3.6.6 Self-study and remote interactions should be prepared during classroom training, focusing on explanations and mentoring. This preparation should support the ability of students for self-study.

4.3.6.7 Depending on the training capacity of students, the time interval between class time and remote interactions extends the total training time. The ATO should offer an adequate number of classroom events for the same subjects within one period. Additional CBTA events based on a flexible provision of instructor and classroom capacity can support a higher number of students per class.

4.3.6.8 Table 4-3 presents a sample training schedule based on ideal conditions where student competency is standardized by adequate entry-level tests, they are available full time for training and there is a high motivation for self-study. The training, volume and duration could be extended by (up to) 50 per cent if optimum conditions are not fulfilled. The modules are then sequenced and scheduled into a plan, as demonstrated by the example given in Table 4-3:

Table 4-3. Sample training modules and definitions

1	Phase 1 — Prerequisite learning objectives
2	Phase 2 — Tasks
CT	Classroom training, subject introduction, student motivation, group work
Q&A	Question and answer, discussion of open-ended questions and exercises, group work, as required
CA	Classroom assessment, dialog oriented, two or three students per group, each student develops questions and case studies, presentation and interaction assessment, written open questions
CA as required	Student individual classroom assessment, any subject, as required, or student individual self-study and remote interaction.
SY/RI/RA	Student individual: self-study/remote interaction/remote assessment
HPL	Phase 1 — Human performance and limitations
POF	Phase 1 — Principles of flight
TEC	Phase 1 — Aircraft systems and engines
LAW	Phase 1 — Air law and air traffic control
M&B	Phase 1 — Mass and balance
MET	Phase 1 — Meteorology
NAV	Phase 1 — Navigation
OPR	Phase 1 — Operational procedures
PEF	Phase 1 — Flight performance
PEFLS	Phase 2 — Performance low speed
PEFHS	Phase 2 — Performance high speed, special performance
SELA	Phase 2 — Selection of aerodromes
FPL&FM	Phase 2 — Flight planning and flight monitoring
OPSSTD	Phase 2 — Operation standards, resource limitation, risk management
COMCL	Phase 2 — Direct operating costs, resource planning, customer, network (commercial risks)

OCC	Phase 2 — Operations control centre interaction, exercise of prepared tasks under realistic conditions. Performed by contracted Aircraft Operator
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Legend

Phase 1 Classroom activities	Self study	Phase 2 Classroom activities	On the job training
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Table 4-4. Sample training module sequencing and scheduling

Week	Phase	Weekday 1	Weekday 2	Weekday 3	Weekday 4	Weekday 5
1	1	FOO CBTA introduction	CT introduction HPL	SY / RI / RA	SY / RI / RA	Q&A HPL
2	1	CA as required	CT introduction POF	SY / RI / RA	SY / RI / RA	Q&A POF
3	1	CA as required	CT introduction TEC	SY / RI / RA	SY / RI / RA	Q&A TEC
4	1	CA as required	CT introduction LAW	SY / RI / RA	SY / RI / RA	SY / RI / RA
5	1	Q&A LAW	CA as required	CT introduction M&B	SY / RI / RA	SY / RI / RA
6	1	Q&A M&B	CA as required	CT introduction MET	SY / RI / RA	SY / RI / RA
7	1	SY / RI / RA	Q&A MET	CA as required	CT Introduction NAV	SY / RI / RA
8	1	SY / RI / RA	SY / RI / RA	Q&A NAV	CA as required	CT Introduction PEF
9	1	SY / RI / RA	SY / RI / RA	Q&A PEF	CA as required	CT Introduction OPR
10	1	SY / RI / RA	SY / RI / RA	SY / RI / RA	Q&A OPR	CA as required
11	1	SY / RI / RA	Phase 1 final exam	SY / RI / RA	Phase 1 final exam repetition	Introduction PEFLS
12	2	SY / RI	Q&A PEFLS	CA as required	Introduction PEFHS	SY / RI

Week	Phase	Weekday 1	Weekday 2	Weekday 3	Weekday 4	Weekday 5
13	2	Q&A PEFHS	CA as required	Introduction SELA	SY / RI	SY / RI
14	2	Q&A SELA	CA as required	Introduction FPL&FM	SY / RI	SY / RI
15	2	SY / RI	Q&A FPL&FM	CA as required	Introduction OPSSTD	SY / RI
16	2	SY / RI	OCC	Q&A OPSSTD	CA as required	Introduction COMCL
17	2	SY / RI	OCC	Q&A COMCL	CA as required	Phase 2 final exam

Note.— During Phase 1, the learning objectives of human performance and limitations (HPL) should be exercised and assessed parallel to the other modules. During Phase 2 the prerequisite HPL learning objectives should be integrated in the observable competence behaviour categories “leadership and teamwork”, “problem solving and decision making” and “communication” and should be assessed during the exercise of tasks.

4.3.7 Sample sequencing restrictions

4.3.7.1 It is the responsibility of the FOO student to discuss the dates for the assessment or repetition of the assessment with the training administration. The assessment date or repetition date should be coordinated with the instructor, student and training administration and should be scheduled at a minimum of *n* days prior to the event.

4.3.7.2 Remote interaction between a student FOO and the instructor can take place regardless of time or place, on the basis of the scheduled availability of the instructor on specific weekdays. Organizing remote interaction (RI) is the responsibility of the scheduled instructor.

4.3.7.3 Feedback to questions provided to the student should follow the agreed minimum response time.

4.3.7.4 The scheduling for OCC interaction should be arranged as soon as Training Phase 2 starts because of capacity and competency constraints of the aircraft operator providing this service.

4.3.7.5 Classroom training and assessment should be taken in the indicated order. Deviations from this plan should be coordinated on the basis of agreed planning and communication standards.

4.3.8 Training and assessment documentation

4.3.8.1 In the CBTA process, a training record is helpful to control the learning progress, but it is not important for competency development. The added value of a training record depends on the ability and motivation of the students for self-study. Training courses with a high percentage of self-study and individual remote instructor and student interaction do not require a detailed training report.

4.3.8.2 The report of learning progress could be automatically documented via the LMS. However, a training record should be applied if required by national or regional regulations and if a fixed number of training days needs to be performed and documented.

4.3.8.3 Table 4-5 shows a sample training record template based on sample training modules.

Table 4-5. Sample training record template

<i>Module</i>	<i>Date</i>	<i>Instructor's name & signature</i>	<i>Student's name & signature</i>
Introduction			
Human performance and limitations (HPL)			
Principles of flight (POF)			
Aircraft systems (TEC)			
Air law (LAW)			
Mass and balance (M&B)			
Meteorology (MET)			
Navigation (NAV)			
Operational procedures (OPR)			
Performance (PEF)			
Selection of aerodromes (SELA)			
Flight planning and monitoring (FPL & FM)			
OPS standards (OPSSTD)			
DOC, customer, network (COMCL)			

Chapter 5

WORKFLOW 3 — DEVELOP ASSESSMENT AND TRAINING STANDARDS AND MATERIALS

5.1 INTRODUCTION

5.1.1 Conventional task- and knowledge-based training generally focuses on isolated elements of knowledge or task performance. In a competency-based approach, shown in Figure 5-1, the goal is to place knowledge and its application as much as possible within meaningful contexts or authentic job- or role-related activities. The exercises in Phase 1 of a competency-based approach should follow this concept in order to prepare the trainee for task-related exercises in training Phase 2. Basic knowledge may be imparted by short explanations, self-study, self-assessment and the skills required to apply this knowledge on a basic level. Even at this stage, knowledge and skill assessment with resilience on multiple choice questions should be avoided in order to have a more valuable competence development. The objective is to focus on meaningful learning and understanding. Multiple choice or objective format tests may focus on the teaching and learning of test-taking strategies.

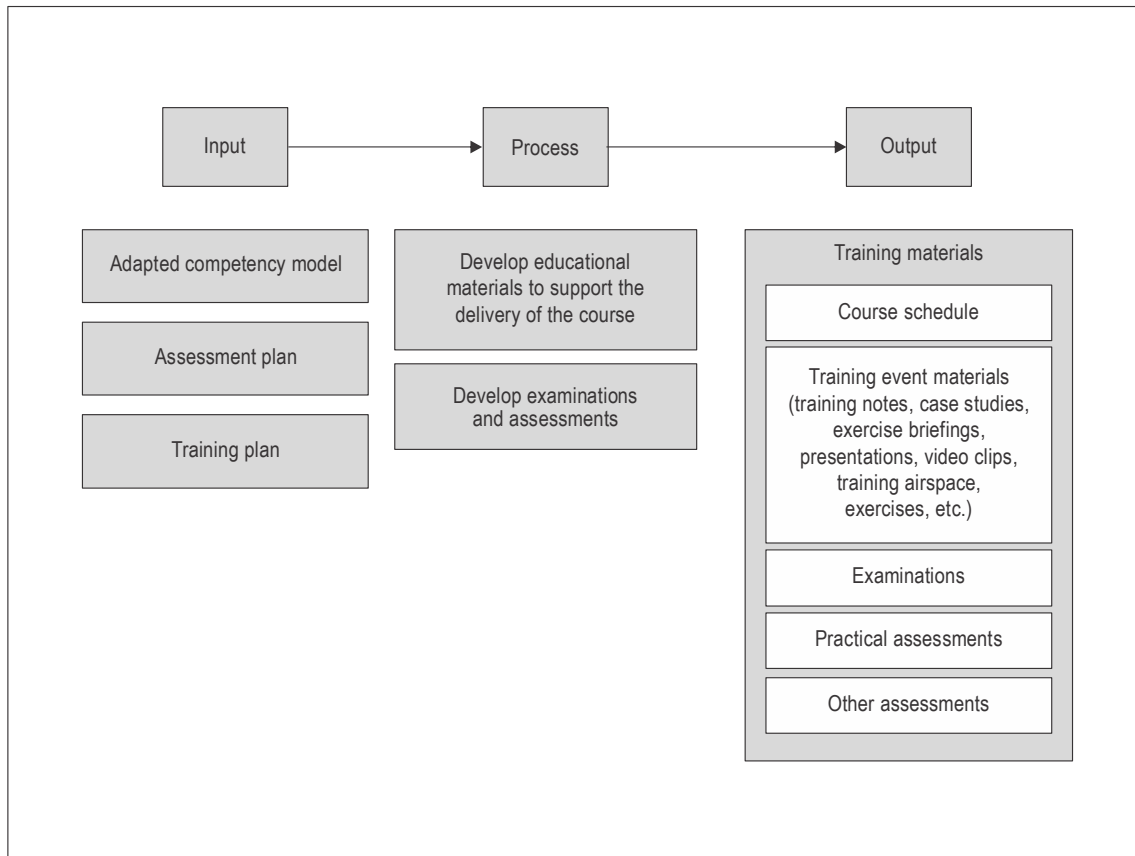


Figure 5-1. Workflow 3 — Develop assessment and training standards and materials

5.1.2 The competency-based approach involves a shift in thinking regarding learning and assessment. In contrast to the hard distinction between formative and summative evaluation encountered in traditional training, competency-based training strives to achieve continuous assessment and learning with exercises. The assessment should support the provision of individually tailored exercises to improve the learning process and transfer of competency. Assessments should not be eliminated and should be used to influence the selection of a training method that will drive decisions about the selection of subsequent exercises.

5.1.3 During the training process, each defined training module should be finished with a competency assessment for each student. The full FOO competence is achieved after passing the assessment of the last scheduled module. To assure a smooth transfer into the task-oriented training phase, it is recommended to repeat a basic knowledge check of all modules at the end of the course. The national or regional authority should monitor and audit the assessment process rather than assessing each individual student competence.

5.1.4 This format imposes a responsibility on the instructor who must be able to select, modify and create exercises that will drive the learning focus of the trainee at any given point in the training process.

5.2 TRAINEE PROGRESS MONITORING AND DOCUMENTATION

In order to select and implement appropriate exercises for the development and evaluation of competencies, instructors should be aware of the competency level of each trainee. This is important as students may interact with multiple instructors during process-oriented training. Preceding instructors should document the status of completed exercises for each trainee with detailed assessment results, comments and recommendations. This information should be available to all subsequent instructors and training coordinators via paper documentation or some form of electronic record keeping methodology such as a web-based LMS.

5.3 MINIMUM COMPETENCY LEVEL FOR TRAINING START

5.3.1 Training without a confirmed minimum competency level at the beginning of the training phase is ineffective. An entry-level test should provide information for an appropriate starting point for each individual student.

5.3.2 All duties in the context of operational control require a minimum analytical and problem solving competence, at a low failure rate and within an appropriate time. A job specification should specify a minimum set of skills and the expected attitude to have before the start of training. Candidates with insufficient general competencies should not be accepted as students. Without sufficient mental skills, students may not develop the appropriate competencies during a training and also throughout operational control duties, within the appropriate amount of time. When this is the case, the candidate could receive notification of preliminary education needs or specific remediation requirements before taking part in a training.

5.3.3 The entry-level test must address relevant basic knowledge and skills of:

- a) general educational background and aptitude;
- b) abstract and analytical thinking;
- c) spatial and logical reasoning;
- d) mathematics and physics;
- e) English proficiency (other language if applicable), preferably ICAO level 4;

- f) communication skills; and
- g) general motivation and attitude.

5.3.4 The results of the test could be as follows:

- a) acceptance into the FOO training course;
- b) selection of appropriate remediation strategy and a repetition of the entry level test; and
- c) non-acceptance into the FOO training course.

5.3.5 The initial competence evaluation of pre-qualified students with sufficient working experience, i.e. airline operations staff or pilots, can address more FOO-related target competencies. The approved training organization (ATO) can then offer individual schedules allowing for training shortcuts, but this cannot be done for assessments.

5.3.6 With different entry levels and flexible individual scheduling, the training and assessment process and the manner in which it is documented becomes more important.

5.3.7 CBTA allows individual support to identify and to apply the right training method for the trainee based on their competency assessments throughout the course.

5.3.8 After each module is completed, the ATO will perform a competency assessment. The ATO will release the student to the next module if they meet the competency targets. The student should repeat each training module as appropriate before taking the assessment.

5.4 ASSESSMENTS — TRAINING PHASE 1

5.4.1 Learning objectives (LOs) are to be used during Training Phase 1 to measure the level of knowledge, skill and attitude. The requirement for LOs is the acquisition of knowledge, but dialog-oriented assessments can help assess a broader understanding of technical context, evaluation of information and results while also assessing skills and attitudes such as communication and the attitude taken for problem solving. Multiple-choice tests should be avoided, as they are inadequate for competency assessment.

5.4.2 The objective is for students to communicate and interact with each other. During this interaction, soft skill-oriented observable behaviours could be assessed.

5.4.3 The following is a sample of a specific assessment during Training Phase 1. The basic condition is one assessment per training module, one assessor and two or three students. The example below has students preparing questions and then posing these to fellow students:

- a) the students are informed about the assessment concept and the technical knowledge level provided in the form of Los, there should be no additional or hidden competency requirement added on short notice;
- b) the preparation for each assessment is already an element of the training process;
- c) each student should prepare questions, examples and small case studies including answers. The quality of the material will be graded in view of structure, presentation, context and the preparation of guidance material. The quality of the preparation is an indicator of individual attitude;
- d) the level of technical knowledge and skills required to answer the questions is defined with the LO itself;

- e) each student should assume, one after the other, the role of the student asking and the student responding;
- f) the grading should be based on the quality of the communication and interaction during this question and answer session. Students should be graded individually;
- g) the simplest elements are questions derived direct from learning objectives;
- h) the student asking the questions will be graded by the quality of the questions, the elements used (see above), the style of the presentation and the ability to evaluate the quality of the answers from the student responding;
- i) the grading of the student responding is based on their ability to abstract the information provided, develop it and adequately present a correct solution;
- j) the assessor shall ask their own questions under the umbrella of the published LOs and cross check the results from the presentation or the LOs of other sections; and
- k) the duration of the dialog-oriented assessment should be not less than 90 minutes per group.

5.4.4 Alternatively, another solution would be a combination of LOs to a story line, i.e. in a small case study. The development and the quality of a story line by the student would improve their grading status. Elements of a story line include:

- a) asking to outline a solution;
- b) transfer a specific result to another context;
- c) initiate a discussion about pros and cons; and
- d) provide good and structured feedback to the partner-student.

5.4.5 Additional written assessments could verify the student's knowledge of details. Since the interactive assessment described above depends on each student not sharing their questions and case studies with other students beforehand, a written element should be integrated based on the published LOs. If required, the LOs should be transformed into adequate questions. The sample list of LOs provided in Appendix A to this document could be used for basic knowledge checks. Basic conditions of a simple but effective written test may include:

- a) one written assessment per training module;
- b) in written tests more than one student can be assessed simultaneously;
- c) the questions should be exactly according to the LOs and provided as open-ended questions, for example: "State the definition of ASDA";
- d) an average duration for each LO or question should be defined and an expected total duration of each written Phase 1 module assessment should also be determined;
 - duration sample: three minutes for each LO or question, not more than 90 minutes total duration per assessment. In this relation, 30 LO or open-ended questions should be applied;
- e) the grading of open-ended answers should be indicated, for example: a maximum of four points per LO or question:

- each answer should be graded in relation to the maximum amount of points, i.e. four points if the answer is complete and fully within the expectation; three points if, for example, one important aspect is missing; two points if two items are missing and one point if the answer is far below the expectation. Zero points should be allocated if the answer is wrong or no answer was provided; and
 - f) the minimum pass mark should be defined.
- 5.4.6 Examples of prerequisite LOs or questions are:
- a) State, in general terms, the intent of the ICAO aerodrome (AD) reference code (location indicator) as well as its composition (Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations*); and
 - b) Define the following terms: accuracy, cyclic redundancy check, data quality, integrity of aeronautical data, light failure and lighting system reliability.

5.5 ASSESSMENTS — TRAINING PHASE 2

5.5.1 The selection of exercises considers relevant tasks, according to the training module and an adequate number and selection of observable behaviour markers from the adapted competency model. Each exercise meets the requirements of the task and permits the demonstration of observable behaviours during training and assessments. Competencies include the aforementioned conditions and criteria, which should be appropriate to the phase of training.

5.5.2 The competency development in relation to the number and the complexity of the selected exercises provides a sufficient overview for the planning of succeeding modules, lessons or exercises.

5.5.3 The competency behaviour observed during the completion of tasks indicates the readiness of the student for assessment. Students should be assigned to a module assessment based on behaviours observed by the instructor during classroom training or by checking uploaded solutions of exercises during self-study.

5.5.4 The concept, method and complexity of exercises and tasks used during the assessment should mirror those demonstrated during training. These exercises and tasks should also be equal to those of realistic FOO duties. Assessment methods outside this definition are generally unacceptable. Multiple-choice tests are not an acceptable method of competency assessment and must not be used. The student will typically put more effort into preparing for a dialogue-oriented assessment. Less effort is made towards an abstract test method, which does not reflect the training environment.

5.5.5 Each student should execute one written exercise individually. All written statements in this exercise could be graded independently or even summarized as passed or failed. The maximum duration of this individual exercise should be clearly defined.

5.5.6 Two or three students should execute an exercise simultaneously as a team task. The exercise should provide several options for a problem solving and decision making process. During this process, the attitude-related competencies could be observed, such as communication, teamwork and leadership, process improvement, situational awareness, problem solving and decision making. The exercise should simulate a realistic, operational control-related situation or problem.

5.5.7 The result of this group work and the quality of the written statement could be graded separately as passed, failed or summarized to one result for each student.

5.5.8 The assessor should ask additional questions, if appropriate. The maximum duration of this group work should be clearly defined.

Example exercise

5.5.9 Table 5-1 presents an extract from the flight operations officer task list (Appendix B refers). As an example, the exercise could integrate the following aspects:

The student needs to identify the adequate airports during a bad weather situation at destination and surrounding alternates. AD reference codes, the core data of airports and their approach procedures should be checked during the application of airport certification requirements learned during Training Phase 1: "Accuracy, cyclic redundancy check, data quality, integrity of aeronautical data, light failure, lighting system reliability".

Table 5-1. Extract from the flight operations officer task list

NOTAMs (NAVAIDS, airport facilities)	Extract NOTAMs for all airports relevant to the operation (departure, destination, en-route and destination alternates).
	Evaluate NOTAMs, i.e. NAVAIDS and procedures, adequate RWY, handling facilities, AD opening hours and assess potential risks for the suitability.
Potential risks of given delays in relation to the actual risks and consequences based on MET, ATM and AIP standards, policies, data and SOPs.	Given conditions of airport infrastructure (RWY, TWYs, apron) against the published status from AIP and NOTAMs.
	Define an appropriate method of data collection and analysis.

5.5.10 In view of the infrastructure availability and realistic operational consequences, the application of sample NOTAMs could offer data conflicts to be handled by the student. The weather forecast should be decoded and applied in relation to the standard procedures used during training. After the decision regarding suitable airports is made (including a discussion about all pros and cons) within the assessment team, the requirements for operator-related NOTAM and data handling processes could be evaluated. The student should describe realistic risks caused by incomplete or incorrect data flow or data handling for the following processes affecting the OCC team, flight crew, handling provider, ops engineering and others as appropriate.

5.5.11 Material provided for this exercise includes:

- the description of a flight situation: point of departure and destination, schedule, aircraft type, load and fuel information;
- sample weather information and forecasts;
- sample NOTAMs;
- Flight Operations Manual for operator-related SOPs;

- e) Aircraft Operation Manual, including MEL and performance data;
- f) route documentation, charts, landing minima, airport core or standard data; and
- g) Annex 14 — *Aerodromes* and the *Manual on Certification of Aerodromes* (Doc 9774), if applicable.

5.5.12 The format or the tools used for the provision of data, procedures and information should be independent from specific operator-related procedures, tools and interfaces. The provision should be as simple as possible, since during Training Phase 2, the focus must be on the identification of relevant information, the ability of the FOO to ask the right questions and the application of data according to standard procedures based on national or regional standards and regulations.

5.6 ASSESSMENT RECORD

5.6.1 In remote interaction and self-study programs, the assessment should be allocated on the basis of the individual student competence development. As described in the training and assessment standards, the purpose of the assessment is to identify competency gaps to support the training process. Each training module should be assessed separately.

5.6.2 Table 5-2 presents a detailed sample competency check sheet which is used to:

- a) identify the training module assessed;
- b) select and mark the observable behaviour items to be evaluated during the assessment; and
- c) identify the task, sub-task or exercise used during the assessment.

Table 5-2. Sample competency check sheet

Student name		Assessor name	Date/time	ATO
Mark the training module assessed: HPL, POF, TEC, LAW, M&B, MET, NAV, OPR, PEF, PEFLS, PEFHS, SELA, FPL&FM, OPSSTD, COMCL				
Competency	Mark the selected competency observable behaviours for assessment		Passed yes/no	Selected task or exercise (Reference/ID) for assessment
Application of procedures and regulations	Interprets SOPs appropriately and uses flexibility included in these where necessary			
Identifies and applies procedures in accordance with operating instructions and applicable regulations.	Identifies and follows all operating instructions in a timely manner			
	Complies with applicable regulations and procedures			
Technical expertise Applies and improves individual technical knowledge and skills	Retrieves the applicable data and operating procedures			
	Explains the intent of the applicable procedure for a given context			
	Considers factors of influence to make optimum decisions in operations control using accurate and appropriate operational information (meteorological, airports, crew, aircraft, network, general)			
	Uses standard and non-standard information distribution systems and sources			
	Keeps up to date on technical knowledge and skills			
Process improvement Contributes to the continuous improvement of the system	Consistently provides appropriate guidance to stakeholders and colleagues on how to implement procedures			
	Analyses evidence to identify opportunities for process improvement			
	Proposes process improvements for approval or adoption by management			
	Provides suitable justification for proposed improvements			
	Recognizes trends in practice of one's own technical area and anticipates changes			