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Manual on Air Traffic Controller Competency-based Training and Assessment

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AMENDMENTS

Amendments are announced in the supplements to the *Catalogue of ICAO Publications;* 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.

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FOREWORD

The next generation of aviation professionals (NGAP) initiatives were launched to ensure that enough qualified and competent aviation professionals are available to operate, manage and maintain the future international air transport system. In May 2009, the NGAP Task Force was created and was instrumental in supporting the preparry work for the NGAP Symposium conducted at ICAO from 1 to 4 March 2010. Several outcomes were drawn from the first NGAP Symposium, among them:

a) the need to develop regulatory frameworks that enable and support the use of modern training and learning technologies (competency-based training, evidence-based training and increased use of simulation) and that are not an obstacle to industry best practices; and

b) the need to define competencies for all aviation activities affecting safety in order to facilitate the free-flow of professionals through internationally agreed upon standards and assessment practices.

The effective performance of the air traffic management (ATM) system depends on competent and qualified air traffic management professionals. The ATM system is evolving towards a globally integrated and collaborative system. Air traffic controllers (ATCs) managing and operating this system must have a shared understanding of what is expected of them in terms of performance wherever they may work in order to support a globally interoperable system and to achieve optimum capacity within acceptable safety limits. This shared understanding becomes critical when considering the increasing traffic and the growing complexity and interconnectedness of the systems involved. As controller-pilot and system-to-system interfaces evolve, the air traffic controllers managing and operating these systems need to share a common reference to ensure seamless operations.

In February 2015, procedures for the implementation of competency-based training and assessment for air traffic control officers (ATCOs) were included in the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868). They provide States, air navigation service providers (ANSPs) and training providers with guidance on how to structure their approach to training and assessment of controllers. The procedures provide a flexible framework that stakeholders can adapt to any local operational context and requirement.

Some of the provisions already included in the PANS-TRG are of a generic nature and can apply to all aviation functions including ATM personnel. The purpose of this manual is to provide additional guidance to the provisions of the PANS-TRG and support stakeholders in the successful implementation of competency-based training and assessment for ATCOs.

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GLOSSARY

DEFINITIONS

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.
Competency	A combination of skills, knowledge and attitudes required to perform a task to the prescribed standard.
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 element	An action that constitutes a task that has a triggering event and a terminating event that clearly defines its limits, and an observable outcome.
Competency unit	A discrete function consisting of a number of competency elements.
Performance criteria	Simple, evaluative statements on the required outcome of the competency element and a description of the criteria used to judge whether the required level of performance has been achieved.
Range of variables (conditions)	The conditions under which the competency units must be performed.

ABBREVIATIONS/ACRONYMS

ACP	Area control procedural
ACS	Area control surveillance
ADC	Aerodrome control
ADDIE	Analyse, design, develop, implement, evaluate
AIS	Aeronautical information services
ALRS	Alerting service
APP	Approach control procedural
APRC	Approach precision radar control
APS	Approach control surveillance
ATC	Air traffic control
ATCO	Air traffic control officer
ATM	Air traffic management
ATS	Air traffic services
ATZ	Aerodrome traffic zone
CE	Competency element
COMM	Communication
CORD	Coordination
CPDLC	Controller–pilot data link communications
CU	Competency unit
FIS	Flight information service
HF	Human Factors
KNOW	Knowledge
LoA	Letter of agreement

NONR	Management of non-routine situations
NOSS	Normal operations safety surveys
NRS	Non-routine situations
OJT	On-the-job training
PANS-TRG	*Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868)
PC	Performance criteria
PROB	Problem solving and decision making
PSR	Primary surveillance radar
SAT	Site acceptance test
SELF	Self-management and continuous development
SEPC	Separation and conflict resolution
SID	Standard instrument departure
SITU	Situational awareness
SPP	Standard practices and procedures
SSR	Secondary surveillance radar
STAR	Standard instrument arrival
TEAM	Teamwork
TRAF	Traffic and capacity management
TWR	Tower (aerodrome control)
WORK	Workload management

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PUBLICATIONS

(referred to in this manual)

Annexes

Annex 1 — *Personnel Licensing*
Annex 10 — *Aeronautical Telecommunications*, Volume II — *Communication Procedures including those with PANS status*
Annex 11 — *Air Traffic Services*

Procedures for Air Navigation Services (PANS)

Procedures for Air Navigation Services — Training (PANS-TRG, Doc 9868)
Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444)

Manuals

Manual of Procedures for Establishment and Management of a State's Personnel Licensing System (Doc 9379)

Doc *Safety Management Manual (SMM)* (Doc 9859)

Manual of Radiotelephony (Doc 9432)
Regional Supplementary Procedures (Doc 7030)
Manual on the Approval of Flight Crew Training Organizations (Doc 9841)

Other Publications

EUROCONTROL. Specification for the ATCO Common Core Content Initial Training. Edition 2.0. Brussels. EUROCONTROL

EUROCONTROL. ATC Refresher Training Manual Edition 1.0. Brussels. EUROCONTROL

OECD. The Definition and Selection of Key Competencies. 2005

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Chapter 1 - Introduction

1.1 General

This manual provides air traffic control approved training organizations (ATOs) and operational units with guidance on how to identify the air traffic controller competencies that are necessary for their environment and then design the training and assessment that is needed for the various stages of air traffic controller development.

Air traffic controller development stages include initial training, the training that is essential for the performance of control duties at operational units and the training that supports qualified air traffic controllers' in maintaining their competence.

Since it is well recognized that ICAO regions, Contracting States and operational air traffic control units have differing regulatory, operational, technical and organizational environments, this manual does not prescribe a "one-size-fits-all" training programme. Instead, it describes how ATOs and operational units can establish an adapted competency model that is appropriate for their specific environment.

The manual is based on the knowledge, skill and experience requirements detailed in *Annex 1 – Personnel Licensing* and the ATC competency framework described in the *Procedures for Air Navigations Services – Training* (PANS-TRG, Doc 9868).

In recognition of the significant role played by the instructors and assessors in a competency-based training system, guidance is provided on the various aspects of instructing and assessing in a competency-based environment.

1.2 Status

This manual provides guidance on how to design a local competency-based training and assessment programme specifically for air traffic controllers. Implementation of competency-based training and assessment for air traffic controllers is optional. However, should the air navigation service providers and/or ATOs choose to implement such training, the relevant procedures in PANS-TRG, supported by this manual, should be used.

1.3 Intended users

This manual is aimed at personnel responsible for the design of ATC training. It includes:

a) designers who are creating a completely new training system; and

b) designers who already have an established training system and who intend to evolve their system towards a competency-based approach.

1.4 Structure of the manual

The manual consists of seven chapters.

Chapter 1 provides an overview of the regulatory requirements for air traffic controller training, an overview of competency-based training, the competency framework, the organization of ATC training and how to use this manual.

Chapter 2 describes, in detail, the step-by-step process for analysing and designing competency-based training. This process may be used for the design of any of the phases of air traffic controller training.

Since some of the fundamental aspects of successful competency-based training and assessment are carried out during the "develop", "conduct" and "evaluate" steps, this chapter also pays attention to these specific aspects. However, please note that for these last three steps, the chapter does not provide a complete process as most of the information is of a more general nature and can be found in many instructional design documents. Only the aspects of ATC competency-based training and assessment that are particular to these phases are highlighted.

Chapter 3 describes the role of instructors and assessors in a competency-based training and assessment environment.

Chapters 4 to 7 cover the various phases of training (initial, unit, refresher and conversion training) and are complementary to Chapter 2. The content of these chapters corresponds with the components of competency-based training and assessment that are discussed in Chapter 2. Each of these chapters elaborates the specifics of these components as they relate to a particular phase of training. These chapters also provide detailed examples to help the user understand the particulars of training during each phase.

1.5 Regulatory requirements

Annex 1 – *Personnel licensing* categorises six air traffic controller ratings that may be endorsed on an air traffic controller licence, or record. They are:

a) aerodrome control (ADC) rating;

b) approach control procedural rating (APP);

c) approach control surveillance rating (APS);

d) area control procedural rating (ACP);

e) area control surveillance rating (ACS); and

f) approach precision radar control rating (APRC).

Annex 1 makes clear that before a person can be issued with an air traffic control licence, there are a number of criteria that need to be met. Some of these criteria relate directly to the training of an air traffic controller. These include the knowledge, skills and practical experience requirements for all controllers and then the specific requirements for each of the ratings.

There is a general requirement that all air traffic controllers demonstrate knowledge in the following subjects[1]:

Subject	Description
Air law	Rules and regulations relevant to the air traffic controller.
Air traffic control equipment	Principles, use and limitations of equipment used in air traffic control.
General knowledge	Principles of flight; principles of operation and functioning of aircraft, engines and systems; aircraft performance relevant to air traffic control operations.
Human performance	Human performance including principles of threat and error management.

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[1] Annex 1, paragraph 4.4.1.2

Subject	Description
Meteorology	Aeronautical meteorology; use and appreciation of meteorological documentation and information; origin and characteristics of weather phenomena affecting flight operations and safety; altimetry.
Navigation	Principles of air navigation; principle, limitation and accuracy of navigation systems and visual aids.
Operational procedures	Air traffic control, communication, radiotelephony and phraseology procedures (routine, non-routine and emergency); use of the relevant aeronautical documentation; safety practices associated with flight.

In addition, Annex 1 states that the applicant shall have completed an approved training course in an approved training organization[2] and have undertaken on-the-job training for at least three months. Furthermore, Annex 1 then details the knowledge required by a controller for each category of air traffic controller rating. In the case of the ADC rating, the knowledge required is listed below[3];

1. Aerodrome layout, physical characteristics and visual aids;
2. Airspace structure;
3. Applicable rules, procedures and source of information;
4. Air navigation facilities;
5. Air traffic control equipment and its use;
6. Terrain and prominent landmarks;
7. Characteristics of air traffic;
8. Weather phenomena; and
9. Emergency and search and rescue plans.

In the case of both the APP and ACP ratings, the knowledge required is listed below[4];

1. Airspace structure;
2. Applicable rules, procedures and source of information;
3. Air navigation facilities;
4. Air traffic control equipment and its use;
5. Terrain and prominent landmarks;

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[2] Annex 1, paragraph 1.2.8.3
[3] Annex 1, paragraph 4.5.2.1 a)
[4] Annex 1, paragraph 4.5.2.1 b)

6. Characteristics of air traffic and traffic flow;
7. Weather phenomena; and
8. Emergency and search and rescue plans.

In the case of the APS, APRC and ACS ratings, the knowledge required is listed below[5];

1. Airspace structure;
2. Applicable rules, procedures and source of information;
3. Air navigation facilities;
4. Air traffic control equipment and its use;
5. Terrain and prominent landmarks;
6. Characteristics of air traffic and traffic flow;
7. Weather phenomena;
8. Emergency and search and rescue plans;
9. Principles, use and limitations of applicable ATS surveillance systems and associated equipment; and
10. Procedures for the provision of ATS surveillance service, as appropriate, including procedures to ensure appropriate terrain clearance.

In the same manner as for the general requirements, Annex 1 states that applicants shall have completed an approved training course in an approved training organization and have undertaken a minimum number of hours of on-the-job training[6].

Finally, the applicant for an air traffic control rating must be able to demonstrate that they have achieved the necessary skill, judgement and performance that is required to provide a safe, orderly and expeditious control service[7].

Although the training and experience requirements are clearly detailed in Annex 1, there are no requirements or recommended practices on how the training should be organized. The only reference that is made to the organization of training is that an applicant must complete an approved training course(s).

Consequently, Contracting States, along with their ATOs and operational units, are able to structure and conduct their air traffic control training courses in a manner that is appropriate to their regulatory context and their operational, technical and organizational environment.

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[5] Annex 1, paragraphs 4.5.2.1 b) and c)
[6] Annex 1, paragraphs 1.2.8.3 and 4.5.2.2.1
[7] Annex 1, paragraph 4.5.2.3

1.6 Competency-based ATC training

1.6.1 What is competency?

Competency-based training (and assessment) is a concept and methodology that was developed during the 1950s and became a mainstream concept sometime in the 1980s. Competency-based training has been applied in many different contexts and professions and therefore, it is understandable that there are many different definitions of what competence and competency-based training are. This section elaborates the competency concepts as they are used in this manual.

Competency is a consistent dimension of human performance that is used to reliably predict successful performance on the job. Competency is manifested and observed through behaviours that mobilize the relevant knowledge, skills and attitudes to carry out activities or tasks under specified conditions. A person successfully achieves competency if its associated standard is met.

Competencies allow people to formulate solutions for complex and/or difficult situations, including those situations that they are experiencing for the first time. For air traffic controllers, they need to be able to deal with these situations effectively and at the same time ensure that they are done in a safe and secure manner.

1.6.1.1 Knowledge

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.

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

1.6.1.2 Skill

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

A *motor skill* is an intentional movement involving a motor or muscular component, that must be learned and voluntarily produced to proficiently perform a goal-oriented task.

Cognitive skills are any mental skills that are used in the process of acquiring knowledge; these skills include reasoning, perception, and intuition.

Metacognitive skills relate 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 are metacognitive.

Skills are developed over time and with practice. Often complex tasks that are new to the controller are initially seen as cognitively demanding, however, as they become more practiced, some of these cognitive processes become automatized and so the skill requires less effort to perform. In terms of air traffic control, this automation gives the controller the capability and the capacity to find solutions to more difficult situations.

1.6.1.3 Attitude

Attitude is a persisting 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.

For air traffic controllers, their attitude towards issues such as safety, adherence to regulations, working with others and responsibility is a significant factor in the achievement of competence and the safety of air traffic. Competence can only be observed through performance. However, it is not possible to directly observe all the different skills which contribute to competence, especially the cognitive skills; instead they are inferred from observations of the controller performing tasks. For example, whilst observing the performance of a trainee who is establishing an arrival sequence, it is not possible for the instructor to directly observe whether the trainee has achieved an effective sequence through adequate planning and appropriate situation awareness or has achieved the sequence by reacting to events and chance circumstances. However, after repeated observations of the trainee consistently achieving an effective sequence, it is reasonable to assume that this is not being accomplished through chance and that the appropriate competencies have been acquired.

1.6.2 Developing competency-based training

Competency-based training and assessment makes use of a systematic approach whereby the air traffic controller's competencies and their performance criteria are defined. The training programme is then based on those competencies that were identified and a process for assessment is developed to ensure that the identified competencies have been achieved. In particular, the performance criteria can only be established by the approved training organization or air navigation service provider since the competency standards are context-dependent.

Competency-based training and assessment for air traffic controllers is generally delivered in three stages:' basic training' that is usually conducted only once, 'rating training' that is conducted once per rating and 'unit training' that is conducted once per specific unit, sector or group of sectors. Refresher training and assessment is conducted multiple times to ensure that competencies are maintained. There may be specific instances where additional training is required, such as training for system upgrades or training after a long period of time not working at an operational position.

1.6.3 Benefits

The key benefits to organizations which implement a competency-based training programme include:

a) **Assurance that ATCOs can demonstrate sufficient expertise**

   A competency based approach ensures that trainees achieve a level of performance that enables them to work independently and safely.

b) **On-going performance evaluation of operational personnel**

   An important feature of competency-based approaches is the identification and collection of assessment evidence which supports decision-makers/managers in monitoring the ongoing competence of operational staff.

c) **Early identification of performance gaps and design of more effective training to close the performance gap**

Accurate identification of performance gaps can be challenging in ATCO training given the complex cognitive nature of the competencies required. Using well defined performance criteria to identify gap/s can ensure that the training is more targeted and effective for the trainee.

d) **Training to meet individual needs**

Meeting the learning needs of the next generation of aviation professionals means recognizing that a “one-size fits all” training approach will not lead to success. Being able to identify and address specific learning gaps and specific trainee needs will ensure the development of the required competencies in each trainee.

e) **Development of effective recruitment and selection tools**

With a clear definition of what competencies are required for the job, recruitment programmes can be tailored to select those individuals who already possess aptitudes in those areas.

f) **Facilitation of effective change management processes**

The air traffic control environment is complex and rapidly changing. New equipment, operational procedures and techniques in both the ATCO and pilot work environment and new capabilities in navigation and aircraft equipage requires continuous learning. Specific identification of competencies and associated performance criteria supports a more accurate analysis of how ATC tasks, techniques and methods will be affected by these changes. More accurate definition of how change will impact ATCO work can ensure the development of more effective conversion training.

1.6.4 ATCO competency framework

1.6.4.1 The PANS-TRG ATCO competency framework describes the competency units, competency elements and observable behaviours that are used to develop adapted competency models that are rating-specific and appropriate for the situation within which they will be applicable.

1.6.4.2 These models are then used to design the training and assessment programmes necessary to achieve the defined competencies. The development of the adapted competency model and the associated training and assessment must take into account the regulatory, operational, technical and organizational environment within which the air traffic controllers will perform their tasks.

Note.— Definitions of competency units, competency elements and performance criteria are provided in the definitions *section of this manual*.

1.6.4.3 The ATCO competency framework is a generic, high level structure that has been designed to apply to all ratings and during any phase of training and assessment.

1.6.4.4 To develop customized competency framework(s), the competency framework is used in combination with regional and/or national task analysis of air traffic controller functions for each rating and a clear understanding of the local environment.

1.6.4.5 Chapter 2 of this manual describes, in detail, the process for developing an adapted competency model.

1.6.5 Structure of ATC training

Note.— The term "trainee" is used throughout this manual. It is a generic term for a person performing a learning activity without any reference to his/her status. Therefore, in some instances, the trainee is an already qualified air traffic controller who is performing a learning activity in the context of refresher or conversion training or is training for an additional rating.

The progression of air traffic controller training has been structured into three phases, illustrated in the diagram below.

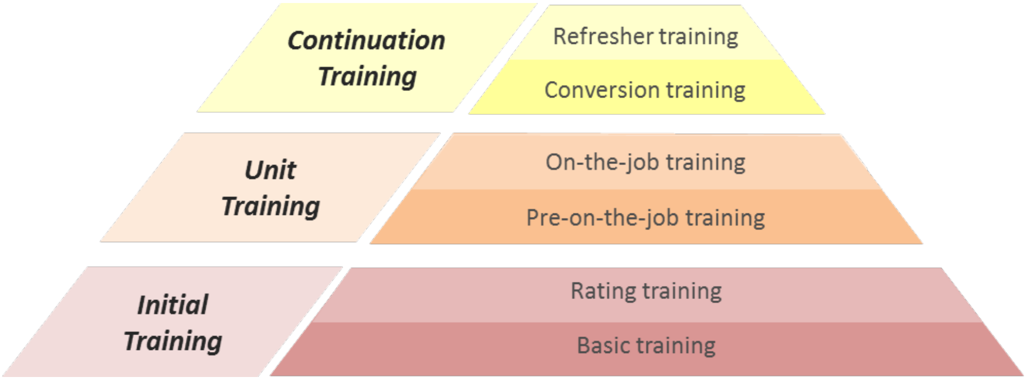

Figure 1: Initial training, unit training and continuation training

1.6.6 Initial training

The objective of initial training is to prepare a trainee for training at an air traffic control unit. It includes two stages, basic and rating training:

Basic training – which is theoretical and practical training designed to impart fundamental knowledge, skills and attitudes related to basic air traffic operations.

Rating training – which is theoretical and practical training designed to impart knowledge, skills and attitudes related to a specific rating.

1.6.7 Unit training

1.6.7.1 The objective of unit training is to prepare a trainee for the issue of an air traffic controller licence and/or the appropriate rating(s) and at a specific unit. In instances, where the air traffic controller already holds the appropriate rating, the unit training prepares the controller for working at a specific unit and/or specific sectors/working positions at that unit.

1.6.7.2 It includes two phases: pre-on-the-job training and on-the-job training (OJT):

Pre-OJT – which is training designed to impart knowledge of site-specific operational procedures, tasks and technical systems. During this phase, site-specific simulations may be used to prepare the trainee for the live operational environment at a unit. The use of simulation during this phase of training is highly recommended for units that handle dense and complex traffic situations.

OJT – which is the operational training designed to enable the trainee to acquire and consolidate the unit specific routines and procedures under the supervision of a qualified OJT instructor.

1.6.8 Continuation training

The objective of continuation training is to enable an operational air traffic controller to maintain the validity of their license and enhance their existing competencies. It consists of two possible phases; refresher training and conversion training, where conversion training only occurs on an “as needed” basis:

Refresher training – which is training designed to review, reinforce and/or enhance the existing competencies of air traffic controllers to provide a safe, orderly and expeditious flow of air traffic.

Conversion training – which is training designed to provide knowledge, skills and attitudes appropriate to a change in the operational environment. Conversion training may be provided for changes to operational procedures and/or systems.

Note.— Changes from one rating to another are part of either initial or unit training as demonstrated in Figure 2.

1.6.9 Organization of ATC training

1.6.9.1 The purpose of ATC training is the acquisition and maintenance of the competencies required to perform as an air traffic controller. It includes situations where already licensed/rated controllers undertake further training:

a) as a result of a move to a different working position or new location, whilst retaining the same rating;

b) to acquire an additional rating;

c) to advance their career in an operational context; and

d) as a result of upgrades to systems and/or changes to procedures.

1.6.9.2 Figure 2 demonstrates how the progression of ATC training is related to the different phases and stages of training. This figure includes an additional phase, development training, for advancing in a career, e.g. for instructing. This phase is not discussed in this manual.

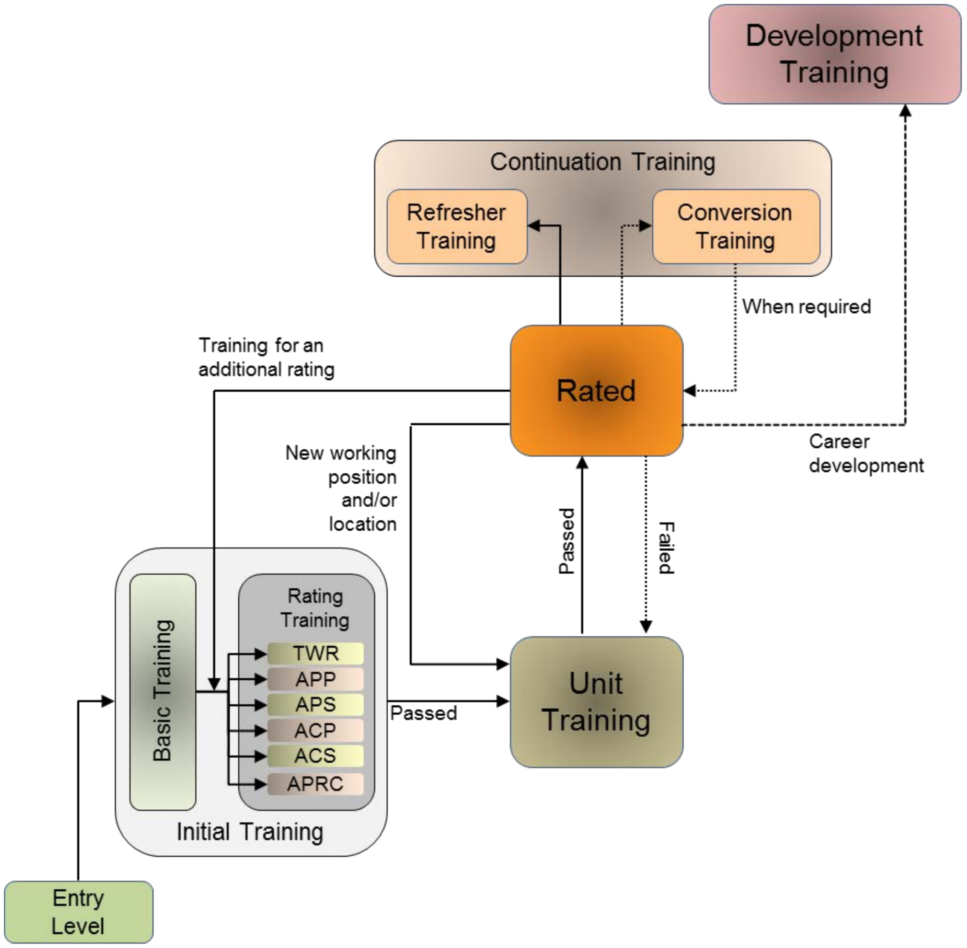
Development Training
Continuation Training
Refresher Training
Conversion Training
When required
Training for an additional rating
Rated
Career development
New working position and/or location
Passed
Failed
Basic Training
Rating Training
TWR
APP
APS
ACP
ACS
APRC
Passed
Unit Training
Initial Training
Entry Level

Figure 1: Organization of training

1.7 How to use this manual

1.7.1 The manual contains the following guidance:

a) provides a detailed step-by-step process for analysing the local training need and designing competency-based training and assessment that is based on the ATCO competency framework contained in PANS-TRG;

b) highlights competency-based elements that are fundamental to the development, conduct and evaluation of the training; and

c) highlights the issues and elements that are specific to each of the phases of training (i.e. initial, unit and continuation training).

1.7.2 This manual does not provide a template syllabus, guidance on generic instructional systems design or instructional techniques, or guidance on administrative policies and procedures for training programmes.

1.8 The instructional systems design model

1.8.1 Model called ADDIE[8]. The ADDIE model consists of five phases: 1) analyse, 2) design, 3) develop, 4) implement, and 5) evaluate. The description of each phase has been tailored so that the process described is specific to air traffic controller competency-based training and assessment. Whilst the ADDIE model has been used for the purposes of this manual it is recognized that there are other equally valid models that are appropriate for the design of competency-based training.

1.9 The step-by-step guide

1.9.1 The complete step-by-step guide is detailed below. Please note that the main emphasis of this manual is on:

a) Workflow 1: Analyse the training need; and

b) Workflow 2: Design local competency-based training and assessment.

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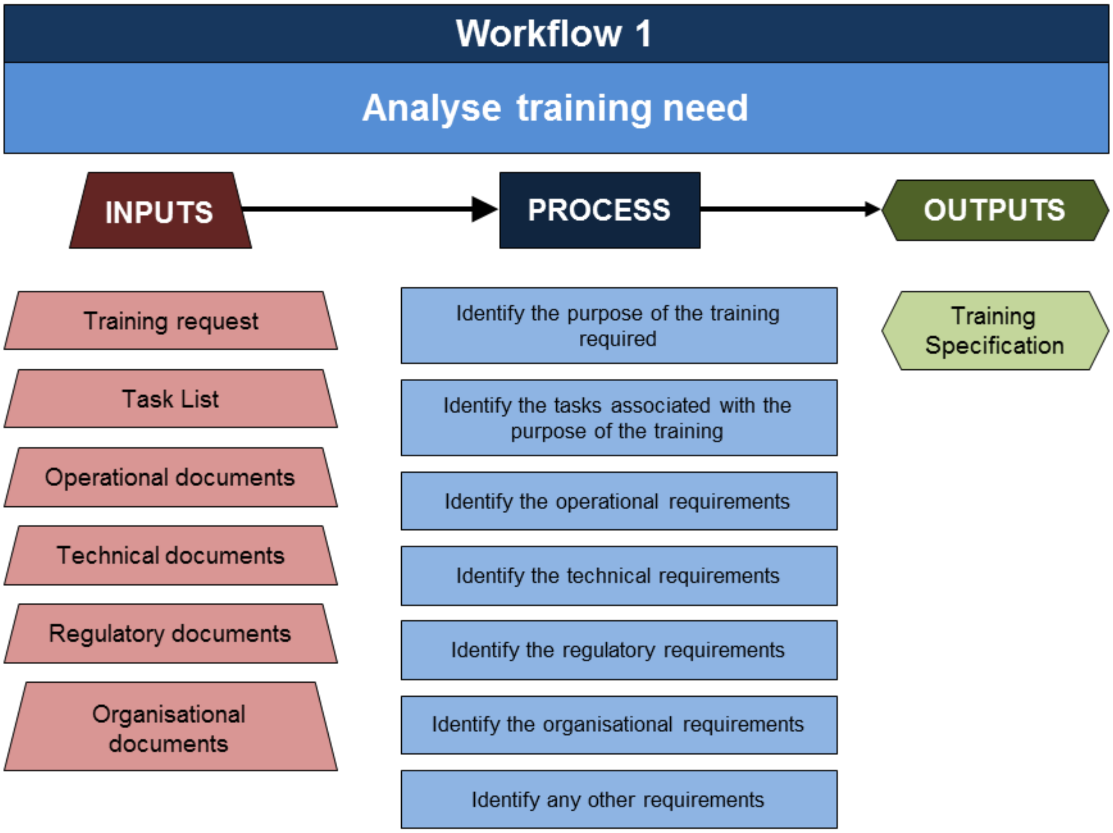
[8] The originator of the ADDIE is unknown, however it has been refined by various persons, most notably Dick and Carey.

References: Dick,W & Carey, L (1996). The Systematic Design of Instruction (4th Edition). New York, Harper Collins College Publishers.



Workflow 1

Analyse training need

INPUTS → **PROCESS** → **OUTPUTS**

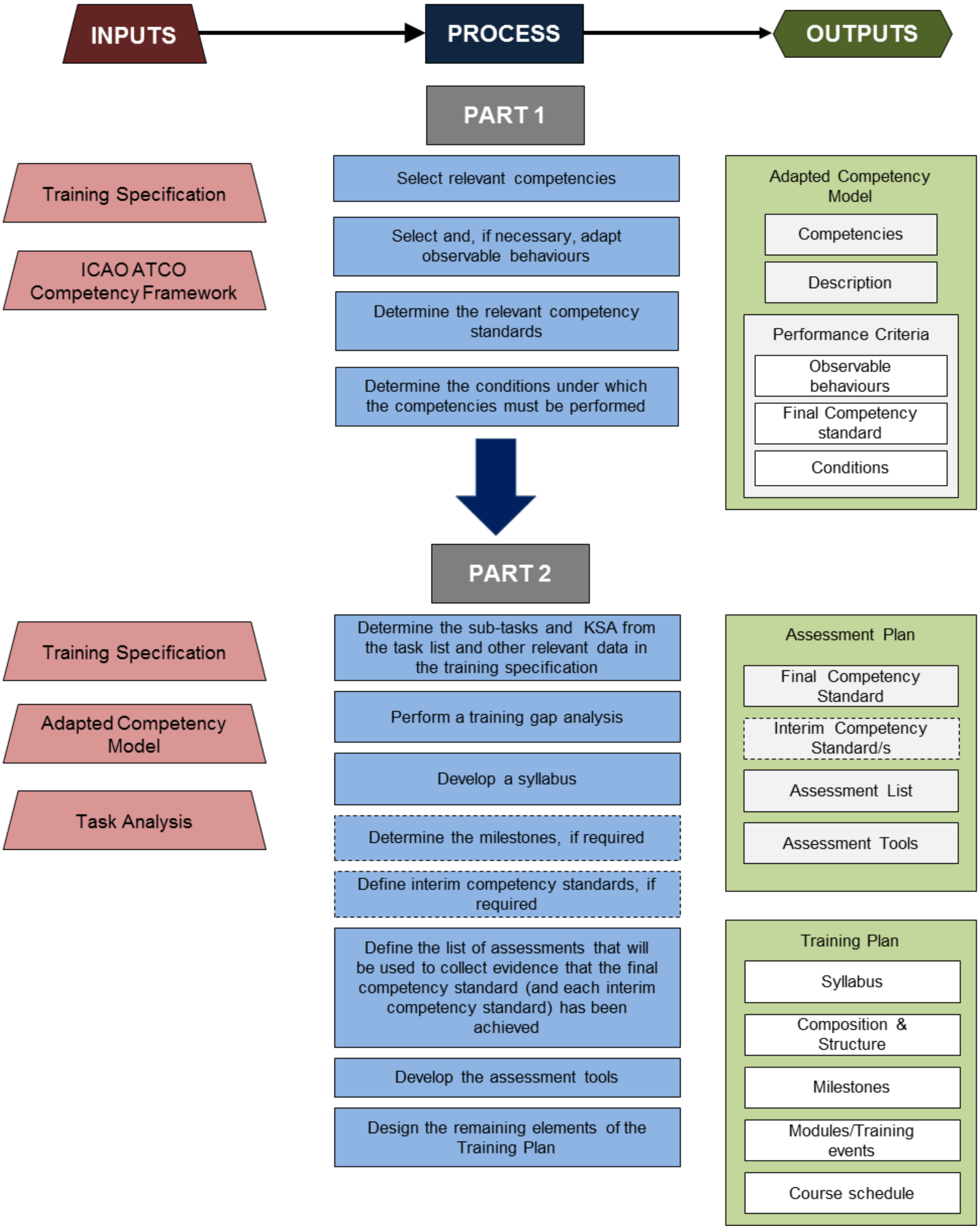
INPUTS
- Training request
- Task List
- Operational documents
- Technical documents
- Regulatory documents
- Organisational documents

PROCESS
- Identify the purpose of the training required
- Identify the tasks associated with the purpose of the training
- Identify the operational requirements
- Identify the technical requirements
- Identify the regulatory requirements
- Identify the organisational requirements
- Identify any other requirements

OUTPUTS
- Training Specification

Workflow 2

Design local competency-based training & assessment



INPUTS → **PROCESS** → **OUTPUTS**

PART 1

Inputs:
- Training Specification
- ICAO ATCO Competency Framework

Process:
- Select relevant competencies
- Select and, if necessary, adapt observable behaviours
- Determine the relevant competency standards
- Determine the conditions under which the competencies must be performed

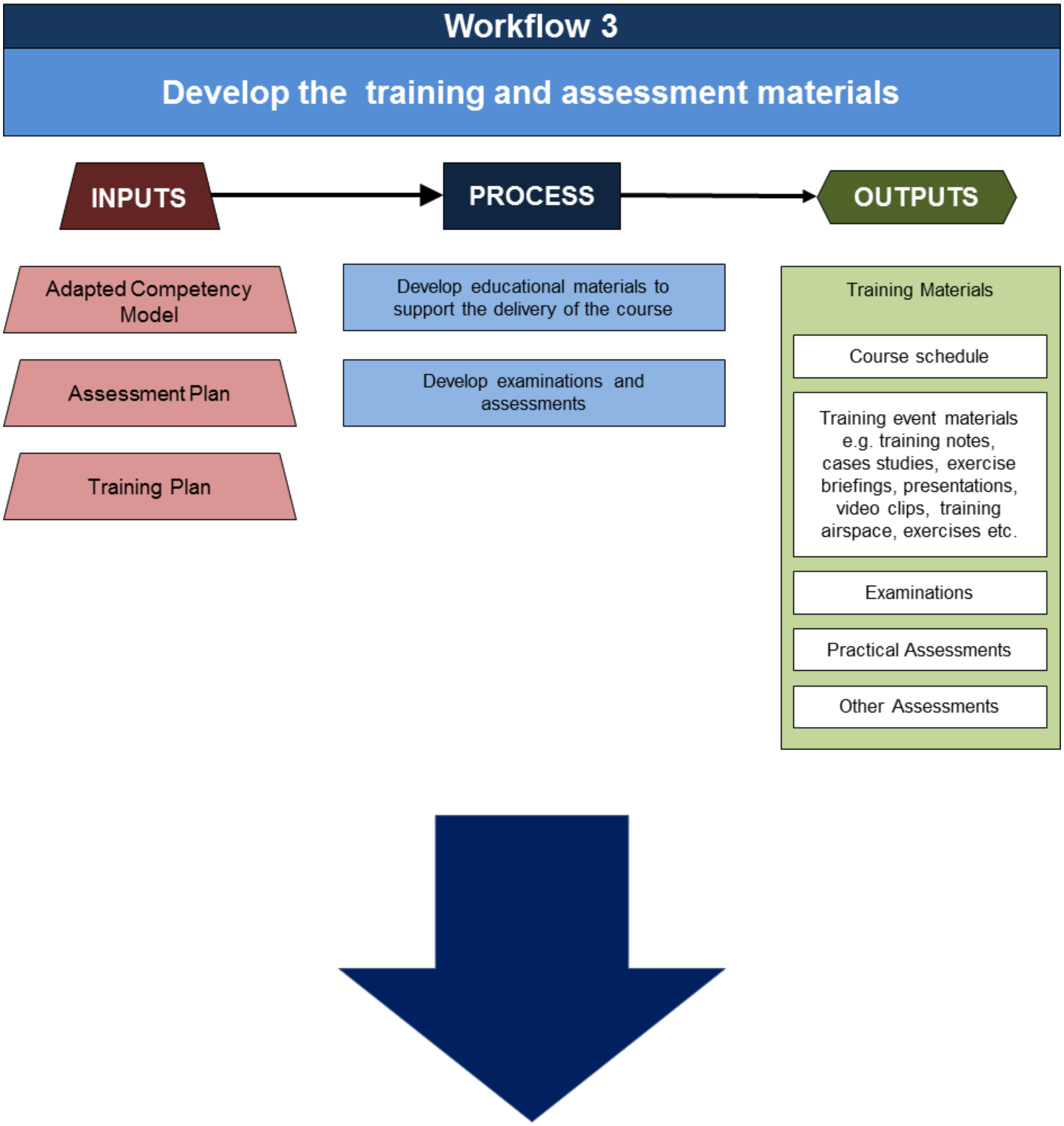
Outputs:
- Adapted Competency Model
  - Competencies
  - Description
  - Performance Criteria
    - Observable behaviours
    - Final Competency standard
    - Conditions

PART 2

Inputs:
- Training Specification
- Adapted Competency Model
- Task Analysis

Process:
- Determine the sub-tasks and KSA from the task list and other relevant data in the training specification
- Perform a training gap analysis
- Develop a syllabus
- Determine the milestones, if required
- Define interim competency standards, if required
- Define the list of assessments that will be used to collect evidence that the final competency standard (and each interim competency standard) has been achieved
- Develop the assessment tools
- Design the remaining elements of the Training Plan

Outputs:
- Assessment Plan
  - Final Competency Standard
  - Interim Competency Standard/s
  - Assessment List
  - Assessment Tools
- Training Plan
  - Syllabus
  - Composition & Structure
  - Milestones
  - Modules/Training events
  - Course schedule



Workflow 3

Develop the training and assessment materials

INPUTS

- Adapted Competency Model
- Assessment Plan
- Training Plan

PROCESS

- Develop educational materials to support the delivery of the course
- Develop examinations and assessments

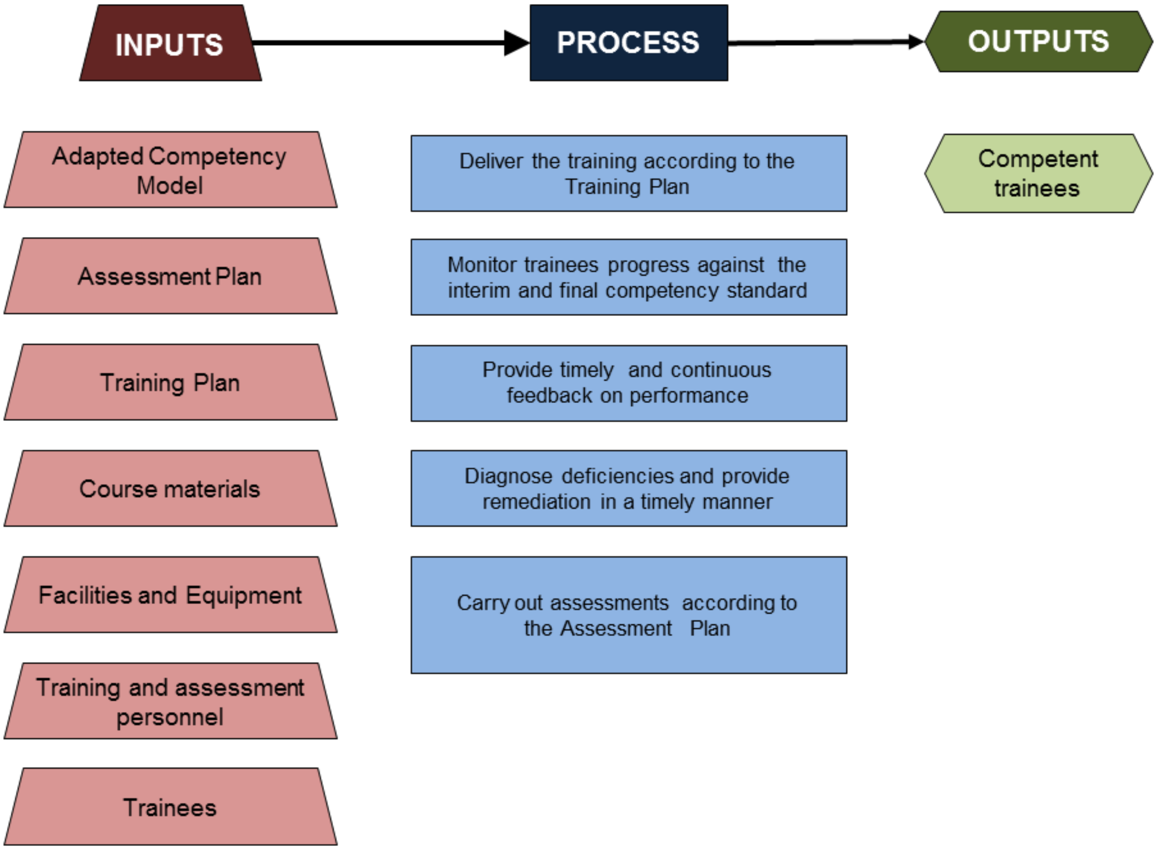
OUTPUTS

Training Materials

- Course schedule
- Training event materials e.g. training notes, cases studies, exercise briefings, presentations, video clips, training airspace, exercises etc.
- Examinations
- Practical Assessments
- Other Assessments

Workflow 4

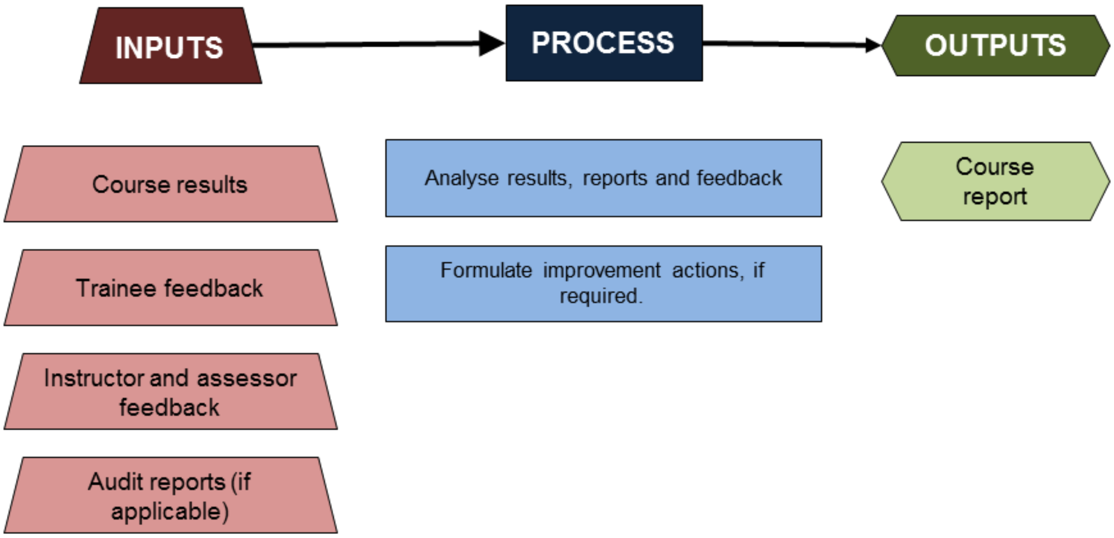
Conduct the course



INPUTS	PROCESS	OUTPUTS
Adapted Competency Model	Deliver the training according to the Training Plan	Competent trainees
Assessment Plan	Monitor trainees progress against the interim and final competency standard	
Training Plan	Provide timely and continuous feedback on performance	
Course materials	Diagnose deficiencies and provide remediation in a timely manner	
Facilities and Equipment	Carry out assessments according to the Assessment Plan	
Training and assessment personnel		
Trainees		

Workflow 5

Evaluate course


INPUTS
PROCESS
OUTPUTS
Course results
Trainee feedback
Instructor and assessor feedback
Audit reports (if applicable)
Analyse results, reports and feedback
Formulate improvement actions, if required.
Course report

1.10 Pre-requisites for establishing competency-based training and assessment

1.10.1 The personnel responsible for establishing and overseeing ATCO competency-based training and assessment should have knowledge and understanding of:

a) the provisions related to ATCO competency-based training and assessment as described in PANS-TRG;

b) Chapters 1, 2 and 3 of this manual; and

c) the training Chapters 4 to 7 of this manual relevant to the phase(s) of training to be designed.

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Chapter 2 – Design of competency-based training and assessment

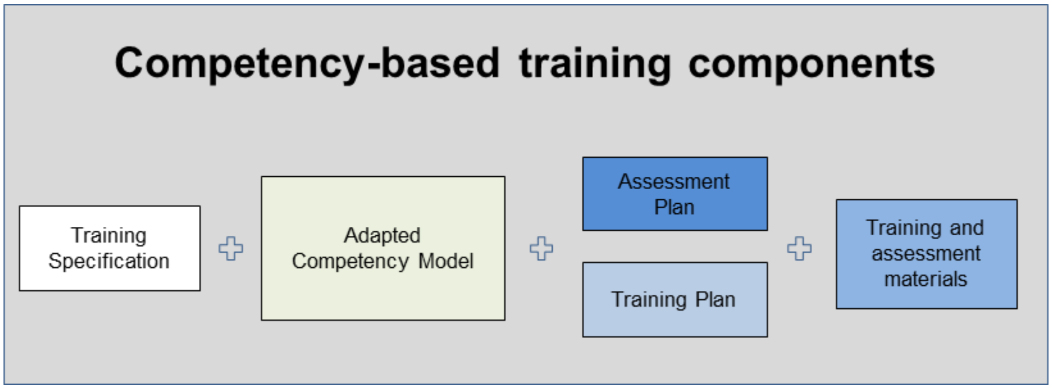
2.1 General

This chapter 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 ATCO competency framework and the ADDIE (analyse, design, develop, implement and evaluate) instructional design model.

2.2 The components of competency-based training and assessment

2.2.1 The aim of competency-based training and assessment is to provide a competent workforce for the provision of a safe and efficient air traffic control service.

2.2.2 To achieve this aim various components are necessary. These components are:

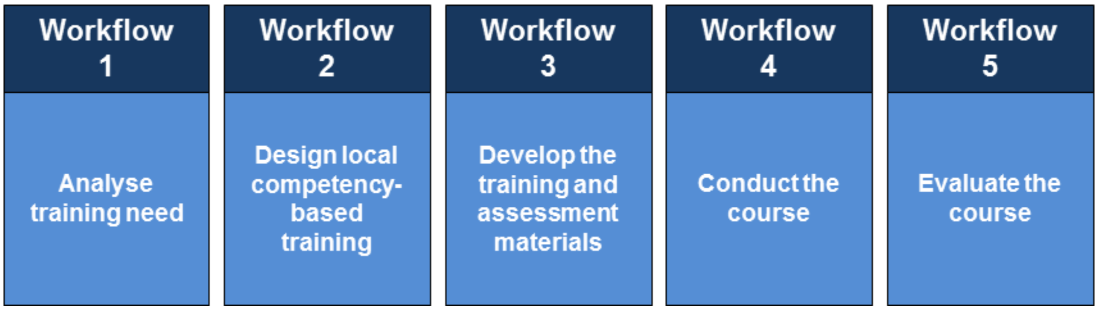


Competency-based training components

Training Specification + Adapted Competency Model + Assessment Plan / Training Plan + Training and assessment materials

<table>
<tr><td>Training Specification</td><td colspan="2">The document that describes the purpose of the training, the task list and the requirements that shall be fulfilled when designing the training.</td></tr>
<tr><td rowspan="3">Adapted Competency Model</td><td colspan="2">A group of competencies with their associated description, and performance criteria adapted from the ICAO competency framework that an organization uses to develop competency-based training and assessment for a given role.
The components of an adapted competency model are:</td></tr>
<tr><td>Competencies</td><td>The competencies that are required to be achieved by the end of training.</td></tr>
<tr><td>Performance Criteria</td><td>The combination of observable behaviours, conditions and standards used to judge whether the required performance has been achieved.</td></tr>
<tr><td>Assessment Plan</td><td colspan="2">The document that details the assessment events and tools (evidence guide, competency checklist, competency assessment form) that will be used to determine if competence has been achieved.</td></tr>
<tr><td>Training Plan</td><td colspan="2">The document used for structuring, developing and delivering the training.</td></tr>
<tr><td>Training and Assessment Materials</td><td colspan="2">All the materials used to deliver the training in accordance with the training plan. These may include course programme, training notes, manuals, presentations, simulated exercises, etc.</td></tr>
</table>

2.3 Overview of competency-based training workflows



2.3.1 The first two workflows, ANALYSE (i.e. analyse training need) and DESIGN (i.e. design local competency-based training and assessment), establish the training specification, the adapted competency model, the assessment plan and the training plan that will be used to develop and conduct the training course. The evaluate training workflow reviews the effectiveness of the training and assessment conducted and recommends improvements, as appropriate.

2.3.2 This chapter focuses on the analyse and design workflows.

2.3.3 An overview of the remaining workflows is provided at the end of the chapter to highlight the important issues directly related to competency-based training and assessment.

2.3.4 A stepped approach is worked through for each of the analyse and design workflows and details:

a) the inputs required;

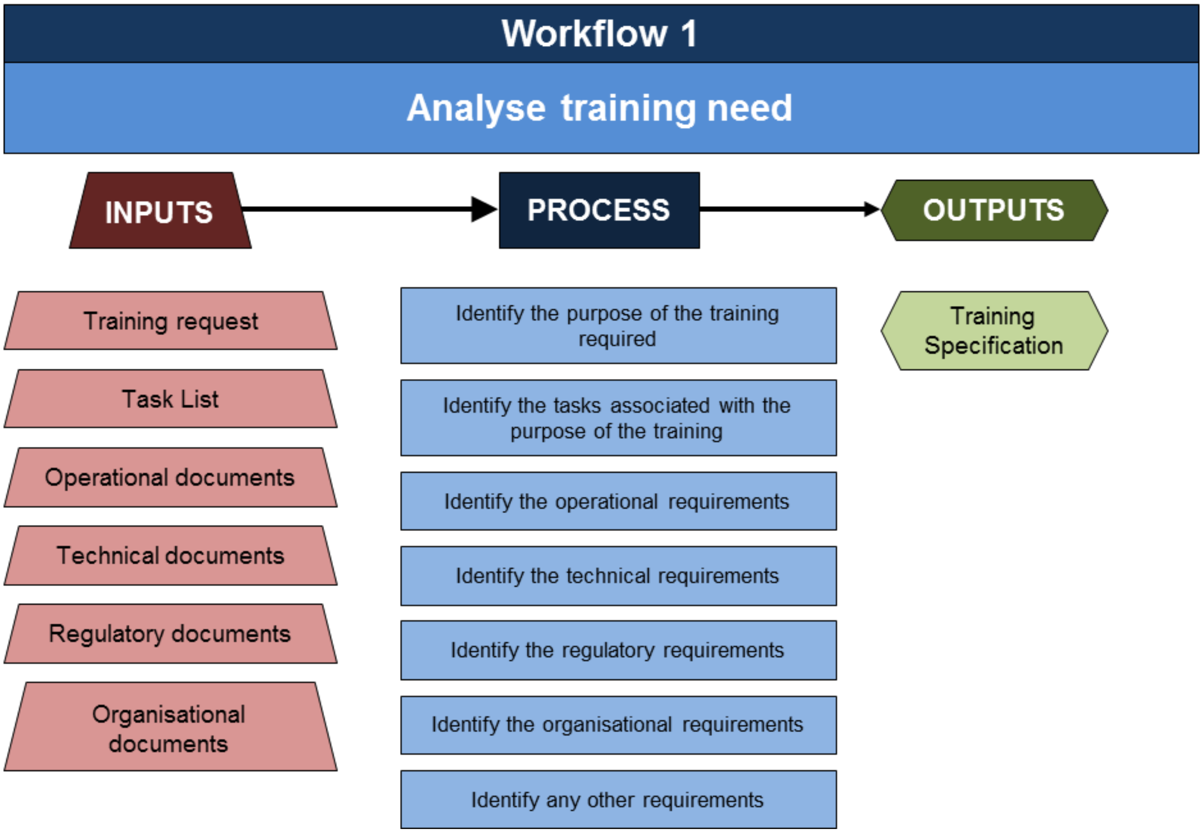
b) the process to be worked through; and

c) the outputs achieved on completion of each process.

2.3.5 Note that the “analyse” output becomes one of the inputs for the “design” workflow.

2.4 WORKFLOW 1: Analyse training need

2.4.1 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. The first step in the development of a competency-based training programme is to conduct a training needs analysis. During training needs analysis, the purpose of the training is considered in relation to the local operational, regulatory, technical and organizational requirements on the training course that will eventually be delivered. A training specification describes the end state to be achieved. The training specification does not describe the progression of training but simply the end state required.


Workflow 1
Analyse training need
INPUTS
PROCESS
OUTPUTS
Training request
Task List
Operational documents
Technical documents
Regulatory documents
Organisational documents
Identify the purpose of the training required
Identify the tasks associated with the purpose of the training
Identify the operational requirements
Identify the technical requirements
Identify the regulatory requirements
Identify the organisational requirements
Identify any other requirements
Training Specification

2.4.2 The training specification should provide sufficient detail to answer the following questions:

Purpose	
What is the purpose of the training?	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.
State the phase/s of training.	Initial, unit, refresher and/or conversion training.
What qualification, if any, will the trainee achieve on successful completion of the training?	In some instances a formal qualification will be achieved at the end of the training e.g. aerodrome control rating, validation on XYZ sector. In other instances this is not the case e.g. after routine refresher or conversion training.
Tasks	
Describe the tasks associated with the purpose of the training	For the purposes of defining the training specification, only a task list is required. This task list may be extracted from a completed 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. The competency elements in the ICAO ATC competency framework may be used as an aid to developing a task list.
Operational requirements	
Which operational procedures will be applied?	In the case of unit training, this is a reference to the local operating documentation e.g. National Manual of ATS, local operating procedures, letters of agreement etc. In the case of initial training, the local operating documentation may not apply at this stage, but would be introduced later at the unit training phase. For the purposes of the training specification, the sources documents should be listed that will be used for developing these procedures e.g. ICAO Doc 4444 and/or National Manual of ATS.
Describe the operational environment where the training will take place.	In the case of training that takes place in a simulated environment, this may include, for example the necessary airspace structures, classification of airspace, type of terrain or climatic environment, number of aerodromes, runway configuration etc. If the training is to take place in a real operational environment and there is no need to develop any form of simulation, it is sufficient to reference the Operations Manual that describes the environment.
Describe the nature of the traffic necessary to achieve the purpose of the training.	In terms of, but not restricted to: a) Type (IFR/VFR); b) Movements (arrivals, departures, overflights); c) Aircraft types and weight classes (wide-body jets, business jets, light aircraft, turbo-props, helicopters, mix of all aircraft types); d) Traffic levels (light, medium, high); and e) Traffic complexity (non-complex, complex) which may include a description the major conflict issues that create complexity such as crossing traffic that is climbing/descending, mixed-mode arrival sequencing etc.

Which non-routine situations are necessary for successful completion of the training?	For example: Emergency, unusual, degraded modes.
Describe the working position configuration.	This will assist the training designer in configuring the practical training and associated assessments. Examples of configurations include: a) For a surveillance environment: one tactical controller + one coordinating controller; and b) For an aerodrome environment: one air controller + one ground/clearance delivery controller, , or all functions combined in one tower position.
Technical requirements	
List any specific operational (or simulated operation) systems and/or equipment that are necessary to achieve the purpose of the training.	For example CPDLC, arrival or departure management systems, surface movement radar, etc.
Regulatory requirements	
Which rules and regulations are applicable?	For example: regional and/or national regulations
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; and e) any other (equipment, qualifications of instructors, trainee to instructor ratios, etc.).	This is recorded in the training specification to ensure that they are taken into consideration during the training design. Typical regulatory requirements may include minimum number of hours of experience in the operational environment under supervision (ICAO Annex 1), minimum list of knowledge subjects to be covered, etc.
Organizational requirements	
Describe any organizational requirements that may impact the training.	In some instances an organization may wish to achieve additional objectives that are required to be included or emphasised in the training e.g. strategic objectives such reducing delays, customer focus, etc.

Other requirements	
Describe any other requirements that may impact the training.	This question captures any other requirements that may not have been covered in the previous questions e.g. two languages to be used.
Simulator Equipment	
List the simulation requirements that are necessary to achieve the training outcome, if any.	Either state the type of simulator, e.g. part-task trainer, hi-fidelity simulator, operational CWP emulator or the simulator/manufacturer name.

Appendix A to Chapter 2 Provides an Example of a Completed Training Specification

2.5 WORKFLOW 2: Design competency-based training and assessment

2.5.1 The purpose of the design competency-based training and assessment workflow is threefold:

1. to establish an adapted competency model that is aligned with the training specifications identified in the previous workflow;
2. to design an assessment plan that will be used to assess the competence of trainees; and
3. to design the training plan that will enable the development and delivery of the training course.

2.5.2 On the following pages, Workflow 2 is shown in two parts:

Workflow 2 - Part 1 deals with the design of the adapted competency model;

Workflow 2 - Part 2 deals with the design of the assessment and training plans.

2.5.3 Note that the processes for developing the assessment and training plans are iterative, however the outputs are separate. Consequently, Workflow 2 - Part 2 incorporates both processes and both outputs.

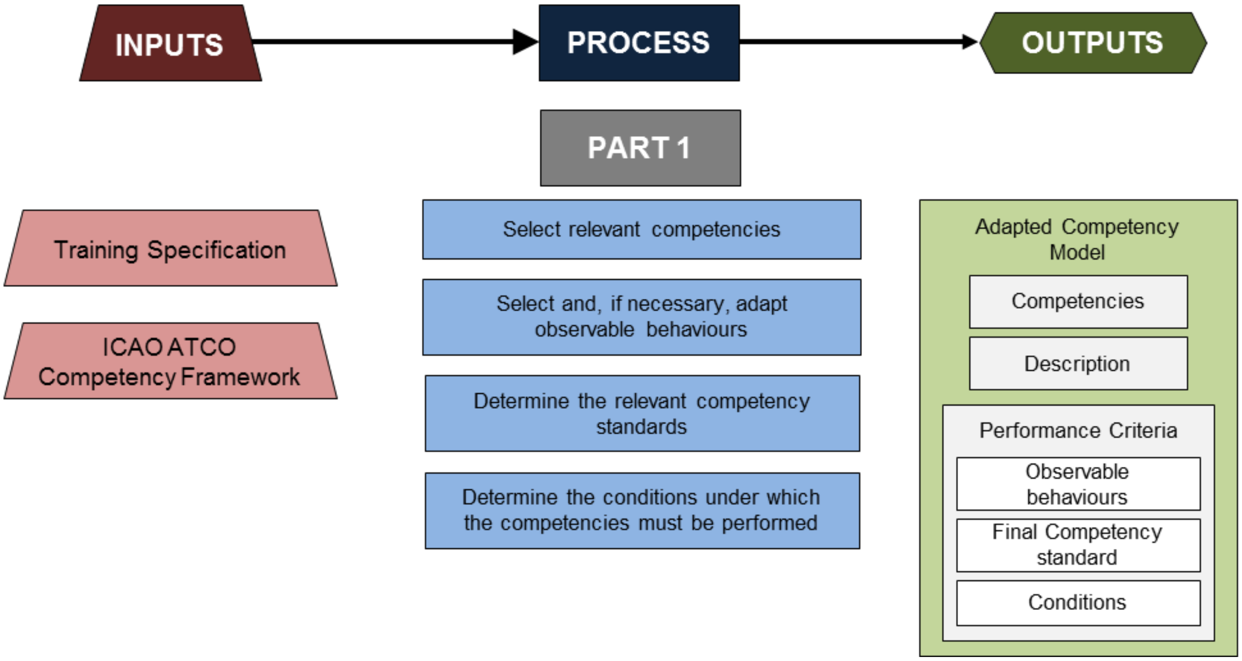
2.6 WORKFLOW 2 - Part 1: Design the adapted competency model

2.6.1 To design an adapted competency model, the PANS-TRG ATCO competency framework is adapted to meet the air traffic control competency requirements. The information contained in the training specification is used to make this adaptation.

2.6.2 The workflow diagram below may be used to aid the design process.

Workflow 2

Design local competency-based training & assessment


INPUTS
PROCESS
OUTPUTS
PART 1
Training Specification
ICAO ATCO Competency Framework
Select relevant competencies
Select and, if necessary, adapt observable behaviours
Determine the relevant competency standards
Determine the conditions under which the competencies must be performed
Adapted Competency Model
Competencies
Description
Performance Criteria
Observable behaviours
Final Competency standard
Conditions

2.6.1 Selection of the competencies

The ICAO ATCO competency framework provides a set of generic competencies that are necessary to perform as an air traffic controller, therefore it is anticipated that the vast majority of adapted competency models will contain the same list of competencies. Should a training designer decide to add or remove a competency, there should be a clear and justifiable reason to do so.

2.6.2 Selection and adaptation of the observable behaviours

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

Examples of observable behaviours that may need to be adapted or not included

In the situational awareness competency, consider the observable behaviour: ‘*Acquires information from available surveillance and flight data systems, meteorological data, electronic data displays and any other means available*.’

This observable behaviour refers to equipment that may not be available in the local air traffic units or aerodromes, especially non-surveillance units. In some instances only some of the systems may be available. Therefore the observable behaviour is either omitted or adapted, if there are other sources from which information can be acquired. This observable behaviour may possibly be adapted to any of the following, based on the actual environment where the training will take place:

a) acquires information from meteorological and ATIS reports; and

b) acquires information from surveillance and flight data system and the electronic data displays.

Other examples of observable behaviours that may not be applicable in all environments:

Traffic and capacity management: Uses available tools to reduce delays and optimize flight profiles (these tools may not be available in the local environment).

Coordination: Coordinates changes of status of operational facilities such as equipment, systems and functions (this may be carried out by personnel other than the ATCO).

Workload management: Delegates tasks when necessary to reduce workload (this may not be possible in some environments).

2.6.2.2 In some instances, the observable behaviour in the ICAO ATCO competency framework include examples to give an indication of what is intended. When selecting the observable behaviour for the adapted competency model, these examples need not be included as they are provided for explanatory purposes only.

Examples that are provided for explanatory purposes only

Situational awareness: *Identifies potentially hazardous situations (e.g. amount of separation with other aircraft, objects, airspace and ground, consequences of adverse weather, navigational deviations and capacity overload).*

Traffic and capacity management: *Uses a variety of techniques to effectively manage the traffic (e.g. speed control, vectoring, traffic sequencing, assigning climb/descent rate)*.

2.6.3 Determining competency standards

Competency standards apply to all observable behaviours and relate to compliance with the standards and procedures, rules and regulations as described in the relevant documents (e.g. national rules, *Manual of Air Traffic Services*, AIPs, local operations manuals, letters of agreement, etc.). In some instances, there may be specific standards associated with a particular observable behaviour.

2.6.4 Determining conditions

2.6.4.1 Conditions refer to anything that may qualify performance in the local environment. In the air traffic environment conditions are related to the local context, the tools and system/ equipment that are used and the amount of assistance a trainee can expect from an instructor/assessor. The training specification completed in Workflow 1 may be used to identify some of these conditions.

2.6.4.2 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.

2.6.4.3 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 section 2.7.4.

2.6.4.4 There are different types of conditions that may be considered for the final competency standard:

Conditions relating to context

Examples of these types of conditions include:

a) traffic levels (low, medium, high);

b) traffic complexity (non-complex, average complexity, high complexity);

c) type of traffic (IFR/VFR/SVFR, arrivals, departures, overflights etc.); and

d) environmental context (different types of adverse weather, configuration of sectors).

Conditions relating to tools and systems/equipment

Examples of these types of conditions include:

a) tools, equipment and/or systems available under normal operating conditions (MTCD [medium term conflict detection] SMR [surface movement radar], CPDLC, DMAN [departure manager], SMAN [surface manager]); and

b) whether the performance takes place in a simulated or live operational environment.

Conditions relating to the amount of support or assistance a trainee can expect from the instructor/assessor

During the early stages of training, trainees can expect active coaching/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 be performing independently without assistance from the instructor.

Examples of conditions applied to all observable behaviours
(i.e. the entire adapted competency model

For an operational area surveilllance unit:

The trainee will be able to demonstrate an integrated performance of all the competencies under the following conditions:

a) with all levels of traffic up to the maximum sector capacities as listed in section XX of the *Unit Operations Manual*;

b) with all levels of traffic complexity;

c) with all sector configurations as described in section XX of the *Unit Operations Manual*;

d) under all weather conditions;

e) without assistance from an instructor; and

f) using all the tools and systems described in the *Unit Operations Manual*.

For initial training for an aerodrome control rating:

The trainee will be able to demonstrate an integrated performance of all the competencies under the following conditions:

a) within the simulated aerodrome environment described in XX *Unit Operations Manual*;

b) with all levels of traffic up to a maximum of thirty-five aircraft/hour;

c) with a maximum of fifteen aircraft being simultaneously controlled and a maximum of three active conflicts to be resolved at any one time;

d) without assistance from the instructor; and

e) using all the tools available in the simulated environment.

Appendix B to Chapter 2 provides an example of an adapted competency model.

2.7 WORKFLOW 2 - Part 2: Design the assessment and training plans

Prior to developing the assessment and training plans it is important to appreciate:

a) the principles of competency-based assessment;

b) typical assessment methods;

c) the concept of milestones;

d) final competency standard and interim competency standards; and

e) the relationship between the adapted competency model, the training plan and the assessment plan.

2.7.1 The principles of assessment in a competency-based environment

In a competency-based environment the following principles apply:

2.7.1.1 Clear performance criteria are used to assess competence

The adapted competency model establishes these performance criteria.

2.7.1.2 An integrated performance of the competencies is observed

The trainee undergoing assessment must demonstrate all competencies and their seamless interaction with each other.

2.7.1.3 **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.

2.7.1.4 **Assessments are valid**

All of the components that comprise the adapted competency model must be assessed. there must be sufficient evidence to ensure that the trainee meets the competency specified by the interim and/or 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.

2.7.1.5 **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.

2.7.2 **Assessment methods**

The primary method for assessing performance is the conduct of practical assessments because the focus is on an integrated performance of competencies. It may also be necessary to supplement the practical assessments with other forms of evaluation such as examinations, oral assessments, projects, simulation, etc. 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. Practical assessments take place in either a simulated or operational environment. There are two types of practical assessment: formative assessments and summative assessments.

2.7.2.1 **Formative assessments**

2.7.2.1.1 Formative assessments are a part of the learning process. Instructors provide feedback to the trainee on how they are progressing toward the interim or final competency standard.

2.7.2.1.2 This type of assessment enables the trainee to progressively build on competencies already acquired and should aid learning by identifying gaps as learning opportunities.

2.7.2.1.3 If trainees receive feedback or are assessed only at the very end of the training, they have no opportunity to use that information to improve their performance.

2.7.2.1.4 The frequency and number of formative assessments may vary depending on the duration of the training.

2.7.2.1.5 Formative assessments should serve to:

a) motivate trainees;

b) identify strengths and weaknesses; and

c) promote learning.

2.7.2.2 Summative assessments

2.7.2.2.1 Summative assessments provide the method whereby a trainee demonstrates competence. This method enables the instructor or assessor to work with a trainee to collect evidence of competence.

2.7.2.2.2 Summative assessments are carried out at defined points during the training and/or at the end of training.

2.7.2.2.3 During summative assessments, the decision is either “competent” or “not competent”. 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.

2.7.2.2.4 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 those instructors working routinely with the trainee.

2.7.2.2.5 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 and therefore the personnel carrying out these assessments should have the necessary competencies to assess objectively and meet the authority’s requirements. These personnel should be provided with the tools necessary to collect evidence in a systematic and reliable manner in order to ensure inter-rater reliability.

2.7.2.3 Oral assessment

2.7.2.3.1 Oral assessment is a method that may be used to supplement a summative assessment.

2.7.2.3.2 Practical assessments have some limitations including:

a) that it may not be possible to observe a representative cross-section of all the competencies and/or the unit’s operation; and

b) that it is not feasible to enter into a discussion with the trainee whilst they are undertaking the practical assessment

2.7.2.3.3 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, seasonal issues) and to refocus on certain actions observed during the practical assessment that may have been cause for some concern.

2.7.2.3.4 Oral assessments may be conducted in front of a simulator or away the practical environment from (e.g. office environment). Oral assessments are usually scenario-based and are designed around the situations that the assessor wants to explore further. The assessor explains the scenario and then asks the trainee to describe what actions they would take. After the trainee has described their actions the assessor may ask further clarifying questions. The assessor then assesses the trainee’s response/s in relation to the adapted competency model.

Example of a scenario based question for oral assessment after a moderately busy summative assessment in an en-route sector

You are working alone on the sector and the number of aircraft on your frequency starts to increase. Due to the number of direct routing requests that flight crew are making and requests for level changes, the need to co-ordinate is also increasing. You also recognize that your RTF load has increased and you are finding yourself becoming increasingly stressed. What do you do?

2.7.2.4 Examinations

2.7.2.4.1 Examinations are used to evaluate theoretical knowledge and to a lesser extent the application of some basic skills. Examinations may be written or completed with the aid of digital equipment and/or online applications.

2.7.2.4.2 Typical areas that are evaluated through examinations include:

a) knowledge of airspace and procedures (e.g. routine procedures, emergency procedures);

b) basic knowledge relating to aviation law, meteorology, navigation, aerodynamics, etc.;

c) standardized phraseology;

d) interpreting SIDS and STARS charts;

e) interpreting aeronautical maps;

f) encoding and decoding flight plans and aeronautical messages; and

g) calculating transition levels.

2.7.2.5 Other methods

2.7.2.5.1 The above list of methods that supplement practical assessment, is not intended to be restrictive. Any suitable supplemental method for assessing competence may be used.

2.7.2.5.2 For example, during initial training other methods may include:

a) projects; and

b) group assignments.

2.7.3 Milestones

2.7.3.1 When the duration or the complexity of a course is such that it makes pedagogic sense to check that a trainee is progressing towards competence at an acceptable pace, then the course may be divided up into milestones. Milestones are cohesive chunks or units of learning that are organized into a logical sequence that generally progress from the simple to the complex. Each milestone is comprised of both training and assessment/s.

2.7.3.2 Milestones build on one another; therefore a trainee would need to successfully complete the training and assessment for the first milestone before proceeding to the next one.

2.7.3.3 Examples of how milestones could be determined:

a) on the basis of the number of simulations or OJT hours to be undertaken; and

b) on the basis of logical units of learning, meaning that the training that takes place in the simulated unit environment is the first milestone and the training that takes place as OJT is the second milestone.

2.7.3.4 The diagram below shows an example of a course that has been divided up into three milestones. The first milestone was decided on the basis of logical units (this milestone is primary about transition to the new operations unit and practicing in the simulator). The remaining two milestones were based on number of OJT hours.

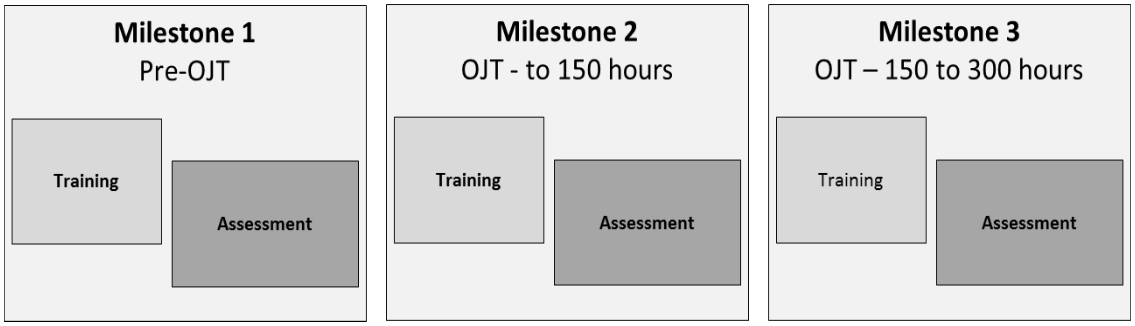


Figure X: Example of milestones

2.7.4 Final and interim competency standards

2.7.4.1 On successful completion of an initial or unit training course, the trainee will have achieved the final competency standard for that phase of training. This means that they will have successfully completed all the required training and assessments that have been determined as necessary to demonstrate the competencies and meet the performance criteria as described in the adapted competency model.

2.7.4.2 If a course has been divided up into milestones, then it will be necessary to define an interim competency standard for each milestone. For the practical assessments, this may be achieved by:

a) modifying the adapted competency model, especially the conditions and/or standards (e.g. limiting the traffic levels and/or the level of complexity); and

b) stating the degree of achievement expected for each performance criteria.

2.7.4.3 An interim competency standard is achieved when all the required assessments (including any examinations or other methods of assessment) for that milestone have been successfully achieved.

2.7.4.4 Making significant modifications to the conditions of an adapted competency model to create an interim competency standard is more typical for training that will take place in a simulated environment. In a simulated environment it is possible to modify conditions such as traffic levels and complexity etc. During OJT there are less opportunities to modify the conditions. The most typical condition to modify during OJT is the level of support that is provided by the instructor.

Example of the modification of conditions of an adapted competency model

For initial training for an aerodrome control rating:

The trainee will be able to demonstrate an integrated performance of all the competencies under the following conditions:

Interim Competency Standard	Final Competency Standard
o Within the simulated aerodrome environment described in XX Operations Manual o With low to medium traffic levels up to a maximum of twenty-five aircraft/hour o With a maximum of ten aircraft being simultaneously controlled and a maximum of two active conflicts to be resolved at any one time o With one non-routine situation occuring o With some assistance from the instructor o Using all the tools available in the simulated environment	o Within the simulated aerodrome environment described in XX Operations Manual o With all levels of traffic up to a maximum of thirty-five aircraft/hour o With a maximum of fifteen aircraft being simultaneously controlled and a maximum of three active conflicts to be resolved at any one time o With two non-routine situations occuring, one of which is an emergency o Without assistance from the instructor o Using all the tools available in the simulated environment

Example of stating the degree of achievement expected for each performance criteria

(Note that this is a partial example since only some of the competencies and performance criteria are shown)

For an operational area surveilllance unit:

	ICS 1	ICS 2	FCS
Situational Awareness			
1.1 Monitors traffic in own area of responsibility and nearby airspace	Routinely scans surveillance data during low to medium traffic and can be observed de-collapsing menus and radar labels to obtain addition information. May fail to scan the complete screen during high traffic and only concentrate on specific areas.	Routinely scans the surveillance data during all traffic levels. Can be observed accessing data from flights in other sectors and highlighting traffic that may cause a conflict in own sector.	Routinely scans the surveillance data during all traffic levels and efficiently obtains additional information through menus and radar labels, as required.

Traffic & Capacity Management			
2.1 Uses a variety of techniques to manage the traffic	Makes predominate use of vectoring to achieve separation. Will ocassionally use speed control when prompted but applies the technique with difficulty, often leaving the instruction to late or not applied correctly.	Uses vectoring and ROC/ROD techniques effectively. Applies speed control correctly but may need to be prompted to act early to use speed control.	Uses vectroring, ROC/ROD and speed control effectively.
Communication			
3.1 Speaks clearly accurately and concisely	Speaks clearly during low traffic levels. During moderate to high traffic levels, may speak too fast, resulting in requests to 'say again'. May provide communication that are too long and contain unnessary details resulting in wasted time.	Speaks clearly during moderate traffic levels but may speak too quickly if under stress. Is able to communicate accurate information without any unnecessary additional information. During high traffic levels may ocassionally have difficulties expressing him/herself clearly.	Speaks clearly, accurately and concisely during all traffic situations
ICS – Interim Competency Standard		FCS – Final Competency Standard	

2.7.4.5 Refresher training is based on the assumption that trainees' have already achieved competence and so it is unlikely that there would be a need to create interim competency standard/s.

2.7.4.6 During conversion training, the extent or complexity of the change and the duration of the training would be the determining factors as to whether it would be necessary to introduce milestones and interim competency standard/s.

2.7.4.7 The diagram below shows an example of a course that has been divided into two milestones. The interim competency standard for Milestone 1 was determined by modifying the conditions and standards of the adapted competency model. The final competency standard is directly linked to the adapted competency model, without any modifications to the conditions and/or standards.

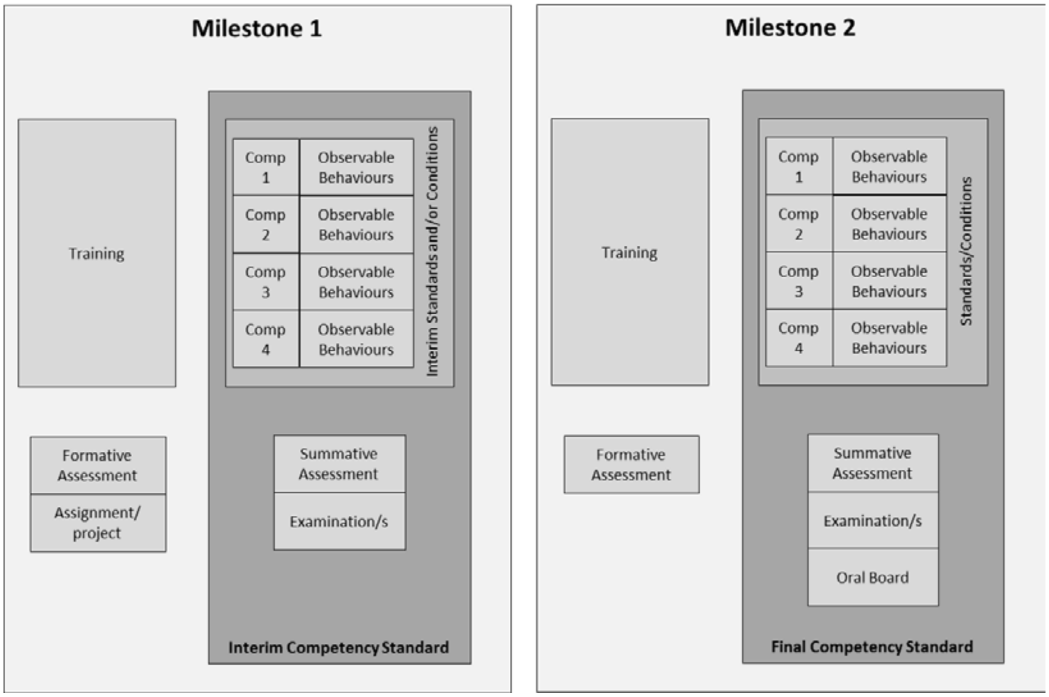

Milestone 1
Training
Comp 1
Observable Behaviours
Comp 2
Observable Behaviours
Comp 3
Observable Behaviours
Comp 4
Observable Behaviours
Interim Standards and/or Conditions
Formative Assessment
Assignment/ project
Summative Assessment
Examination/s
Interim Competency Standard
Milestone 2
Training
Comp 1
Observable Behaviours
Comp 2
Observable Behaviours
Comp 3
Observable Behaviours
Comp 4
Observable Behaviours
Standards/Conditions
Formative Assessment
Summative Assessment
Examination/s
Oral Board
Final Competency Standard

Figure X: Two milestones with an interim and a final competency standard

2.7.5 The assessment plan

2.7.5.1 The purpose of the assessment plan is to detail how competence is going to be determined. It supports the principles of assessment in a competency-based environment. The assessment plan details:

a) the final competency standard associated with the final milestone;

b) the interim competency standard associated with each milestone (if required);

c) list of assessments (e.g. formative and summative assessments, examinations, oral assessments etc.) that are required for each of the milestone/s that have been defined;

d) when these assessments should take place;

e) what the pass marks are for oral assessments, examinations and/or projects;

f) if required, the minimum number of formative assessments to be undertaken prior to starting summative assessments;

g) the number of observations required, at the interim and final competency standard, to assess performance; and

h) which tools are used to collect evidence during practical assessment.

2.7.5.2 Please note that in this document it is assumed that the organization has a Training and Procedures Manual that describes the administrative procedures relating to:

a) which personnel may conduct assessments and their qualifications;

b) roles and responsibilities of personnel during the conduct of assessments

c) assessment procedures (preparation, conduct and post-assessment);

d) the conditions under which assessment is undertaken;

e) record-keeping; and

f) actions to be taken when a trainee fails to meet the requirements of the assessment.

2.7.6 The training plan

2.7.6.1 The purpose of the training plan is to detail:

a) the composition and structure of the course;

b) the syllabus;

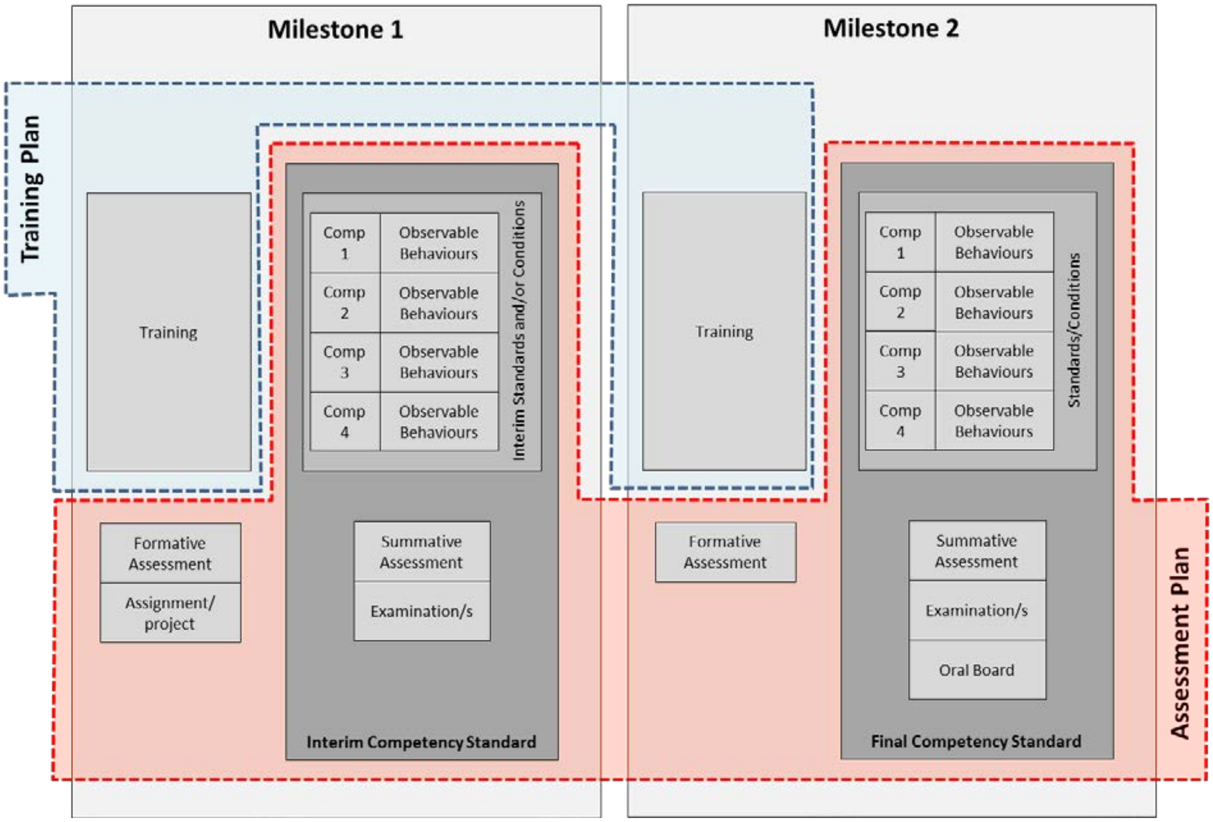
c) the milestones (if required);

d) the modules, training events and their delivery sequence; and

e) course schedule.

2.7.6.2 The training plan will be used by the training designer/s to create the training and assessment materials.

2.7.6.3 The diagram below illustrates the relationship between milestones, an assessment plan and a training plan.


Milestone 1
Milestone 2
Training Plan
Training
Comp 1
Observable Behaviours
Comp 2
Observable Behaviours
Comp 3
Observable Behaviours
Comp 4
Observable Behaviours
Interim Standards and/or Conditions
Formative Assessment
Assignment/ project
Summative Assessment
Examination/s
Interim Competency Standard
Training
Formative Assessment
Comp 1
Observable Behaviours
Comp 2
Observable Behaviours
Comp 3
Observable Behaviours
Comp 4
Observable Behaviours
Standards/Conditions
Summative Assessment
Examination/s
Oral Board
Final Competency Standard
Assessment Plan

2.7.7 Relationship between the adapted competency model, training and assessment plans

2.7.7.1 The relationship between the adapted competency model, training and assessment plan is fundamental to understanding how competency-based training and assessment works.

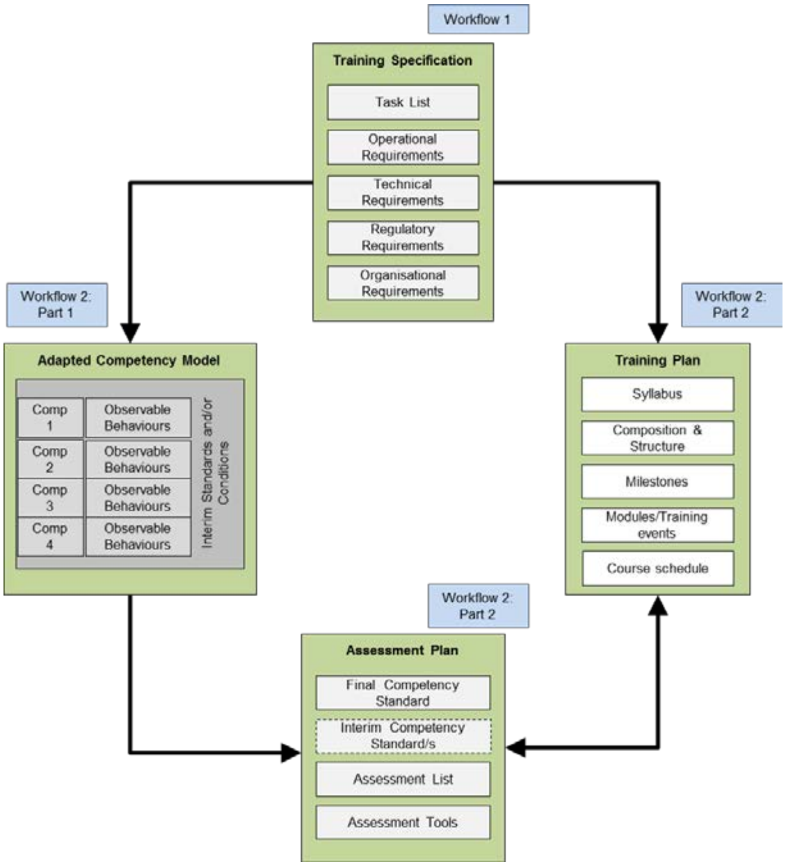

Workflow 1
Training Specification
Task List
Operational Requirements
Technical Requirements
Regulatory Requirements
Organisational Requirements
Workflow 2: Part 1
Workflow 2: Part 2
Adapted Competency Model
Comp 1
Observable Behaviours
Comp 2
Observable Behaviours
Comp 3
Observable Behaviours
Comp 4
Observable Behaviours
Interim Standards and/or Conditions
Training Plan
Syllabus
Composition & Structure
Milestones
Modules/Training events
Course schedule
Workflow 2: Part 2
Assessment Plan
Final Competency Standard
Interim Competency Standard/s
Assessment List
Assessment Tools

Figure X: Relationship between Workflow 1 and 2

2.7.7.2 The training specification serves as the common basis for the development of the adapted competency model, the training and the assessment.

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

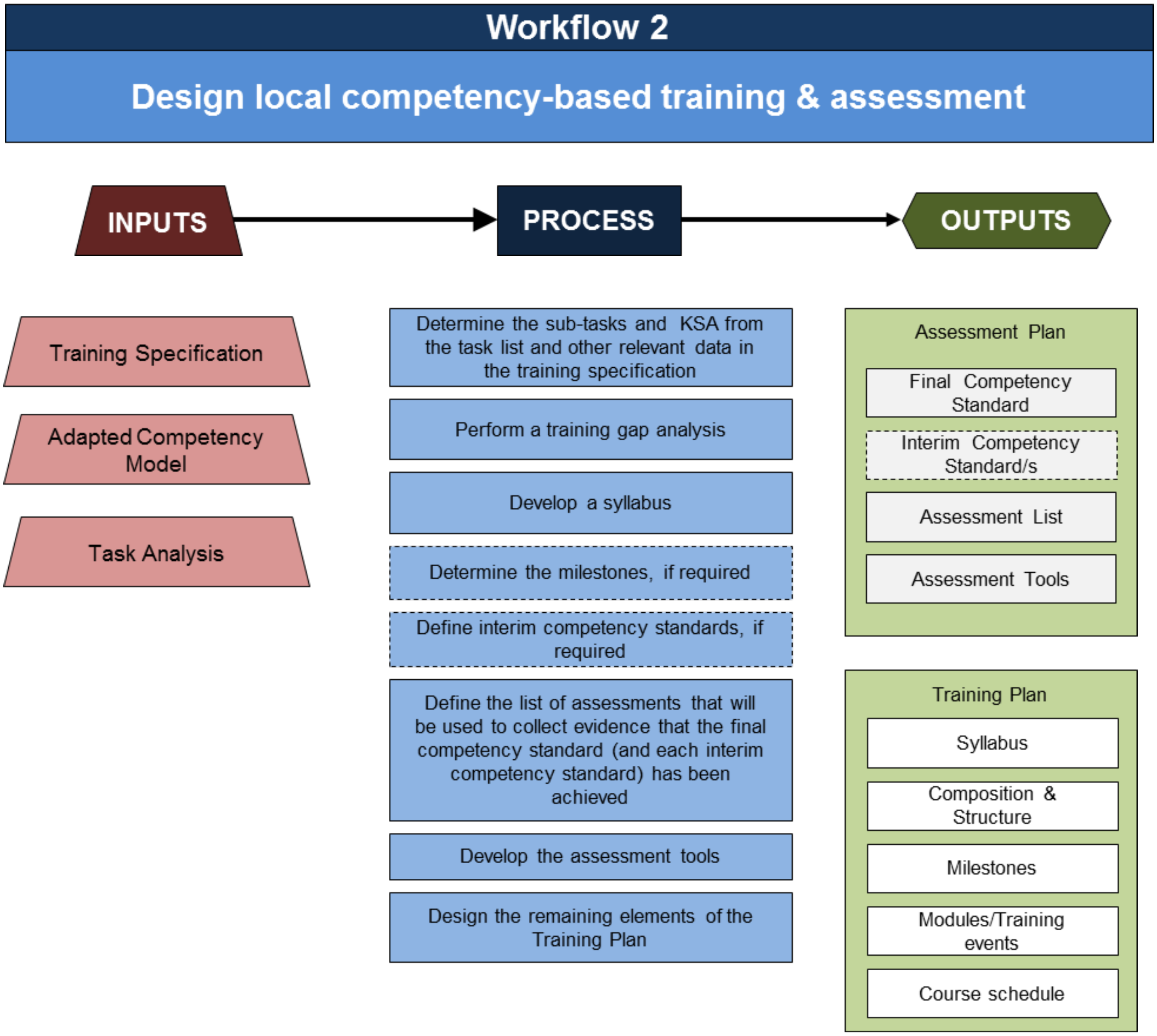
2.7.7.4 The same task list and requirements are used to develop the training plan. This training plan is used to prepare the trainee to undertake assessment to determine if they are competent in accordance with the adapted competency model.

2.7.7.5 The adapted competency model and the training plan are used to develop the assessment plan.

2.7.7.6 The syllabus in the training plan is composed of tasks and sub-tasks, as well as the underlying knowledge, skills and attitudes required to support them. However, when assessing if competence has been achieved, the adapted competency model, not the syllabus, is referenced. Consequently, the performance criteria are used to assess if competence has been achieved and the tasks/sub-tasks that are carried out by the trainee, are the 'vehicle' for enabling the assessment to be conducted.

2.7.8 The process for designing the assessment and training plans

The workflow diagram below may be used to aid the design process.


Workflow 2
Design local competency-based training & assessment
INPUTS
PROCESS
OUTPUTS
Training Specification
Adapted Competency Model
Task Analysis
Determine the sub-tasks and KSA from the task list and other relevant data in the training specification
Perform a training gap analysis
Develop a syllabus
Determine the milestones, if required
Define interim competency standards, if required
Define the list of assessments that will be used to collect evidence that the final competency standard (and each interim competency standard) has been achieved
Develop the assessment tools
Design the remaining elements of the Training Plan
Assessment Plan
Final Competency Standard
Interim Competency Standard/s
Assessment List
Assessment Tools
Training Plan
Syllabus
Composition & Structure
Milestones
Modules/Training events
Course schedule

2.7.8.1 Determining the sub-tasks and KSA

2.7.8.1.2 To develop the training it is necessary to determine what tasks and sub-tasks the trainee will perform and what knowledge, skills and attitudes (KSA) are required to do so. The task list has already been recorded in the training specification (Workflow 1). Therefore the sub-tasks and KSA are determined on the basis of the task list, in conjunction with the operational, technical, regulatory and organizational requirements.

2.7.8.1.3 It is not necessary to list a knowledge element, a skill element and an attitude element for each task; only the elements that are required are listed.

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

2.7.8.2 Perform training gap analysis

The training gap analysis is used to compare the tasks/sub-tasks and KSA that are required to perform competently (i.e. the list prepared in 2.9.7.1 above) and the trainee population current level of task execution and KSA. The end result of the training gap analysis is a list of tasks/sub-tasks and KSA that will be used to development the syllabus. In some instances, it may not be possible to accurately analyse the target population (because they are not yet known). A baseline level of tasks/sub-tasks and KSA is assumed to exist and the training developed on this assumption. Clearly once the target population is known, it must be verified that the assumption is still correct and if not, adjustments should be made to the tasks/sub-tasks and KSA.

2.7.8.3 Develop syllabus

2.7.8.3.1 The syllabus is the list of tasks/sub-tasks and KSA that have been formulated into training objectives and structured in such a way that it will be possible to gauge the scale of the training and, in the next step, whether it will be necessary to introduce milestones or not.

2.7.8.3.2 The syllabus is an element of the training plan.

2.7.8.4 Determine milestones and interim competency standards

Section 2.7.3 and 2.7.4 explain how milestones and interim competency standards are determined. The end result of this process is a high level description of the learning activities and environment for each milestone, their sequence and a complete description of the interim competency standard associated with each milestone.

2.7.8.5 Define the list of assessments

2.7.8.5.1 The number of assessments required for each milestone and the methods that will be used are determined by the complexity of the training and any regulatory requirements.

2.7.8.5.2 An example of an assessment list for unit training for a group of sectors at an en-route centre is provided below:

The final competency standard will be achieved when the candidate has successfully completed the following:

Formative Assessments

1. A minimum of thirty formative assessments have been completed
2. The candidate is ready to undertake summative assessment when four formative assessments indicate that the candidate is demonstrating an integrated and consistent performance.

Written Examinations

No.	Subject	Pass mark
1.	Local Procedures	90 per cent
2.	Letters of Agreement	90 per cent
3.	XYZ System	80 per cent

Summative Assessments

The candidate must demonstrate a consistent performance of the competencies defined in the adapted competency model for at least six out ten consecutive summative assessments.	A competent/ not competent judgement is made for each assessment.

Oral Assessment

The oral assessment will include two parts: 1. Scenario-based questions relating to ATC procedures and will include at least one non-routine scenario 2. System questions relating to functionality of the SDPS and FDPS	Pass mark – 80 per cent

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

2.7.8.6 Develop assessment tools

The following documents should be designed to support practical assessments:

2.7.8.6.1 Evidence guide

2.7.8.6.1.1 An evidence guide contains word pictures for each performance criteria. It translates the performance criteria from the adapted competency model into practical examples of observations that assessors/instructors can expect to see. It is used to eliminate different interpretations amongst instructors and assessors and ensures valid and reliable evidence is gathered.

2.7.8.6.1.2 It details competencies, their associated observable behaviours and the expected performance that should be observed at the interim or final competency standard.

2.7.8.6.1.3 Appendix C to Chapter 2 provides an example of part of an evidence guide.

2.7.8.6.2 Competency checklist

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

2.7.8.6.2.2 Appendix D to Chapter 2 provides an example of a competency checklist.

2.7.8.6.3 Competency assessment form

2.7.8.6.3.1 The competency assessment form is used to summarise the results of all the assessments that have been undertaken by a trainee (practical, oral and written) and then decide if they have achieved either an interim competency standard or the final competency standard. The number and method/s of assessment are described in the assessment plan. The competency assessment form must correlate with the assessment plan.

2.7.8.6.3.2 Appendix E to Chapter 2 provides an example of a competency assessment form.

2.7.8.7 Design the training plan

The training plan is made up of the following elements:

2.7.8.7.1 Composition and structure

This is a high level description of what will be trained (composition) and how the various elements of training relate to each other (structure). If the course covers only one type of training (e.g. aerodrome rating) then the composition is very simple. When a course is composed of more than one type of training (e.g. one course covering basic + aerodrome rating + approach surveillance rating), then it will need to be explained how these types of training will relate to each other in terms of structure and sequence.

2.7.8.7.2 Syllabus

2.7.8.7.2.1 The syllabus is the list of training objectives that will need to be covered by the end of the course. The training objectives are derived from the tasks/sub-tasks and associated knowledge, skills and attitudes identified in sub-section 2.9.7.1 and the training gap analysis as described in sub-section 2.9.7.2. A syllabus does not prescribe the order or sequence of learning, it simply lists the training objectives. To make the process of assigning training objectives to the various milestones, modules and training events easier, it is useful to structure a syllabus into logical groups of subjects.

2.7.8.7.2.2 Appendix F to Chapter 2 provides an example syllabus.

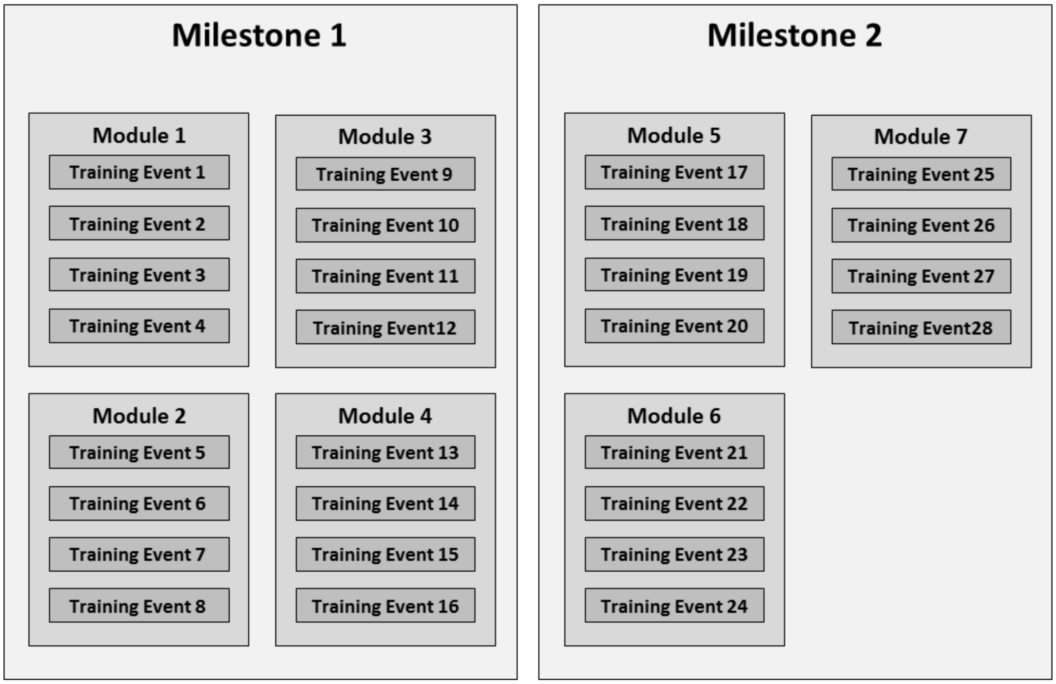
2.7.8.7.3 **Milestones**

2.7.8.7.3.1 If it has been determined that milestones are necessary to structure the course, then the assessment plan will already have defined the interim competency standards that are associated with each milestone and the final competency standard that needs to be achieved by the end of the last milestone.

2.7.8.7.3.2 Training objectives from the syllabus are assigned to each milestone.

2.7.8.7.4 **Modules, training events and sequence**

2.7.8.7.4.1 Depending on the number, type and complexity of the training objectives, it may be helpful to further sub-divide the training into modules (within an entire course or within all or some milestones, if milestones are required).


Milestone 1
Module 1
Training Event 1
Training Event 2
Training Event 3
Training Event 4
Module 3
Training Event 9
Training Event 10
Training Event 11
Training Event12
Module 2
Training Event 5
Training Event 6
Training Event 7
Training Event 8
Module 4
Training Event 13
Training Event 14
Training Event 15
Training Event 16
Milestone 2
Module 5
Training Event 17
Training Event 18
Training Event 19
Training Event 20
Module 7
Training Event 25
Training Event 26
Training Event 27
Training Event28
Module 6
Training Event 21
Training Event 22
Training Event 23
Training Event 24

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

a) which objectives are grouped and taught together (i.e. a training event);

b) the number of periods needed to teach each group of objectives;

c) what method(s) should be used (e.g. lessons, case studies, individual simulation, briefing, self-study, etc.);

d) which media is used (e.g. simulators, visual aids, textbook);

e) he learning rate (i.e. self-paced, time-restricted or real-time); and

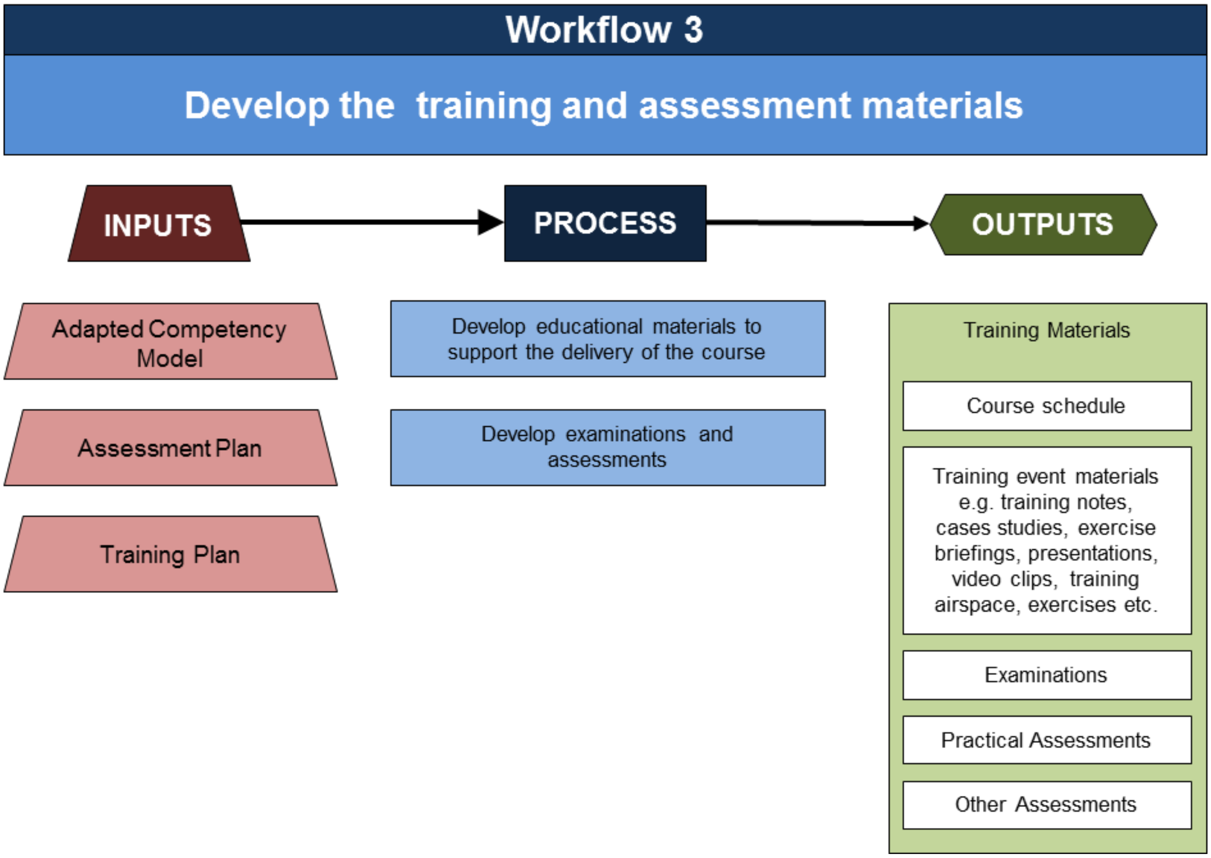
f) whether the training is delivered to individuals or in groups.

2.7.8.7.4.3 Training events should be sequenced into an order of delivery that takes into account sound pedagogic practice, the sub-structure defined and the assessment requirements. The training events are the template that the training designers use to create the training materials necessary to deliver the course.

2.7.8.7.5 **Course schedule**

The course schedule indicates how the training events and assessments fit together into the total duration of the course.

2.8 **WORKFLOW 3: Develop the training and assessment materials**

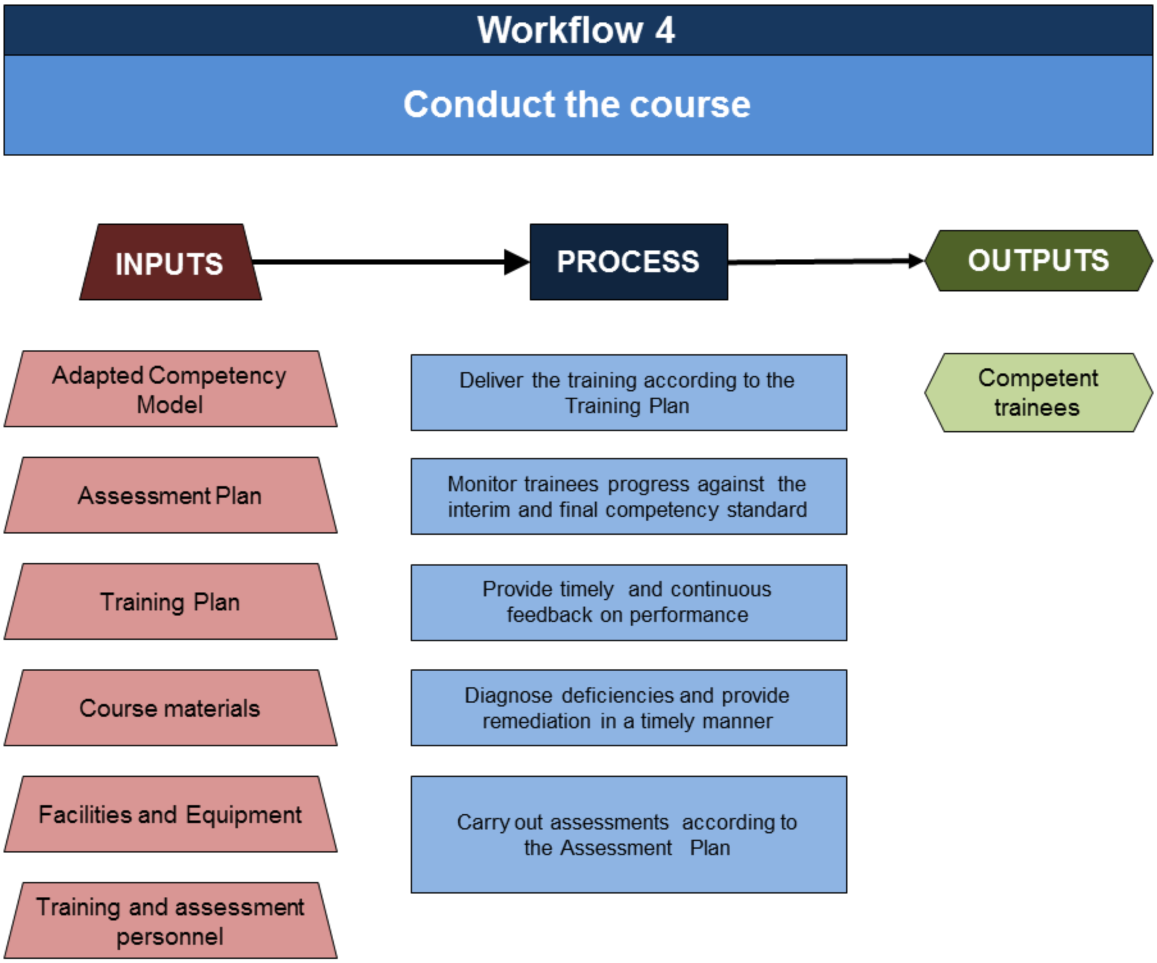


Workflow 3
Develop the training and assessment materials
INPUTS
PROCESS
OUTPUTS
Adapted Competency Model
Assessment Plan
Training Plan
Develop educational materials to support the delivery of the course
Develop examinations and assessments
Training Materials
Course schedule
Training event materials e.g. training notes, cases studies, exercise briefings, presentations, video clips, training airspace, exercises etc.
Examinations
Practical Assessments
Other Assessments

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

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

2.9 WORKFLOW 4: Conduct the course



Workflow 4

Conduct the course

INPUTS → PROCESS → OUTPUTS

INPUTS

- Adapted Competency Model
- Assessment Plan
- Training Plan
- Course materials
- Facilities and Equipment
- Training and assessment personnel

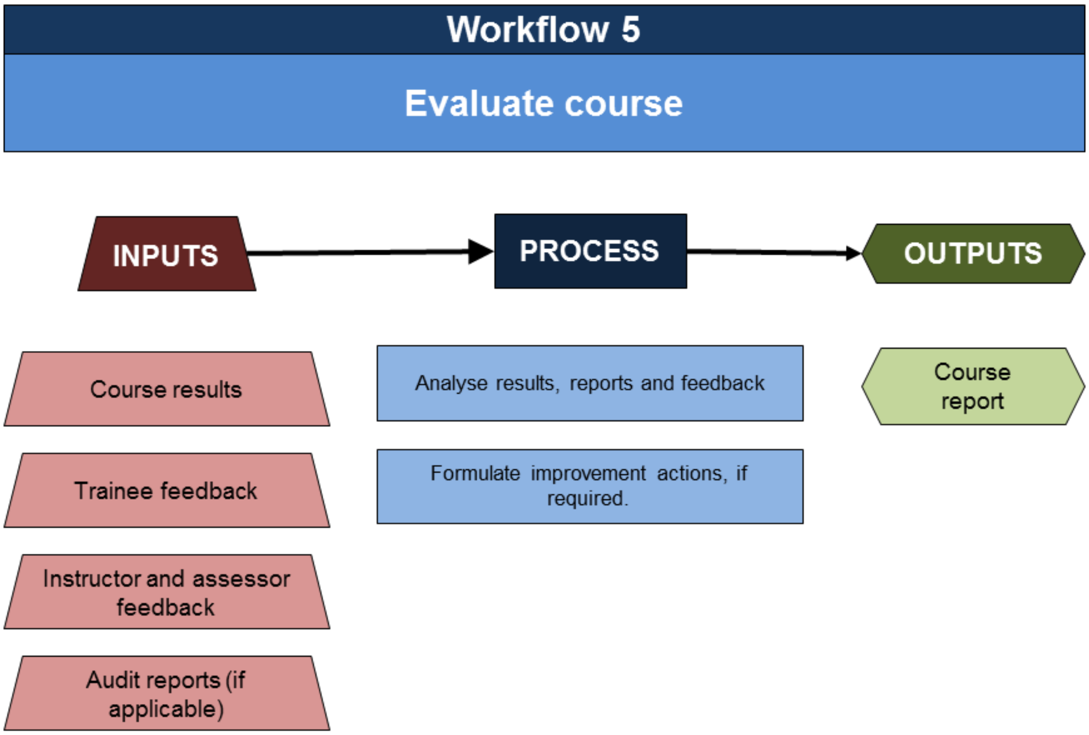
PROCESS

- Deliver the training according to the Training Plan
- Monitor trainees progress against the interim and final competency standard
- Provide timely and continuous feedback on performance
- Diagnose deficiencies and provide remediation in a timely manner
- Carry out assessments according to the Assessment Plan

OUTPUTS

- Competent trainees

2.10 **WORKFLOW 5: Evaluate course**


Workflow 5
Evaluate course
INPUTS
PROCESS
OUTPUTS
Course results
Trainee feedback
Instructor and assessor feedback
Audit reports (if applicable)
Analyse results, reports and feedback
Formulate improvement actions, if required.
Course report

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

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Chapter 3 – Instructors and assessors

3.1 Introduction

3.1.1 This chapter discusses the role of simulation and on-the-job training instructors (OJTI), and assessors in a competency-based training and assessment environment. The instructors and assessors make use of the adapted competency model, the training and assessment plan and the associated materials to implement a course, or in the case of the OJTI, to deliver the operational training. To do this effectively, they must be competent to deliver competency-based training and assessment.

3.1.2 In this chapter, practical instruction refers to both simulation and operation training. All instructors in a competency based environment shall have an understanding of the overall competency based training and assessment approach.

3.2 Practical instructing and assessing

3.2.1 One of the requirements of competency-based training and assessment is that multiple observations are conducted throughout a course or training session. As detailed in Chapter 2, there are usually two types of assessment that take place:

a) the formative assessments that are mainly teaching and feedback sessions and are aimed at helping the trainee to determine how they are progressing and where there may be performance deficiencies, and

b) the summative assessments that are used to establish if the final or an interim competency standard has been achieved.

3.2.2 In the case of formative assessment, the instructor is both teaching and "assessing" at the same time and therefore needs to be competent to perform both functions. In practice, the results of the assessment aspect of the session are recorded and discussed with the trainees as part of their development. Formative assessments would not include a competent/not yet competent result but they would provide feedback about positive aspects of the performance and where improvements may be necessary.

3.2.3 Typically during summative assessments, there is no teaching taking place as the objective is to determine if a standard has been reached. However, in a competency-based environment, there are some exceptions to this norm. If a course has been divided up into milestones, with interim competency standards linked to those milestones, then it is possible that during the earlier assessments the trainee is given some assistance from the instructor (this would be clearly stated in the interim competency standard for that milestone). In this case, the assessor would also be performing some instructing functions.

3.2.4 When assessment is conducted in live traffic situations, it must be explicitly clear who is responsible for ensuring safety. In most cases this would be the person(s) conducting the assessment, but it may also be an additional instructor who is monitoring the trainee but not conducting the assessment.

3.2.5 In a competency-based environment, the same person can instruct and assess. The following sub-sections describe the general requirements for instructors and assessors to be able to do their job in this environment.

3.3 General requirements

3.3.1 To instruct or assess in a competency-based environment, personnel should:

a) fully understand the principles of competency-based training and assessment;

b) have detailed knowledge of the adapted competency model and assessment plan. This is especially important when the assessment plan includes multiple milestones with interim competency standards; and

c) use the tools and documentation that ensure a fair and objective assessment of interim and final competency standards (i.e. evidence guides, competency checklists and competency assessment forms).

3.4 Instructors

3.4.1 To teach effectively, an instructor will need to demonstrate many competencies and personnel who are to take up instructing duties should be adequately trained. For competency-based training, the instructors will specifically need:

a) **To instruct on the basis of the training plan and associated training materials**

The training plan details the structure and order of the training, which is directly linked to the requirements of the assessment plan.

b) **To understand the merits of, and provide timely and continuous feedback on trainee performance**

Feedback is an important component of learning that helps the trainees to progress towards the interim and final competency standards. Feedback may be positive to reinforce desirable performance or it may be information about how the trainee's performance differs from the standard. Feedback should be supportive and timely and the trainee should finish each session with a clear understanding of what they need to do to progress.

c) **To use the adapted competency model to diagnose the root cause(s) of performance difficulties**

The adapted competency model, particularly the performance criteria, help the instructor to analyse a trainee's performance and identify which competencies have not yet been fully mastered.

For example, a trainee is routinely becoming overloaded and as a result starts to make poor control decisions. The instructor could easily begin focussing exclusively on correcting the poor control decisions, however, with the aid of the adapted competency model, the instructor may consider identifying a wider number of possible performance issues that could be the root causes affecting the trainee's performance, including:

1) failure to make use of the tools and equipment that increase efficiency;

2) too much focus on the use of the tools and equipment and not enough on the traffic situation;

3) the trainee is not fully familiar with the standard procedures and so is using significant amounts of thinking time to work out what to do; and/or

4) not taking appropriate actions to ensure that demand does not exceed capacity.

If the instructor in the above example focusses only on correcting the trainee's control actions when in reality the problem is incompetent use of the tools available to increase efficiency, then the problem is likely to persist and very slow progress will be made.

d) **To recognize the challenges associated with instructing and diagnosing deficiencies in the cognitive processes**

It is not possible to observe what a trainee is thinking, so it is difficult to monitor the development of competencies such as situational awareness, problem solving and decision making and some aspects of traffic and capacity management and separation and conflict resolution. At best, the instructor can observe the trainee's performance and infer from the outcomes that his/her strategies, problem solving and planning are effective. However, without any further exploration of the trainee's thinking, it is also possible that the observed outcomes were achieved by chance.

To address this challenge, instructors may ask their trainees to explain their control plan prior to carrying it out, their reasons for performing certain actions or their priorities at a particular moment in time. Of course, the instructor should recognize when it is appropriate to ask these questions and when it would distract the trainee from the task. The instructor should also recognize that the questions must be appropriate for the phase of training being conducted, e.g. it is unlikely that the questions asked of a new trainee who has just started his/her first rating at a unit would be the same as the questions asked of an experienced ATCO who is undertaking conversion training onto a new system. If it is not possible to ask these questions during the training session, then the instructor should save these discussions for the debriefing afterwards. Getting an insight into how the trainee is thinking will help the instructor to diagnose if there is a problem with the competencies that needs to be addressed.

e) **To manage issues related to attitude**

Attitudes are identified in the adapted competency model and elaborated in the evidence guide. Instructors should use the evidence guide to identify attitudinal issues. They should be able to employ the appropriate technique(s) to support trainees in acquiring or adjusting attitudes (e.g. coaching, mental fitness, etc.).

3.5 Assessors

In a competency-based environment, the assessor:

a) gathers evidence of competent performance through practical observations (and any associated interviews), and

b) analyses all the evidence to determine if the trainee's performance demonstrates that he/she has acquired or maintained the competencies detailed in the adapted competency model.

A nominated person within the organization, gathers all the competency checklists and competency assessment forms that have been completed and the results from any examinations or other assessments that have been undertaken, and then compares them with the final competency standard requirements detailed in the assessment plan. If all the requirements are fulfilled, then the trainee is considered to be competent.

The assessor of the practical performance of a trainee should:

a) **Be able to assess an integrated performance and, at the same time, evaluate the performance of separate competencies**

Since one of the competency requirements is that the trainee demonstrates an integrated performance of the competencies, the assessor is required to evaluate if this integration has been achieved. In addition, when the performance is not at the competency standard that is being assessed, then the assessor should be capable of identifying if any of the individual competencies may be inadequate and provide clear evidence for the resulting conclusions.

b) **Conduct assessment(s) by gathering evidence of competent performance**

Assessors obtain and assess evidence to determine if a trainee is competent. To do this effectively the assessor should be capable of sound judgement, possess analytical skills and be able to distinguish crucial or essential issues from less important ones.

A significant part of gathering evidence is done through observation of performance; however it may be necessary to ask a trainee to explain some of their thinking so as to evaluate their cognitive skills. The assessor should be able to manage this interaction with the trainee tactfully and recognize when it is most appropriate to make these enquiries. To this end, the assessor should be constantly aware of the effects of assessment observations and personal interactions during the assessments. It may be necessary, or possibly even planned, that these questions take place during a dedicated interview or as part of a debriefing after the practical session.

The assessor should use the evidence obtained to reach a substantiated final conclusion about the practical performance of the trainee.

c) **Use the tools provided in the assessment plan**

The assessment plan provides not only the details of when and what will be assessed, but also includes the tools to be used to assess competence. These include the evidence guide, the competency checklist and the competency assessment forms.

Assessors should be sufficiently familiar with the evidence guide and competency checklist, to ensure that during summative assessments their attention is mainly focused on observing the performance of the trainee and not on finding information in the tools or working out how to use the tools.

d) **Debrief the trainees in a manner that will aid their progress**

Being assessed, particularly in the case of summative assessments, can be a stressful experience for trainees. Nonetheless, the assessor should be able to debrief the trainee in a manner that encourages a positive mind-set and a willingness to continue to learn and make progress.

In some instances, particularly where the performance has been considerably below the standard, the assessor should take into account the human aspects of delivering difficult messages and take care that the feedback is objective, can be substantiated and that the trainee understands what he/she needs to change to improve the performance.

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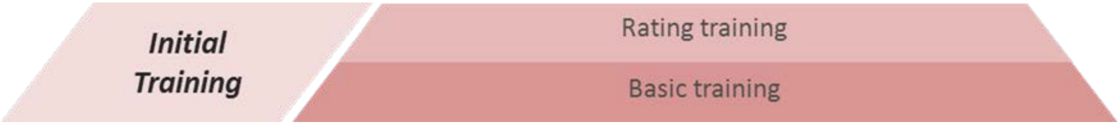
Chapter 4 – Initial training

4.1 **Introduction**

This chapter provides guidance on the design of ATC initial training. It explains the overall purpose of initial training and then elaborates on the design considerations that are specific to this phase of training. The main objective of initial training is to prepare a trainee for training at an air traffic control unit. This manual structures initial training into two phases: *basic* and *rating* training.



4.1.1 **Basic training**

Basic training usually covers at least the knowledge subjects detailed in ICAO Annex 1 Personnel Licensing, para 4.4.1.2 a) to g),and required by all air traffic controllers. Although the emphasis in basic training is on the acquisition of underpinning knowledge, it should also include some practical training that gives trainees an overall appreciation and some exposure to all the ATC ratings.

Introducing practical training at this early stage serves two purposes: first it directly supports the concept of competency-based training which is driven by performance rather than simple acquisition of knowledge only; and secondly it provides hands-on contact with the aerodrome, approach and area control disciplines (simulated), which from a pedagogic perspective enables better-quality learning and appreciation of each of the disciplines and how they connect with each other.

4.1.2 **Rating training**

Rating training is designed to enable a trainee to acquire the knowledge, skills and attitudes that are needed for a specific rating. On successful completion of rating training, the trainee will be ready to start training at a unit (but only for the ratings that were successfully completed during initial training).

4.2 **Design considerations**

This section supplements Chapter 2 by elaborating on some of the design considerations and potential issues that are specific to initial training design.

4.2.1 **WORKFLOW 1: Analyse training need**

The purpose of an initial training course is fairly straight forward: to prepare trainees to start their training at an operational unit. The purpose of the training will influence the composition of the training course that is eventually delivered. There are many possible combinations.

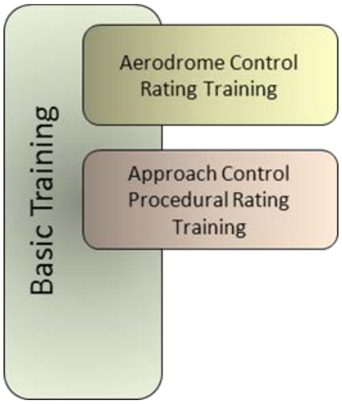
At the most rudimentary level, a stand-alone basic training course could be provided with rating training being delayed to a later stage. However a far more typical composition would be basic training combined with at least one rating training.

ATCOs, who have already completed at least one rating, may return to initial training to complete just the rating training for a new discipline. In this case, they will have acquired the basic competencies during their original initial training course and consolidated this in the operational environment. For these controllers there would be no requirement to repeat the basic training.

There may be instances where, due to the operational organization of the ATC units it is logical to provide basic training in combination with two or more rating training courses. Examples of more conventional combinations include:

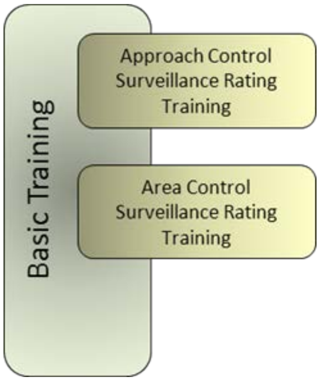
Example 1

This combination could be used at units where, either permanently or occasionally, the aerodrome and approach control functions are conducted simultaneously by the same air traffic controller in an environment where there is no surveillance.


Basic Training
Aerodrome Control Rating Training
Approach Control Procedural Rating Training

Example 2

This combination could be used at units where the air traffic controllers are required to perform the duties of both area and approach surveillance controllers (combined or separately).


Basic Training
Approach Control Surveillance Rating Training
Area Control Surveillance Rating Training

If the course is composed of basic and rating training with possibly more than one rating training, the designer may consider delivering each component as clearly separated courses or alternatively combine the rating elements and deliver as a series of milestones.

4.2.2 WORKFLOW 2 – Part 1: Design the adapted competency model

Identification of all the required elements of the adapted competency model is driven primarily by the information in the training specification. Generally, the task list will aid the choice of competencies and observable behaviours and the regulatory, technical and operational requirements will aid the development of the conditions and standards.

If it has been decided that the basic course is to be provided as a stand-alone course, then it should be recognized that the adapted competency model for this course, will have a very limited number of observable behaviours and the conditions will be limited to low traffic levels and non-complex situations. It is far more typical to develop the adapted competency model for the end of the rating training, with basic training being considered as a milestone.

4.2.2.1 Selection of the competencies

All the competency units that are listed in the PANS-TRG ATCO competency framework are likely to be relevant for initial training courses. During initial training, it is advantageous to have all the competency units present that are ultimately required to succeed as an air traffic controller, as this will enhance the trainees' transition from initial to unit training.

However, an exception that may be considered for initial training is the competency unit dealing with non-routine situations. There are two views on the introduction of this competency unit during initial training. It could be considered valuable to include this competence during initial training because early exposure to emergency and unusual situations will enable the trainee to build up the basic competencies for dealing with these situations. From the beginning trainees will be encouraged to have an inquisitive attitude towards irregularities in an operation. On the other hand, it may be considered more advantageous to dedicate the entire initial training to building up and consolidating the competencies required for normal operations and leaving the non-routine situations for the later part of unit training. This will allow trainees to build up a certain amount of experience and confidence in their ability and be ready to manage situations that are likely to be either complex and/or unpredictable.

4.2.2.2 Selection and adaptation of the observable behaviours

Training designers should ensure that all the observable behaviours selected are possible to realize within the technical and time limitations of an initial training environment.

Examples of observable behaviours that may be impractical or unrealistic to achieve during initial training include:

a) monitors the operational circumstances in nearby sectors to anticipate impact on own situation (from the Situational Awareness CU);

b) maintains, through personal initiative, awareness of developments and changes in aviation (from the Self-Management and Continuous Development CU); and

c) uses the automated capabilities of ATS equipment to improve efficiency (from the workload management CU).

4.2.2.3 Determining conditions

During initial training the practical sessions usually build up from low traffic numbers and non-complex scenarios to more busy traffic and complex scenarios, as the trainee acquires more experience. Nonetheless, in most cases, the conditions relating to the level and complexity of traffic that the trainee is expected to manage to achieve the final competency standard set for an initial training course remains less demanding than what would be set for unit training.

One of the conditions of an initial training course is that the practical performance takes place in a simulated environment. A simulated environment can be understood as a range of simulation tools and/or technologies. What is important is that the simulation equipment used must be adequate to simulate the actual environment and enable the trainee to achieve the required competencies.

4.3 WORKFLOW 2 – Part 2: Design the assessment and training plans

4.3.1.1 Assessment methods - examinations

During initial training, especially the basic training phase, there is a significant amount of underpinning knowledge that the trainee will need to acquire.

The basic training subjects may be examined as separate or as combined subjects.

Single subject examinations enable an in-depth evaluation of the trainee's knowledge of that specific subject without consideration of any other subject. The examination can take place at any time during the course once the subject material has been delivered and is not dependent on the completion of any of the other subjects.

Combining the examination of certain theoretical elements from different subjects can have the advantage that understanding of the integrated ATM environment can be evaluated (e.g. it is possible to evaluate not only if the trainee understands the development stages of a cumulonimbus but also the implications of cumulonimbus development in the vicinity of an aerodrome). However, one of the disadvantages of combined subject examination is that a trainee may have insufficient knowledge for a specific subject but this is not identified because their results in other subjects compensate and bring the total mark to a pass.

Rating training is focused on the acquisition of the competencies required to deliver an integrated performance and so the majority of the subjects have training objectives are practical in nature, with a smaller percentage given over to theoretical objectives.

Given the limited number of theoretical training objectives per subject, it may be appropriate to combine most of them and develop a limited number of examinations.

Prior to starting the practical part of the training, it is advisable to examine the trainees' knowledge of the simulated airspace and the associated ATC coordination and communication procedures to be used. Checking that trainees have the underpinning knowledge they need to train in this practical environment will ensure that valuable simulator or practical training time is not wasted.

4.3.1.2 Milestones

During initial training, the sequence of milestones usually reflects the progressive nature of learning, starting with a fairly simple interim competency standard (e.g. low traffic, low complexity and assistance from the instructor) to the final competency standard (e.g. high traffic, high complexity, no assistance).

Example: Milestones for an ACS rating course

High Level Description of the Learning activities	**Competency standard and assessments** FA – Formative assessments SA – Summative assessments
MILESTONE 1	
During this milestone the trainee learns basic surveillance procedures and techniques for separating aircraft in an area surveillance environment and consolidates the associated radiotelephony phraseology. These procedures include:	**Examinations:** Aviation law & ATM examination – 80 per cent Airspace, local procedures and letters of agreement – 90 per cent

a) identification; b) speed control (including Mach number techniques); c) verifying Mode C; d) vectoring; e) rates of climb/descent; and f) parallel off-set procedures. Traffic conflicts include aircraft on same and opposite tracks, conflicts on a one-way airway that crosses two bi-directional airways. The trainee will need to take into account different aircraft performance types when solving conflicts. Training includes required standard coordination with complex coordination issues to solve.	**Number of practical assessments:** FA – 30 SA - 6 **Summative assessments will be carried out at ICS** 1: (i.e. the trainee is competent to provide an integrated performance of all performance criteria in a non-complex, normal and low level of traffic, using a non-complex, simulated surveillance airspace, with some prompting from the instructor.) The airspace shall be Class C and G, with four aerodromes in adjacent areas and two aerodromes below the exercise area. Airspace shall contain three parallel, bi-directional ATS routes with two crossing ATS routes, one of which has an Omni-directional flow. Each exercise to last 45 minutes and include a total of 25 IFR aircraft of which six to eight aircraft will be controlled at the same time. Three to four aircraft will simultaneously generate actions but there will only be one conflict to resolve at a time.
MILESTONE 2	
During this milestone the trainee continues to integrate the techniques learned in the previous milestone. VFR traffic is introduced and FIS is provided. Some requests for information will be made by flight crews. Moderate weather conditions are present (cross-wind, IMC in some areas, moderate CAT). Traffic conflicts occur simultaneously. Diversions, incorrect Mode C, non-adherence to instructions are introduced. More complex coordination issues are included requiring the trainee to cooperate with adjacent ATS units to resolve issues. Holding is introduced.	**Examinations:** Procedures for unusual situations – 80 per cent **Number of practical assessments**: FA – 50 SA - 8 **Summative assessments will be carried out at ICS** 2. (i.e. the trainee is competent in most situations to provide an integrated performance of all performance criteria in a non-complex, normal and moderate levels of traffic, using non-complex, simulated area surveillance airspace.) Each exercise will last 45 minutes and include a total of 30 IFR aircraft and four VFR aircraft of which eight to ten aircraft will be controlled at the same time. Four to six aircraft will simultaneously generate actions with at least two simultaneous problems to be resolved.

MILESTONE 3	
During this milestone the trainee continues to integrate the techniques learned in the previous milestones. During some exercises severe CAT and thunderstorms are present causing aircraft to request alternative FLs and diversions around weather. Some exercises contain emergencies or degradations in the ATM equipment. Some exercises have traffic levels at 120 per cent sector capacity to enable capacity and workload management.	**Examinations:** Procedures for emergency situations and degraded modes – 80 per cent **Number of practical assessments**: FA – 60 SA - 10 **Summative assessments will be carried out at FCS:** (i.e. the trainee is competent to provide an integrated performance of all performance criteria in non-complex, normal and busy levels of traffic, using non-complex, simulated area surveillance airspace. Each exercise will last 45 minutes and include a total of 35 IFR aircraft and four VFR aircraft of which eleven to twelve aircraft will be controlled at the same time. Five to eight aircraft will simultaneously generate actions with at least two simultaneous problems to be resolved. Four of the summative exercises shall contain one of the following: severe weather, failure of flight data processing system, emergency situation. Each exercise shall contain one of the following: diversion, Mode C error, radio communication failure, non-adherence to flight level, inability to comply with an ATC instruction.

4.3.1.3 The process for designing the assessment and training plans

The process for designing the assessment and training plans includes a need to perform a training gap analysis.

In many ATOs, initial training courses are designed as ‘standard’ courses with amendments only being made:

a) on the basis of review and feedback of the course; or

b) as a result of a significant change to the course content (e.g. a decision is made to change from using flight progress strips during the course to a strip-less environment); or

c) a revision of the basic composition of a course (e.g. a course that is currently composed of basic + area control surveillance + area control procedural but is changed to only basic + area control surveillance).

Therefore, for each course, the result of the training gap analysis is used to adjust precisely what content, from the standard course, is going to be delivered. Although it is possible to adjust what training is delivered during the course, the final competency standard to be achieved remains the same in all instances.

For example, a group of area control surveillance air traffic controllers are moving to a new location and will also be changing to approach control surveillance (APS). Prior to starting at the unit, they will be doing an initial training - APS rating course. Due to their previous experience, these controllers have already acquired a substantial amount of the theory and are competent with many of practical controlling techniques used in APS, therefore the course can be shortened to take this into account. Although the course duration may be shorter (due to the reduced number of theory lessons and practical exercises), the controllers are expected to achieve the final competency standard set for that course.

4.2.2.3.1 **The syllabus**

Aside from the training objectives developed from the task/sub-task and KSA list and the introductory objectives that are typically associated with any training course, there are some objectives that may not be immediately apparent that would be useful to include in the syllabus.

Initial training should include an explanation of competencies, typically during basic training. Since this is usually the first encounter that a trainee has with the air traffic control training environment, they may not be familiar with the concepts used to describe competency. If this is the case, it would be useful to include objectives that familiarize the trainee with how a competency-based training system works, what the air traffic controller competencies are and what the expectations are in terms of the trainee’s performance in relation to the identified competencies.

Competencies such as ‘separation and conflict resolution’, ‘teamwork’ and ‘traffic and capacity management’ may be fairly uncomplicated to understand. However, other competencies such as ‘situational awareness’, ‘problem solving and decision making’ and ‘workload management’ may require a more expansive explanation to enable the trainee to fully grasp the sense and significance of these competencies. This understanding could also be enhanced by the inclusion of practical elements of training.

Additionally, some of the competencies, particularly ‘communication’ and ‘self-management and continuous development’ may only be understood by the trainee in the general sense of the term and therefore would need an explanation to ensure that the specifics of these competencies, as applied in the air traffic control environment, are understood.

Appendix 1 to Chapter 4 contains examples of a basic training syllabus, and rating syllabi that have been mapped to the PANS-TRG ATCO competency framework’s competency units.

4.2.2.3.2 **Training events**

The training plan contains training events to aid the structuring of the course.

When designing the training events for initial training, the designer should have a good indication of what material resources are available, or will be made available, for the implementation of the course. Having this information available will assist in making realistic choices about the methods and media that are going to be used.

Initial training usually takes place in a highly structured environment where it is possible to design very detailed and precise training events, particularly practical exercises that take place in the simulator. To sequence the training events, the training designer will need to establish what the pre-requisites are for each training event. It would not make any sense, for example, to sequence a radar simulation event when the trainee has not covered the objectives dealing with radar procedures, the airspace briefing and phraseology. The prerequisites are all training events that must have already been completed before addressing the one under consideration.

The final competency standard to be achieved at the end of initial training will require a trainee to demonstrate an integrated performance. However, one of the major design advantages during initial training is that it is also possible to isolate specific tasks and/or skills that are required to achieve competence and then design learning activities and training events that address these needs. Examples of the types of tasks and skills that could be learned and 'automated' separately prior to being integrated into the 'bigger picture' are vectoring, sequencing aircraft onto final approach(es), separating aircraft, speed control, managing IFR aircraft departing from an aerodrome, managing VFR aircraft overflying/transiting an aerodrome.

The document that describes all the training events for an initial training course (even a simple combination of basic training and one rating training) will be lengthy. Appendix 2 to Chapter 4 contains examples of two different training events; the first deals with knowledge and the second, with practical training.

4.2.2.3.3 **Course schedule**

On the basis of the information contained in both the assessment and training plans it is possible to determine the duration of the course. Variables that may influence the schedule, that will be addressed as part of the implementation planning include:

a) public holidays during the planned duration;

b) number of trainees; and

c) availability of instructors and simulators.

One variable that is difficult to schedule is remedial training as it is not possible to ascertain, in advance, the number of trainees that will require remedial training nor the amount of hours they will need to bring them back on track. Although a buffer can be built into the schedule to cater for this, the schedule may need to be adapted in real time to accommodate the actual situation as it arises. Possible ways to build in a buffer is to add a few additional days to the course or to include an hour of 'self-study' at the end of each training day that may be used for remedial training, if or when required.

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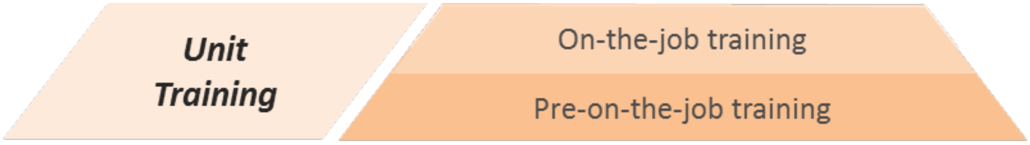
Chapter 5 – Unit Training

5.1 **Introduction**

This chapter provides guidance on the design of ATC unit training. It explains the overall purpose of unit training and then elaborates on the design considerations that are specific to this phase of training.

The main objective of unit training is to prepare a trainee for the issue of an air traffic controller licence and/or the validation of their ratings achieved during initial training, at a specific unit. The manual structures unit training into two phases: pre-OJT and OJT. When combined, these two phases prepare the trainee to apply rating competencies in a local, site-specific environment.



Unit training occurs where the specific rating competencies acquired during initial training are applied in a local environment. The training within the local environment may be described in many different ways including:

a) the training for a single airspace sector or group of sectors;

b) a specific role within a sector (e.g. tactical controller or coordinating controller);

c) an aerodrome control or a specific role at an aerodrome control (e.g. ground controller or air controller); or

d) a combination of the above.

A fundamental difference between unit and initial training is the consideration of safety implications. Unit training takes place primarily in the live operational environment and, as a consequence, a safe air traffic control service must be provided at all times. This leads to challenges in providing an environment which allows training and assessment of the competencies without compromising operational safety.

5.1.1 **Pre-OJT phase**

This is a phase of unit training that prepares the trainee for live OJT. During this phase the trainee is familiarized with the airspace, local procedures, letters of agreement, systems and equipment. Knowledge and understanding of this information is essential before starting training in a live operational position.

In many cases initial training will have been carried out on different equipment, airspace and with different procedures to that of the unit. Consequently, this phase prepares the trainee to make the transition from the more generic and simulated environment encountered during initial training to the site-specific unit and/or position where training will be undertaken in the live traffic environment.

In the case of busy and/or complex positions, the teaching of some practical skills may be more appropriately achieved through the use of a simulator in the pre-OJT phase. It will not always be necessary to have practical pre-OJT and the need will be determined during the development of the milestones and interim competency standards and/or be a requirement of the regulatory authority.

Where practical pre-OJT is given, it allows an established interim competency standard to be attained outside of the live environment where safety becomes a factor. It also allows the trainee to become more familiar with the application of the local procedures and techniques before encountering the added pressure of a live traffic environment.

5.1.2 OJT phase

During the OJT phase, competencies are developed in the live operational environment through practice and feedback. This training is delivered by suitably qualified OJT instructors in accordance with the training plan.

OJT may be supplemented with simulator and theory training for those situations that do not occur regularly but need to be taught and assessed. The trainee's performance in situations taught in this way must also be assessed as competent prior to the granting of an ATCO licence or rating.

The main reason for using a simulator during the OJT phase is to train for non-routine situations, which includes emergency and unusual situations related to aircraft operations and degraded modes of ATS operations (e.g. system degradation and fall-back procedures).

Other situations that do not occur regularly during OJT but need to be taught and assessed may also be addressed through simulation. Examples include:

a) unusual procedures – e.g. flight testing and military activity;

b) seasonal traffic procedures – e.g. summer vacations or ski season, Hajj flights;

c) irregular complex traffic situations or procedures – e.g. air shows; and

d) Human Factors – e.g. team resource management and resilience training.

It is vital that this phase fully prepares the trainee for solo operations as an air traffic controller. As such, it must be ensured that all scenarios likely to be encountered in normal operations are seen and all required competencies must be both objectively assessed and fully documented.

5.2 Design considerations

This section supplements Chapter 2 by elaborating on some of the design considerations and potential issues that are specific to unit training design.

5.2.1 WORKFLOW 1: Analyse training need

The purpose of unit training is to prepare a trainee for operations in the live operational environment. It is the training that leads to an ATCO licence qualification at an operational position. This can be the:

a) first issue of an ATCO licence or rating;

b) qualification on a subsequent operational position at the same unit in the same rating for an existing ATCO licence holder;

c) qualification at a new unit in the same rating for an existing ATCO licence holder; or

d) qualification on an operational position in a subsequent rating for an existing ATCO licence holder.

5.2.2 WORKFLOW 2 – Part 1: Design the adapted competency model

5.2.2.1 Conditions

The conditions that are applied to the observable behaviours are mostly dictated by the local requirements, including the type of equipment that is being used, the procedures in place and the nature of the traffic and the airspace.

Examples

During pre-OJT, the performance of the competencies will be in a simulator that replicates the operational environment. During OJT, the performance of the same competencies will be in the operational position.

During the early stages of OJT, the trainee should manage all routine traffic situations but is not expected to manage non-routine situations. During the later stages of OJT, the trainee will be expected to manage all routine and non-routine situations.

5.2.3 WORKFLOW 2 – Part 2: Design the assessment and training plans

5.2.3.1 Assessment methods - examinations

Underpinning knowledge is typically examined and is an enabler for competent performance at a specific operation position. This underpinning knowledge is derived from the local environment and op erating procedures and may include, but is not restricted to, such elements as:

a) knowledge, use and hierarchy of the documents in force at the unit (e.g. manual of ATS, letters of agreement, aeronautical information publication, briefing sheets, user manuals for equipment);

b) sector structure, aerodrome layout, internal sector configurations;

c) applicable location indicator, aircraft operator call-signs, prevailing aircraft types and their performance;

d) coordination procedures;

e) working principles of equipment and systems (flight planning, voice and coordination);

f) operations room configuration (e.g. dynamic sectorization, and combining/splitting positions such as executive controller and planner);

g) basic principles of team resource management and critical incident stress management;

h) SSR code allocation principles; and

i) working principles for conflict alerts and safety nets

5.2.3.2 Milestones

During unit training, the sequence of milestones usually reflects the progressive nature of the learning. Both the pre-OJT and OJT phases may be sub-divided into milestones or may be individual milestones in their own right.

The underpinning knowledge objectives required to train in the live environment will be primarily delivered during the pre-OJT milestone(s). Where training is to be sequenced, for example training on one sector for a period before progressing to another, the underpinning knowledge should be delivered as close to the relevant point in the training as possible.

The same applies to the underpinning knowledge objectives for managing non-routine situations; typically non-routine situations are introduced as a separate milestone towards the end of the training when the trainee has gained some practical experience. If this is the case, then the underpinning knowledge objectives dealing with emergency procedures and degraded modes of operation should only be introduced during this milestone.

To aid learning, the training designer can prioritise certain performance criteria during a particular milestone. It is also the case when for some competencies the trainee will be expected to reach higher levels of performance only at later stages of training whereas other competencies can be mastered early on. This is easier to design during the pre-OJT phase where practical training is taking place in the simulated environment. However, it is also possible to manage the levels of performance expected during OJT milestones.

Example

During the first milestone of the OJT phase, the trainee may only be expected to handle low traffic levels; consequently it may be necessary for them to avoid certain positions at the busiest times of day and to allow the instructor to handle complex and non-routine situations. As the trainee progresses to the final milestone, they will be expected to handle busy and complex situations as well as routine and non-routine situations.

Progression from one milestone to the next is usually driven by the learning pace of the trainee whereby competent assessment at one level triggers progress to the next. Nonetheless, for practical purposes, it may be necessary to establish time parameters, where a certain level of performance is expected to be achieved within a specified time.

5.2.3.3 Final and interim competency standards

At unit level it may be necessary to introduce several milestones for which assessment will be required. The first will usually be to ensure the trainee is sufficiently competent to commence live OJT. This may be purely through an examination of underpinning knowledge or, at busier units, this may entail practical assessments in a simulated environment to ensure a minimum level of proficiency before starting to work in the operational environment. For each milestone, interim competency standards should be developed.

The final assessment is the most important in the case of unit training, as this will authorize an air traffic controller to work independently in an operational environment and so its importance cannot be overstated. The required competencies, with their associated conditions and standards must be fully assessed as part of an integrated performance.

Note.— Prior to the final assessment(s), any competencies that are not routinely observed in a live environment must be assessed in a simulated environment.

5.2.3.4 The process for designing the assessment plan and the training plan

Unit training plans are developed as the ‘standard package’ to be delivered to trainees that have just completed initial training. A training gap analysis is performed to determine the starting point for the unit training.

This analysis identifies the gap between the standard achieved at the end of rating training and what is required to operate as an ATCO in a specific operational sector. This is particularly important in situations where initial training is delivered independently of the air navigation service provider, or if the adapted competency model of the initial training provider is different to that of the unit.

Note.— For knowledge acquired during initial training, and not currently practiced, (e.g. an experienced ATCO training for a new rating or rating validation), consideration should be given as to whether some form of assessment should be given to ensure that sufficient knowledge has been retained and whether any supplemental training needs to be provided.

Example

An air traffic controller, who has been working for many years in a non-complex airspace, now moves to an environment with a busy airspace and complex procedures. Although he/she maintains the same rating, it may be necessary to provide additional training to review the techniques and methods used in busy environments.

The training gap analysis should take into account any local training prerequisites that have been determined by the regulatory authority or by the air navigation service provider’s internal policy. In most cases these will be the acquisition of the appropriate ratings through initial training but could include additional qualifications such as language proficiency or meteorological observation certification. The training plan should include a list of the prerequisites that are required to be achieved before starting the unit training.

Initial training is not the only route to unit training. Taking into account the many possible routes and consequent levels of experience of trainees undertaking unit training, it is clear that the training provided may be different in all these cases. However the final competency standard defined for each of these qualifications, remains unchanged. For each of these cases, it must be explicit what knowledge, skills and attitudes are assumed to already have been acquired and the training designed to take this into account. This is typically achieved by conducting a training gap analysis for each trainee or group of similar trainees. For individuals, reference to training records for both initial training and any other unit training they may have done (at the same or other units), facilitates this.

Example

Much of the basic knowledge and skills required to operate as an ATCO at a particular unit could be assumed to have already been acquired for an individual who is already a licence holder at that unit. The training would focus on the specific procedures and knowledge associated with the new position. The assessment would also focus on these new areas, as the existing knowledge and skills will have already been tested and will likely be subject to on-going competence review.

5.2.3.5 Course Schedule

The schedule of training and assessment events should be contained within the training plan. For unit training this is important as milestones may be triggered by training length. It is important that all stakeholders are clear about the objectives that must be satisfactorily met and in what timescale. It should also detail if any flexibility is permissible in the event of a trainee not achieving the objectives within the intended timescale e.g. the trainee may be provided with an additional 50 hours of training or no additional time is permitted.

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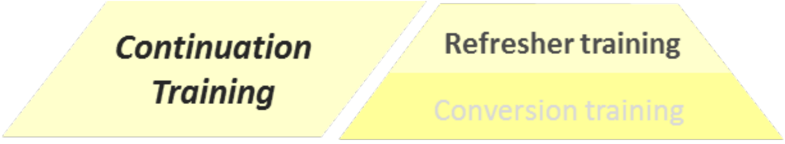
Chapter 6 – Refresher Training

6.1 Introduction

This chapter provides guidance on the design of ATC refresher training. It explains the purpose of refresher training and then elaborates on the design considerations that are specific to this phase of training. This manual structures refresher training as one of the phases of continuation training.



Refresher training is designed to review, reinforce or enhance the existing knowledge, skills and attitudes of air traffic controllers to provide a safe, orderly and expeditious flow of air traffic.

Refresher training is typically provided on a routine and scheduled basis. However, it may additionally be provided when an ad-hoc need has been identified, e.g. typically in response to an incident that has highlighted an individual's weakness in the application of a particular emergency procedure, but occasionally it may also be identified that there is a systemic issue affecting all ATCOs in the unit and/or team, that is sufficiently safety critical that it should be addressed early than the scheduled refresher training. Refresher training needs will differ from ATS unit to ATS unit, and should be tailored to meet the identified requirements. In addition to the local ATS unit requirements, there may be nationally identified refresher training elements to be included in the local programme. Refresher training is not designed to train on elements you do every day that are done in a proficient and correct manner. Refresher training needs to be relevant to the situation so that it is received in a positive and productive way.

Refresher training may address, but is not limited to:

a) standard practices and procedures, using approved phraseology and effective communication;

b) non-routine situations, such as:

  1. unusual and emergency situations related to aircraft operations;

  2. degraded modes of ATS operation; and

c) Human Factors.

Standard practices and procedures could include seldom used procedures, seasonally dependant traffic flows and procedures, working at maximum or slightly above maximum sector capacity, etc. Emergency situations are serious and potentially dangerous situations requiring immediate actions(s), e.g. emergency descents, fire on-board aircraft.

Unusual situations typically arise from a set of circumstances which are neither habitually nor commonly experienced and for which the controller may not have developed a practiced response. The essential difference with an emergency situation is that an element of danger or serious risk is not necessarily present in an unusual situation, e.g. atypical adverse weather, radio communication failure. A list of other refresher training topics to consider are contained in Appendix 4 of Chapter 6.

Degraded modes of ATS operation are typically the result of technical system failure and malfunction or of a set of circumstances arising from human error or violation of rules affecting the quality of the service provided (e.g. the service continues to be available, even though in a reduced or limited fashion).

6.2 Design considerations

This section supplements Chapter 2 by elaborating on some of the design considerations and potential issues that are specific to refresher training design.

6.2.1 WORKFLOW 1: Analyse training need

Refresher training is more dynamic than most other training phases since it responds to operational safety needs, as and when they arise. Some of these needs are fairly predictable (e.g. seasonal dependant traffic flows), others are more routine (e.g. refreshing on the management of emergencies) and some are less predictable (e.g. the results of an incident investigation).

Consequently, refresher training may cover a variety of situations and therefore it is not always possible or practicable to cover all refresher training situations at the same time. Hence, when considering the purpose of the training, it is important to be clear about which aspects of refresher training are being addressed.

Examples

Refresher training for stabilized approaches

Refresher training for communication issues

The purpose could also be stated more generically, if it is envisaged that the refresher training will be comprised of multiple situations.

Examples

Refresher training for standard practices and procedures

Refresher training for non-routine situations

In the broadest sense, the purpose of any refresher training course is that the already competent controllers maintain and/or enhance their existing competence to perform their duties.

Nonetheless, refresher training outcomes have the greatest potential for maintaining and /or enhancing performance if operational specific data is used to identify the issues that may cause competence degradation at the ATC unit concerned.

The data collected should allow for a detailed analysis of the threats and potential weaknesses in the unit’s operational safety. Most of this data, with the exception of training data, resides within the safety section of a service provider. Likewise, it is usually the safety section that has the expertise to analyse most of the data. Nonetheless, the collecting and analysing of the data require close liaison between the safety and training sections of the service provider.

The data collection may be sourced from, but is not restricted to, the following:

a) analysis of normal operations safety surveys (NOSS);

b) reports from the unit safety management system;

c) analysis of unit-specific operational challenges;

d) reports of incident/accident investigations;

e) feedback from operational personnel; and

f) unit competence assessments and unit training reports.

The result of the data analysed should be used to understand which competencies are at greatest risk of eroding and in which scenarios they are likely to occur. The training outcome is then designed to maintain/enhance these competencies in the given scenarios or combinations of scenarios.

Example 1

As a result of a series of reported incidents, a unit identifies that its tower and approach controllers are at times compromising the flight crew's ability to stabilize their flights during final approach. This is probably due to the pressure to achieve efficient traffic sequences with no delay. The unit decides to address this through refresher training. Since competence cannot be judged in isolation, the training outcome is focused on an integrated performance of all the competencies but with specific attention given to traffic sequencing skills and ensuring that controller attitudes and actions do not impact on the flight crew's ability to stabilize their approach.

The training includes practical scenarios that give the controllers an opportunity to analyse their traffic capacity and management competence, particularly relating to the techniques they are using to sequence aircraft (i.e. speed instructions, distance to touchdown and late changes of runway). To reflect a more realistic operational environment, the exercises include typical Human Factors issues such as designed distractions, interruptions and other changes in the normal operational environment.

Example 2

As a result of NOSS, a unit identifies that, although there have been no reported incident, the controllers are not being vigilant with their communication procedures and it is evident that they have a fairly dismissive attitude towards using standardized radiotelephony phraseology. The unit decides to address this through refresher training that is concentrated exclusively on the topic 'communication issues'. The training outcome is focused on an integrated performance of all the competencies but with specific attention given to demonstrating effective verbal and non-verbal communication and managing particular communication difficulties.

The training includes practical scenarios that give the controller an opportunity to detect and clarify misunderstandings and ambiguities (that, by design, are initiated by pseudo-pilots, other controllers and/or supervisors), and to communicate with pseudo-pilots who have limited language ability and with flights whose call signs are likely to lead to call sign confusion. To reflect a more realistic operational environment, the exercise includes typical Human Factors issues such as designed distractions, interruptions and other changes in the normal operational environment.

It is important to recognize that not all operational safety issues or risks identified can be mitigated through refresher training. There are some issues for which an alternative mitigation would be more effective.

Appendix 1 to Chapter 6 provides a possible way to determine if the scenarios or topics identified during data analysis would be appropriate for refresher training and those for which training would have minimal benefit.

6.2.2 WORKFLOW 2 – Part 1: Design the adapted competency model

One of the specifics of refresher training is that the adapted competency model that is used for unit training is also used for refresher training, with some modifications made to the conditions so as to accommodate the fact that refresher training is usually delivered in a simulated environment.

6.2.2.1 Selecting Competencies

Since the purpose of refresher training is to maintain and/or enhance existing competencies, all the competencies in the adapted competency model are relevant. That said, it is recognized that, during refresher training, the emphasis will be on some of the competencies, more so than others, particularly those competencies that have been identified as at risk of eroding.

For example, if the purpose of the training is to maintain the competencies required to manage emergency situations, then clearly the competency unit for ‘management of non-routine situations’ will be the focus of the training design and scenarios would be developed that expose the controller to these situations. Nonetheless, competencies such as ‘situational awareness’, ‘communication’, ‘coordination’ and possibly ‘separation and conflict resolution’ and ‘teamwork’ will also be affected and the controller would also be expected to demonstrate that they are able to manage the emergency situations and, at the same time, continue to provide an integrated performance.

6.2.2.2 Determining conditions

Refresher training is most often delivered in a simulated training environment and therefore it is possible through the conditions to limit the scope of the training in terms of:

a) the types of emergency/abnormal scenarios that could be encountered;

b) the type of assistance available;

c) which equipment degrades; and

d) the number of other roles available (e.g. supervisors, fire station, adjacent ATS units, etc.).

6.2.3 WORKFLOW 2 – Part 2: Design the assessment and training plans

6.2.3.1 Assessment methods – summative assessments

Depending on the organizational and regulatory environment of an operational unit, refresher training may or may not require summative assessments.

Refresher training is typically quite short in duration therefore if summative assessments are required, they may constitute a significant portion of the course.

The typical duration of refresher training makes it unlikely that it will be necessary to introduce milestones or interim competency standards into the assessment plan.

The training plan defines which scenarios are being covered during the refresher training (based on the purpose of the training and the scenarios identified as relevant for the operational unit).

6.2.3.2 Assessment methods – examinations

Since the trainee is an operational controller and has already demonstrated competence, it is reasonable to assume that the underpinning knowledge required to do the job has been acquired, is understood and can be applied in the operational environment. Any theoretical examinations provided during refresher training would be for the purposes of:

a) enhancing controllers' understanding of non-routine situations and of the options available to them in managing these situations (e.g. through case studies);

b) introducing new procedures for dealing with non-routine situations;

c) revising a procedure that is being incorrectly applied;

d) reviewing seldom used procedures; and

e) refreshing seasonal procedures just prior to the start of that particular season.

6.2.3.3 The process for designing the assessment plan and the training plan

6.2.3.3.1 Assessment tools - evidence guide

Due to the targeted nature of refresher training, it is beneficial to supplement the evidence guide with additional information that is focused on the specific issues and scenarios identified during the step where the training need was analysed (see section 6.2.1).

6.2.3.3.2 Training plan

The training plan is derived from the training specification. It can be expected that the training plan for refresher training will be revised and modified routinely to respond to the changing needs of the operational unit.

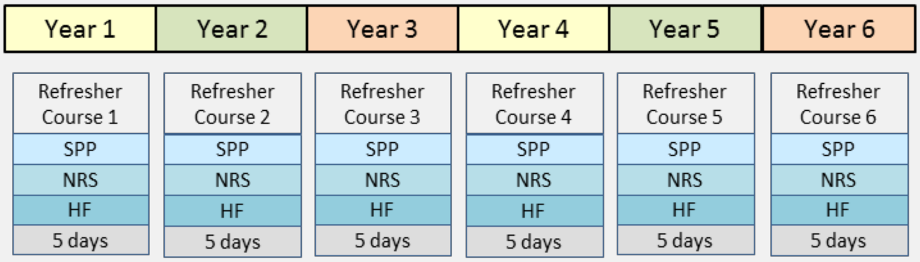
Refresher training syllabi are based on the scenarios that are to be covered during the refresher training. Appendix 2 to Chapter 6 provides an example of a syllabus that demonstrates the link between the scenarios (sub–topics), the information that supplements the evidence guide and the competencies that are relevant to that scenario. An example of a training event structure for a short refresher training course is provided in Appendix 3 to Chapter 6.

Due to operational constraints, there are a limited number of days available per year to conduct refresher training and the designer should take this into account when scheduling the training.

There are a number of different ways that refresher training could be scheduled. The first, and simplest, is to schedule fixed-duration refresher training courses at a predetermined frequency.

Example 1

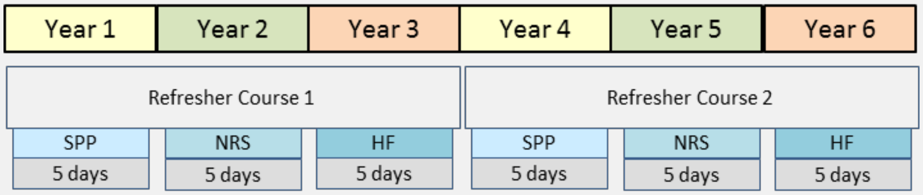
A unit decides that their refresher training will be conducted once per year and it will have a duration of five days. Each refresher training course will contain standard practices and procedures (SPP), non-routine situations (NRS) and Human Factors (HF) elements. The training designer decides each year what the content of the refresher training course will be and designs the training plan and training materials accordingly. The structure will look something like this:


Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Refresher Course 1
SPP
NRS
HF
5 days
Refresher Course 2
SPP
NRS
HF
5 days
Refresher Course 3
SPP
NRS
HF
5 days
Refresher Course 4
SPP
NRS
HF
5 days
Refresher Course 5
SPP
NRS
HF
5 days
Refresher Course 6
SPP
NRS
HF
5 days

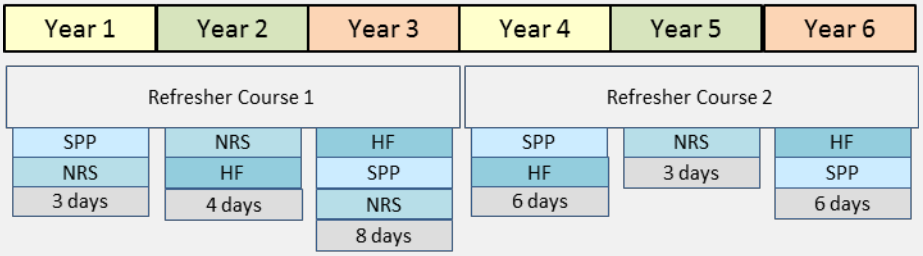
An alternative way to structure a refresher training course is to determine that the refresher training course has a fixed-duration and a predetermined frequency. However, the course will be delivered in a number of segments (usually one segment per year). In this instance, the course will still contain all three elements of refresher training. However, they are not necessarily all delivered in the same segment.

Example 2

A unit decides that its refresher training course will be conducted every three years and it will have a duration of fifteen days. The course is divided up into three segments of five days each. One segment is delivered per year. The training designer decides the content of the entire course and which content will fit into which segment. The training plan covers the three year period. During year one, standard practices and procedures are covered; in year two, non-routine situations are covered; and in year three, Human Factors are covered. The structure will look something like this:


Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Refresher Course 1
SPP
5 days
NRS
5 days
HF
5 days
Refresher Course 2
SPP
5 days
NRS
5 days
HF
5 days

As a second possibility the training designer could ensure, over the three year period that all elements are covered, with some segments containing two or more of these elements. The structure could then look something like this:


Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Refresher Course 1
SPP
NRS
3 days
NRS
HF
4 days
HF
SPP
NRS
8 days
Refresher Course 2
SPP
HF
6 days
NRS
3 days
HF
SPP
6 days

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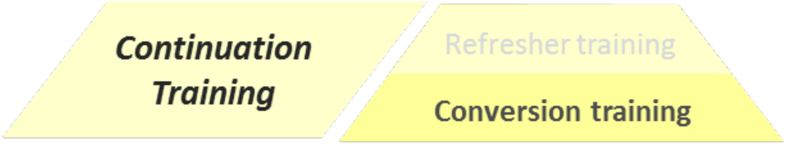
Chapter 7 – Conversion Training

7.1 **Introduction**

This chapter provides guidance on the design of ATC conversion training. It explains the purpose of conversion training and then elaborates on the design considerations that are specific to this phase of training. This manual structures conversion training as one of the phases of continuation training.



Conversion training is different to other phases of training in that it is only provided if and when there is an operational need. As a consequence, conversion training is often viewed as ad-hoc training and often suffers from less structure during the design process. This chapter aims to address this issue by placing conversion training within the overall competency-based training design methodology.

Conversion training is designed to provide knowledge, skills and attitudes appropriate to a change in the operational environment. Conversion training may be provided for changes to or new operational procedures, regulations, and/or systems, e.g. the introduction of a new Surveillance Data Processing System, or new SID/STAR procedures are introduced at an approach surveillance unit. As air traffic control systems and operations become more complex and the pace of change increases, conversion training becomes an effective training mechanism to ensure that all air traffic controllers remain competent in the changing environment.

Note.— In this manual, training for a new rating(s) is categorized as a part of initial training followed by unit training. Training for a new sector(s) within same rating(s) is a part of unit training. Conversion training is categorized as a part of continuation training and is considered as training to maintain ATCO competencies when there is an operational change, ***not*** *as a change in a job category (new ratings and sectors).*

Conversion training is usually prepared independently from refresher training since it is tailor-made training that reflects a particular change. Typically, at some point after the completion of the conversion training, the content is incorporated into the routine training that is delivered during unit training.

7.1.1 **What is a change in the operational environment?**

In general terms, a change to the operational environment means that there will be significant modifications or additions to ATC systems and/or procedures. Usually these changes will require some form of training for the ATCOs to ensure that they maintain their competence in light of the changes.

7.1.1.1 **Safety assessment**

The need for conversion training is determined by evaluating the impact of the planned changes on the ability of the ATCO to continue to perform competently. This evaluation is usually a part of the safety assessment that is conducted for the proposed change.

If a safety assessment concludes that there is a need for training due to a particular change, then a training specification will be developed.

The safety assessment could conclude that the change has minimal impact on the competence of the ATCOs and therefore only a straightforward briefing of the changes is required. In this case, the ATCO will receive the briefing but will not be required to undergo conversion training as it is described in this chapter.

Example

Instances where training may not be necessary and a briefing would meet the requirements of the change include changes for frequencies, airspace restrictions, route limits and horizontal divisions of airspace.

One of the main differences between conducting conversion training and providing a briefing is the requirement for assessment. When theoretical training takes place as part of conversion training, then an assessment is required, whereas with a briefing it is not.

7.2 Design considerations

This section supplements Chapter 2 by elaborating on some of the design considerations and potential issues that are specific to conversion training design.

7.2.1 WORKFLOW 1: Analyse training need

There are many different elements which should be considered when preparing the training specification for a conversion training course. Since conversion training is so different to the other phases of training, it is quite likely that many of the issues will be recorded in the ‘other requirements’ section of the training specification.

Examples of elements considered in training need analysis:

a) time until implementation of the change;

b) complexity of the change;

c) number of ATCOs to be trained;

d) recency of conversion training provision;

e) the need to evaluate training efficacy, prior to implementation, and possible additional training;

f) dynamic change environment (e.g. technical bug fixes change a way of doing something that has been previously taught);

g) requirement for assessment (formal summative vs course completion only);

h) availability of training tools (e.g. simulator and pseudo pilots); and

i) previously gained knowledge.

The purpose of the training is usually triggered by the results of the safety assessment of a planned change.

Examples

a) New design of SIDs/STARs, holding procedures, instrument approach procedures and minimum usable altitudes at the “XY” airport.

b) New function “XY”.

c) New sectorization, division of flight levels and changes in frequencies.

When developing the training specification it is important to identify any secondary areas of operation that may be impacted by the change and ensure that they are included in the requirements even though they may not be explicitly mentioned in the training request. The operational change safety assessment will help inform this.

It is important to consider whether there is a need for the ATCO to “unlearn” some skills that have already become engrained. The success of the training could depend heavily on this unlearning process.

Example

The introduction of Mode S into the functionality of an ATM system will result in changes to the amount of usable information available to controllers and will reduce the number of requests for information from flight crew.

It should also be taken into account that this training is not only about the functionality and availability of the additional information but should also designed to allow the controllers to make the shift from routine and commonly used verbal requests for information to accessing it through the ATS system.

There is also a possibility that the training will need to be focused on enabling the ATCO to change existing habits especially when a new system is going to be introduced. This change impacts many players, but for those who have been working in the same environment for many years it may be more difficult to adapt to the changes, or there may be an initial psychological barrier to change, that is easily overcome if identified properly.

Example: changing from paper flight strips to electronic flight strips.

7.2.1 WORKFLOW 2 – Part 1: Design the adapted competency model

Conversion training deals specifically with changes to an existing operational environment. Consequently it is important to identify which are impacted by the change. The training should then be designed to ensure that the ATCO is able to continue to demonstrate acceptable performance of the impacted competencies.

In many instances, conversion training is conducted so that the ATCO maintains the existing competencies whilst using new procedures or new systems. In this case, the changes to the adapted competency framework can be seen mostly at the level of the performance criteria.

Example

In some operational environments, adaptability might be considered valuable enough to include in the competency dealing with *self-management and continuous development*. In those environments, the ATCOs should demonstrate that they are able to adapt to the changed environment by applying new rules, procedures and using new ATS equipment, functions or tools. An individual's ability to adapt or cope with change will impact his/her capability to deal with the change in the operational environment. Demonstrating the ability to adapt may be very important in some technologically advanced and/or airspace-optimized operational environments. ATCOs might need to manage with frequent but routine changes to the airspace, routes and/or sectorization that occur when the daily air traffic complexity and density vary, or when unexpected situations and weather occur.

The scale of a change in the operational environment can be major or minor. In some instances, the conversion training may affect a wide range of competencies, and in other instances it may affect only one or two of the competencies.

There are many different sources of underpinning knowledge for conversion training. These include documents such as operations manuals, letters of agreement, aeronautical information publications, regulations, maps, technical manuals and training materials. In many instances these documents also need to be understood in relation to each other.

Underpinning knowledge may be assessed by theoretical means, however it is important that the understanding of this knowledge is transferred into practical application.

7.2.2 WORKFLOW 2 – Part 2: Design the assessment and training plan

7.2.2.1 Assessment methods – summative assessments

When the duration of the conversion training is very short (e.g. One to four practical exercises) then it is practical to make the assessment of competence at the end. The assessment takes into account the integrated performance of all the competencies even though the purpose of the training may have been the introduction of a change affecting only one or two competencies.

It is important to highlight that conversion training is conducted typically in a peer-to-peer environment where instructors and 'trainees' are both qualified controllers and colleagues. Nobody is at ease with the fact that some ATCOs may not be successful. In addition, some already competent ATCOs may not be comfortable with having any apparent weaknesses in their performance highlighted. Therefore a more delicate training technique may be needed to bring about change without creating a judgmental environment.

7.2.2.2 The process for designing the assessment plan and the training plan

An issue that may arise during conversion training with a longer duration and for which training designers need to be prepared, is that there is the potential for the training content to evolve over time. This applies not only to theoretical knowledge but also to practical training. Training designers should be aware of this possibility and design the training to be flexible enough to accommodate some unexpected changes to the training. It is unlikely that there will be these types of unexpected changes when the training is for minor changes and takes a few hours or days to complete. Nonetheless, the training designer should be aware of the possibility.

7.2.2.2.1 Syllabus

The syllabus might consist of only one subject or it could consist of many subjects, depending on what the change is and what it affects.

Since each conversion will be unique, each conversion training syllabus will be tailor-made for each change in the operational environment.

Example

Subject: SIDs/STARs, holding procedures and instrument approach procedures

Topic 1: SIDs/STARs

Objective 1.1: Describe the new SIDs/STARs

Objective 1.2: Explain the precautions that need to be taken when the new SIDs/STARs are implemented (content: incorrect procedure carried out by pilots).

Objective 1.3: Manage the traffic in the terminal control area/control zone taking into account the new SIDs/STARs

7.2.2.2.2 Course schedule

The length of the training is dependent on the complexity of the change and the identification of the number of competencies and tasks that are affected by that change. Each change has a different impact on the number and categories of personnel involved, the length of time and scheduling required for implementing the change and the extent of the training.

ATCOs should be included in the operational change project lifecycle at an early stage for two reasons: first, so that they can make technical contributions and gain an early understanding of the changes (these ATCOs need not be instructors); and secondly, so that they can start preparing the training well ahead of the implementation.

Starting the conversion training well ahead of the implementation date for a change is sometimes unavoidable simply because there is a large number of ATCOs who have to attend the conversion training. The risk, which the implementation team must be aware of, is that those ATCOs who are trained very early may need some update training as the implementation date gets closer. This update training should address any modifications/changes that have been made after their training was completed, e.g. changes resulting from fixes to bugs, user interface changes at the request of the service provider and modifications to available system functionality.

There might be a situation where some changes to the system arise due to fixes during the implementation period (usually during SAT – Site acceptance test) and when some ATCOs are already trained. If the changes have an impact on the competencies of the ATCO there may be a need to provide additional training to update the ATCOs on these changes. A process should be in place to deal with this particular situation.

The timescale for completing the conversion training is affected by the number of personnel that are required to be trained before the change becomes effective. Major changes keep many people involved for a long time; these include the management, the safety personnel, technicians, ATCOs and other ATM personnel. The preparation of the various training personnel involved in the implementation lifecycle must be managed to ensure that they are ready to deliver the training at the appropriate time.

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APPENDICES

CHAPTER 2 - Appendix A – Example Training Specification

The table below contains an example of a completed training specification for an initial training/aerodrome control rating course.

Purpose	
What is the purpose of the training?	Train new aerodrome controllers
State the phase/s of training.	Initial training (basic + aerodrome rating)
What qualification, if any, will the trainee achieve on successful completion of the training?	Student licence with aerodrome control rating
Tasks	
Describe the tasks associated with the purpose of the training	The trainee shall carry out the following tasks: 1. Separate aircraft and vehicles operating on the manoeuvring area. 2. Separate aircraft in the circuit, and from arriving and departing aircraft. 3. Select runway in use. 4. Issue IFR clearances for departing aircraft and ensure correct readbacks. 5. Manage inbound and outbound IFR aircraft. 6. Issue inbound and outbound Visual Flight Rules (VFR) clearances to aircraft. 7. Integrate VFR arrivals into the aerodrome traffic circuit. 8. Integrate VFR departures within the traffic flow. 9. Issue flight and aerodrome information. 10. Issue traffic information. 11. Coordinate the movement of traffic with approach/area control and relevant airport services. 12. Monitor flight data displays and ensure that they are kept up-to-date 13. Transfer control and communication of aircraft to other sectors.

Operational requirements

Which procedures will be applied?	Manual of ATS – XYZ Aerodrome (Simulated)
Describe the operational (or simulated) environment required to successfully achieve the purpose of the training	Dependent parallel runways, mountainous terrain in the vicinity of the aerodrome, Control Zone, Class D airspace.
Describe the nature of the traffic necessary to achieve the training outcome	Type of traffic: a) mix of IFR and VFR traffic; b) arrivals, departures, overflights and circuit traffic; c) heavy and medium jets, business jets, light training aircraft, helicopters, ground vehicles; d) all levels of traffic up to maximum of twenty-five aircraft in a 45-minute simulation; and e) maximum of three aircraft involved in a conflict and maximum of two conflicts to be solved simultaneously.
Which non-routine situations are necessary for successful completion of the training?	a) IFR missed approaches; b) runway incursion; c) aborted take-off; and d) blocked taxiway.
Describe the working position configuration	Aerodrome controller provides all services from one position.

Technical requirements

List any specific operational (or simulated operation) systems and/or equipment that are necessary to achieve the training outcome	a) situation display so that trainee can monitor the position of aircraft inbound to the aerodrome; and b) flight data display.

Regulatory requirements

Which rules and regulations are applicable?	a) national regulations ABC/2015 on the provision of air traffic services; and b) ICAO Doc 4444 and ICAO Annex 10, Volume II, for standard words and RT phraseology.
Are there any regulatory requirements that will affect the following aspects of the training: • Duration • Content • Assessment procedures • Course approval • Any other	a) thirty hours of simulation required prior to undertaking practical assessment; and b) one assessor to be a representative of the CAA.

Organizational requirements	
Describe any organizational requirements that may impact the training?	None
Other requirements	
Other constraints	None
Simulation requirements	
List the simulation requirements that are necessary to achieve the training outcome, if any	a) part-task trainer; and b) minimum of 180° aerodrome simulator.

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CHAPTER 2 - Appendix B – Example Adapted Competency Model

This competency model has been adapted from the ICAO competency framework to make it appropriate for Wondertree approach unit, which is a fictitious approach surveillance control unit located in a mountainous terrain that serves one aerodrome called Wondertree Aerodrome.

The unit has secondary surveillance and a limited number of support systems and tools. The area control centre above Wondertree is called Coach ACC. Coach ACC is responsible for the surveillance system in use at Wondertree approach.

The controller typically works the sector alone although there is a second controller available should it become necessary.

The traffic levels are typically between 10(low) and 25(high) aircraft per hour, however, due to the mountainous terrain the traffic situations can become complex even with low traffic levels.

The conditions and standards apply to all the competencies and are therefore listed at the beginning of the model.

Wondertree Approach Surveillance Unit Competency Model	
Performance	The trainee shall demonstrate an integrated performance of all the competencies described in this model
Conditions	The following conditions shall apply: - with all levels of traffic up to the maximum sector capacities as listed in Chapter 2 of the *Wondertree Approach Surveillance Operations Manual*; - with all levels of traffic complexity; - under all typical weather conditions; - under normal operating conditions including fully functional surveillance and voice communication systems; and - without assistance from an instructor. *Note.— The following may be performed under simulated conditions:* - Degraded systems situations, including flight plan server failure, flight tracker failure, degraded surveillance data, total surveillance failure and degraded VCS - Unusual or emergency situations, including aircraft experiencing navigational difficulties when approaching Wondertree Aerodrome from the NW (mountainous terrain) - Adverse weather including low visibility procedures in operation at Wondertree Aerodrome - Seasonal traffic variations including the winter increased ski/helicopter traffic
Standards	The performance shall comply with the procedures, rules and regulations described in the following documents: - *Wondertree Approach Surveillance Operations Manual* - Letters of Agreement between Wondertree Approach Surveillance Unit and Coach Area Control Centre - *National Manual of Air Traffic Services*

1	Situational Awareness	**Definition**	*Comprehend the current operational situation and anticipate future events*
PC No.	**Observable Behaviour**		
PC 1.1	*Monitors air traffic in own area of responsibility and nearby traffic in Coach ACC lower sector.*		
PC 1.2	*Monitors the meteorological conditions that impact on own area of responsibility.*		
PC 1.3	*Monitors the status of the Wondertree VCS, Wondertree ILS and WTV (VOR).*		
PC 1.4	*Integrates information obtained from monitoring and scanning into overall picture.*		
PC 1.5	*Analyses the actual situation based on information obtained from monitoring and scanning.*		
PC 1.6	*Interprets the situation based on the analysis.*		
PC 1.7	*Predicts the future operation situation.*		
PC 1.8	*Identifies potentially hazardous situations.*		
PC 1.9	*Verifies that information is accurate and assumptions are correct.*		

2	Traffic and Capacity Management	**Definition**	*Ensure a safe, orderly and efficient traffic flow and provide essential information on environment and potentially hazardous situations*
PC No.	**Observable Behaviour**		
PC 2.1	*Manages arriving, departing and/or en-route traffic using procedures described in WOP Chapters 3-4.*		
PC 2.2	*Takes aircraft performance into account when issuing clearances and instructions.*		
PC 2.3	*Uses a variety of techniques to effectively manage the traffic.*		
PC 2.4	*Increases safety margins when deemed necessary.*		
PC 2.5	*Takes action, when appropriate, to ensure that demand does not exceed sector capacity.*		
PC 2.6	*Maintains focus despite varying traffic levels.*		
PC 2.7	*Reacts appropriately to situations that have the potential to become unsafe.*		
PC 2.8	*Issues appropriate clearances and instructions.*		
PC 2.9	*Issues hazard and safety alerts to the flight crews when necessary.*		
PC 2.10	*Issues weather information to flight crews when necessary.*		

3	Separation and Conflict Resolution	**Definition**	*Manage potential traffic conflicts and maintain separation*
PC No.	**Observable Behaviour**		
PC 3.1	*Identifies traffic conflicts.*		
PC 3.2	*Selects the most appropriate separation method.*		
PC 3.3	*Applies appropriate air traffic separation and spacing.*		
PC 3.4	*Issues clearances and instructions that ensure separation is maintained.*		
PC 3.5	*Issues clearances and instructions that take into account aircraft performance, terrain obstacles, airspace constraints and weather.*		
PC 3.6	*Issues clearance and instructions that resolve traffic conflicts.*		
PC 3.7	*Resolves conflicts through coordination with Coach ACC and Wondertree aerodrome when necessary.*		
PC 3.8	*Monitors the execution of separation actions.*		
PC 3.9	*Adjusts control actions, when necessary, to maintain separation.*		

4	Communication	**Definition**	*Communicate effectively in all operational situations*
PC No.	**Observable Behaviour**		
PC 4.1	*Speaks clearly, accurately and concisely.*		
PC 4.2	*Uses appropriate vocabulary and expressions to convey clear messages.*		
PC 4.3	*Uses standard radiotelephony phraseology, when prescribed.*		
PC 4.4	*Adjusts speech techniques to suit the situation.*		
PC 4.5	*Demonstrates active listening by asking relevant questions and providing feedback.*		
PC 4.6	*Verifies accuracy of readbacks and corrects as necessary.*		
PC 4.7	*Uses plain language when standardised phraseology does not exist or the situation warrants it.*		
PC 4.8	*Writes or inputs messages according to WOP Chapter 6.*		

<table>
<tr><th>5</th><th>Coordination</th><th>Definition</th><th>Manage coordination between operational positions and with other affected stakeholders</th></tr>
<tr><td>PC No.</td><td colspan="3">Observable Behaviour</td></tr>
<tr><td>PC 5.1</td><td colspan="3">Coordinates with personnel in other operational positions and other stakeholders, in a timely manner.</td></tr>
<tr><td>PC 5.2</td><td colspan="3">Coordinates the movement, control and transfer of control for flights using the coordination procedures described in WOP Chapter 7.</td></tr>
<tr><td>PC 5.3</td><td colspan="3">Coordinates changes of status of airspace with Coach ACC and Wondertree aerodrome.</td></tr>
<tr><td>PC 5.4</td><td colspan="3">Uses clear and concise terminology for verbal communication.</td></tr>
<tr><td>PC 5.5</td><td colspan="3">Uses standard ATS message formats and protocol for non-verbal coordination.</td></tr>
<tr><td>PC 5.6</td><td colspan="3">Uses clear and concise non-standard coordination when required.</td></tr>
<tr><td>PC 5.7</td><td colspan="3">Conducts effective briefings during position handover.</td></tr>
</table>

<table>
<tr><th>6</th><th>Management of Non-routine Situations</th><th>Definition</th><th>Detect and respond to emergency and unusual situations related to aircraft operations and manage degraded modes of ATS operation</th></tr>
<tr><td>PC No.</td><td colspan="3">Observable Behaviour</td></tr>
<tr><td>PC 6.1</td><td colspan="3">Recognises, from the information available, the possibility of an emergency or unusual situation developing.</td></tr>
<tr><td>PC 6.2</td><td colspan="3">Determines the nature of the emergency.</td></tr>
<tr><td>PC 6.3</td><td colspan="3">Prioritises actions based on the urgency of the situation.</td></tr>
<tr><td>PC 6.4</td><td colspan="3">Decides upon the most appropriate type of assistance that can be given.</td></tr>
<tr><td>PC 6.5</td><td colspan="3">Follows procedures for communication and coordination of urgent situations described in WOP Chapter 8.</td></tr>
<tr><td>PC 6.6</td><td colspan="3">Provides assistance and takes action, when necessary, to ensure safety of aircraft in area of responsibility.</td></tr>
<tr><td>PC 6.7</td><td colspan="3">Detects that ATS systems and/or equipment have degraded.</td></tr>
<tr><td>PC 6.8</td><td colspan="3">Assesses the impact of a degraded mode of operation.</td></tr>
<tr><td>PC 6.9</td><td colspan="3">Follows procedures for managing, coordinating and communicating a degraded mode of operation described in WOP Chapter 9.</td></tr>
<tr><td>PC 6.10</td><td colspan="3">Creates solutions when no procedure exists for responding to non-routine situations.</td></tr>
</table>

7	Problem Solving and Decision-making	**Definition**	*Find and implement solutions for identified hazards and associated risks*
PC No.	**Observable Behaviour**		
PC 7.1	*Takes into account the existing rules and operating procedures when determining possible solutions to a problem.*		
PC 7.2	*Implements an appropriate solution to a problem.*		
PC 7.3	*Determines the situations that have the highest priority.*		
PC 7.4	*Organizes tasks in accordance with an appropriate order of priorities.*		
PC 7.5	*Perseveres in working through problems without impacting safety.*		
PC 7.6	*Considers timeliness in decision making.*		

8	Self-Management and Continuous Development	**Definition**	*Demonstrate personal attributes that improve performance and maintain an active involvement in self- learning and self-development*
PC No.	**Observable Behaviour**		
PC 8.1	*Takes responsibility for own performance, detecting and resolving own errors.*		
PC 8.2	*Improves performance through self-evaluation of the effectiveness of actions.*		
PC 8.4	*Maintains self-control and performs adequately in adverse situations.*		
PC 8.5	*Changes behaviour and responds as needed to deal with the demands of the changing situation.*		
PC 8.7	*Participates in monthly briefing sessions.*		

9	Workload Management	**Definition**	*Use available resources to prioritize and perform tasks in an efficient and timely manner*
PC No.	**Observable Behaviour**		
PC 9.1	*Manages tasks effectively in response to current and future workload.*		
PC 9.2	*Manages interruptions and distractions effectively.*		
PC 9.3	*Determines if and when support is necessary based on workload.*		
PC 9.4	*Ask for help, when necessary.*		
PC 9.5	*Accepts assistance, when necessary.*		
PC 9.6	*Adjusts the pace of work according to workload.*		
PC 9.7	*Selects appropriate tools, equipment and resources to support the efficient achievement of tasks.*		

10	Teamwork	**Definition**	*Operate as a team member*

PC No.	**Performance Criteria (Observable Behaviour)**
PC 10.1	*Provides both positive and negative feedback constructively.*
PC 10.2	*Accepts both positive and negative feedback objectively.*
PC 10.3	*Shows respect and tolerance for other people.*
PC 10.4	*Carries out actions and duties in a manner that fosters a team environment.*
PC 10.5	*Manages interpersonal conflicts to maintain an effective team environment.*
PC 10.6	*Raises relevant concerns in an appropriate manner.*
PC 10.7	*Shares experiences with the aim of continuous improvement.*

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CHAPTER 2 - Appendix C – Example Evidence Guide

Note that this is only a partial example. A complete evidence guide would contain all the competency units and observable behaviours.

1.	**Situational Awareness**	**ICS 1**	**ICS 2**	**FCS**
1.1	Monitors traffic in own area of responsibility and nearby airspace	Routinely scans surveillance data during low to medium traffic and can be observed de-collapsing menus and radar labels to obtain addition information. May fail to scan the complete screen during high traffic and only concentrate on specific areas.	Routinely scans the surveillance data during all traffic levels. Can be observed accessing data from flights in other sectors and highlighting traffic that may cause a conflict in own sector.	Routinely scans the surveillance data during all traffic levels and efficiently obtains additional information through menus and radar labels, as required.
1.2	Monitors the meteorological conditions that impact on own area of responsibility and nearby airspace	Occasionally monitors the weather in own sector, usually only when traffic brings it to his/her attention. Passes relevant weather information only during extreme situation's (e.g. thunderstorms) or when asked. Not able to monitor the weather in other sectors or aerodromes.	Monitors weather during low to medium traffic situations. Occasionally manages to monitor weather in other sectors during high traffic levels. Passes relevant weather information most of the time.	Consistently monitors the weather and passes relevant information to traffic well in advance.
1.3	Monitors the status of the ATC systems and equipment	Monitors the status of ATC s/e when there is an obvious unserviceability e.g. degraded FDPS. May need assistance to adjust control action to accommodate unserviceability.	Monitors the status of ATC s/e most of the time and adjusts control actions based on the unserviceability.	Consistently monitors the status of ATC s/e and adjusts control actions accordingly. Informs technical supervisor of unserviceability's in a timely manner.
1.4	Monitors the operational circumstances of personnel in nearby sectors to anticipate impact on own situation	Monitors circumstances in other sectors during low traffic levels only.	Will offer higher levels to lower sectors during medium traffic levels.	Routinely monitors the operational circumstances of other personnel.

1.5	Predicts the future operational situation	Can maintain the picture during low traffic. Has difficulty to form overall picture using all the information and predict the future situation during medium and high traffic.	Predicts the future situation under normal, medium traffic levels. Still has difficulty predicting situation when something unusual (weather, diversion etc.) occurs. During high traffic loading may not always choose the correct information needed to keep the picture.	Consistently predicts the future operational situation with all traffic levels.
1.6	Identifies potentially hazardous situations	Predicts a few minutes ahead, which aircraft will be in conflict. Not able to project the full trajectory through the sector yet. Occasionally surprised when new aircraft establishes contact.	Predicts the full trajectory of aircraft through sector and identifies which aircraft will affect each other during low to medium traffic situations. Often predict flights impact on next sector.	Predicts all future traffic situations early and consistently for the full trajectory of the flight through the sector. Reliably predicts flights impact on next sector.
2.	**Traffic and Capacity Management**	**ICS 1**	**ICS 2**	**FCS**
2.1	Uses a variety of techniques to manage the traffic	Makes predominate use of vectoring to achieve separation. Will occasionally use speed control when prompted but applies the technique with difficulty, often leaving the instruction to late or not applied correctly.	Uses vectoring and ROC/ROD techniques effectively. Applies speed control correctly but may need to be prompted to act early to use speed control.	Uses vectroring, ROC/ROD and speed control effectively.
2.2	Takes aircraft performance into account when issuing clearances	Trainee is adjusting to real aircraft performance and so issues instructions that occasionally are unrealistic for the aircraft to comply with. May be over-cautious with instructions and fail to take advantage of an aircraft's performance capabilities to manage the traffic. May spend an excessive amount of time confirming with aircraft if they are able to comply with an instruction.	Provides instructions that are appropriate for most aircraft performance capabilities. When under stress may pass unrealistic instructions. During non-routine situations will require support from the instructor on what the performance capabilities are for certain aircraft.	Provides appropriate instructions for all aircraft types that are typical for the airspace.

3.	Communication	ICS 1	ICS 2	FCS
3.1	Speaks clearly, accurately and concisely	Speaks clearly during low traffic levels. During moderate to high traffic levels, may speak too fast, resulting in requests to ‘say again’. May provide communication that are too long and contain unnessary details resulting in wasted time.	Speaks clearly during moderate traffic levels but may speak too quickly if under stress. Is able to communicate accurate information without any unnecessary additional information. During high traffic levels may occasionally have difficulties expressing him/herself clearly.	Speaks clearly, accurately and concisely during all traffic situations
3.2	Uses appropriate vocabulary and expressions to convey clear messages	Has difficulties to respond to non-standard communications and takes a long time to formulate a non-standard reply.The message may occasionally be unclear.	Has difficulties to formulate non-standard messages when under stress. Messages may occasionally be unclear during periods of high traffic levels or complexity.	Formulates non-standard messages with ease and is clealry understood.
ICS – Interim Competency Standard			FCS – Final Competency Standard	

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CHAPTER 2 - Appendix D – Example Competency Checklist

A competency checklist is a comprehensive document that could be lengthy. The example below shows the competency checklist for only two competency units: situational awareness and traffic and capacity management. A complete list would include all the competencies and performance criteria listed in the adapted competency model.

Competency Checklist – Area Surveillance Control

Trainee name: J Blogs
Unit: XYZ Centre
Sector/s: Upper and Mid Delta Sectors
Date: 01.01.01
ICS or FCS: ICS 2
Instructor/assessor name: J Smith

The evidence guide describes the level of performance required for each competency standard. An overall assessment of competent at the competency standard being assessed, can only be made when all performance criteria have been achieved.

For formative assessment grading supports the learning progress and is intended to be used for diagnostic purposes only.

Situational Awareness: Comprehends the current operational situation and anticipates future events		**1** (NC)	**2** (NC)	**3** (C)	**4** (C)
PC 1.1	Monitors traffic in own area of responsibility and nearby airspace				
PC 1.2	Monitors the meteorological conditions that impact on own area of responsibility and nearby airspace				
PC 1.3	Monitors the status of the ATC systems and equipment				
PC 1.4	Monitors the operational circumstances of personnel in nearby sectors to anticipate impact on own situation				
PC 1.5	Predicts the future operational situation				
PC 1.6	Identifies potentially hazardous situations				

Comments:……………………………………………………………………………………………
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Traffic and Capacity Management: Ensures a safe, orderly and efficient flow and provides essential information on environment and potentially hazardous situations		**1** (NC)	**2** (NC)	**3** (C)	**4** (C)
PC 2.1	Manages arriving and departing traffic using prescribed procedures.				
PC 2.2	Takes aircraft performance into account when issuing clearances and instructions.				
PC 2.3	Uses a variety of techniques to effectively manage the traffic.				
PC 2.4	Increases safety margins when deemed necessary				
PC 2.5	Takes action when appropriate to ensure that demand does not exceed capacity.				
PC 2.6	Maintains focus despite varying traffic levels.				
PC 2.7	Reacts appropriately to situations that have the potential to become unsafe.				
PC 2.8	Issues clearances and instructions to flight crew that result in a cost effective and efficient traffic flow.				
PC 2.9	Issues appropriate clearances and instructions.				
PC 2.10	Issues clearances and instructions in a timely manner.				
PC 2.11	Issues hazard and safety alerts to flight crews when necessary.				
PC 2.12	Issues weather information to flight crews when necessary.				

Comments:..……………………………………………………………………………………………………
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Overall Assessed performance is:

(1) Not competent
(2) Competent in most situations
(3) Competent
(4) Above the required competence

Signature: OJT Instructor:___________________ Date:____________________

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CHAPTER 2 - Appendix E – Example Competency Assessment Form

Competency Assessment Form

Trainee name: J Blogs
Unit: XYZ Centre
Sector/s: Upper and Mid Delta Sectors
Start of training: 01.05.01
ICS or FCS: FCS

Formative assessments

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

Summative assessments

Number	Date undertaken	Assessor/s	Result

Summary of results:

	1 (NC)	**2** (NC)	**3** (C)	**4** (C)
1. Situational Awareness				
2. Traffic & Capacity Management				
3. Separation & Conflict Resolution				
4. Communication				
5. Coordination				
6. Management of Non-routine Situations				
7. Problem-solving & Decision making				
8. Self-management and Continuous Development				
9. Workload Management				
10. Teamwork				

Comments:..
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Conclusion (competent/not competent): ....

Written Examinations:

Examination	Date undertaken	Result	Pass Mark required
Local Procedures			
Letters of Agreement			
XYZ System			

Oral assessment:

Date of assessment:	Assessor:	Result:

Comments:..…………………………………………………………………………………………………….…………
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Recommendation: (Competent/Not competent) ………………………………………………………………..

Name: ……………………………………………..….

Signature: ………………………………………….

Date: ……………………………………………….

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CHAPTER 2- Appendix F – Example Syllabus

This example shows all the subjects for an initial training aerodrome control course. However, it only provides a further elaboration of one subject; air traffic management, to demonstrate how the subjects are divided into topics, sub-topics and training objectives.

Subject 1:	Introduction to the course
Subject 2:	Aviation law
Subject 3:	Air traffic management
Subject 4:	Meteorology
Subject 5:	Navigation
Subject 6:	Aircraft
Subject 7:	Human Factors
Subject 8:	Equipment and systems
Subject 9:	Professional environment
Subject 10:	Abnormal and emergency situations
Subject 11:	Aerodromes

Subject 3: Air traffic management

The subject objective is:

> *Learners shall manage air traffic to ensure safe, orderly and expeditious services.*

# of the Objective	Corpus - Description of required performance	level	Content – shaded = explicit content italics = content support	Applicable operational position	SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC ATM 1: PROVISION OF SERVICES															
Sub-topic ATM 1.1 — Aerodrome control service															
TWR ATM 1.1.1	Appreciate areas of responsibility.	3	Control Zone, traffic circuit, manoeuvring area, movement area, vicinity. *Content support: ATZ.*	TWR	X	X									X
TWR ATM 1.1.2	Provide aerodrome control service.	4	Annex 11, Doc 7030, Doc 4444, operation manuals.	TWR	X	X	X	X	X		X	X	X	X	
Sub-topic ATM 1.2 — Flight information service (FIS)															
TWR ATM 1.2.1	Describe the information that shall be passed to aircraft by an aerodrome controller.	2	Annex 11	TWR											
TWR ATM 1.2.2	Provide FIS.	4	Doc 4444 *Content support: National documents.*	ALL	X	X		X	X	X	X	X	X	X	
TWR ATM 1.2.3	Issue appropriate information.	3	Doc 4444, essential local traffic, traffic information.	TWR		X									
TWR ATM 1.2.4	Appreciate the use of ATIS for the provision of flight information service by aerodrome controller.	3		TWR		X									
Sub-topic ATM 1.3 — Alerting service (ALRS)															
TWR ATM 1.3.1	Provide ALRS.	4	Doc 4444 *Content support: National documents.*	ALL	X	X		X	X	X				X	
TWR ATM 1.3.2	Respond to distress and urgency messages and signals.	3	Annex 10, Doc 4444	ALL						X					

# of the Objective	Corpus - Description of required performance	level	Content – shaded = explicit content italics = content support	Applicable operational position	SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 1.4 — ATS system capacity and air traffic flow management															
TWR ATM 1.4.1	Appreciate principles of ATS system capacity and air traffic flow management.	3	*Content support: Slot management, Slot allocation procedures.*	TWR		X							X		X
TWR ATM 1.4.2	Organize traffic to take account of flow management.	4	*Content support: Departure sequence.*	TWR	X	X					X				
TWR ATM 1.4.3	Inform appropriate authority.	3	*Content support: Abnormal situations, decrease in sector capacity, limitations on systems and equipment, changes in workload/ capacity, unusual meteorological conditions, relevant information: reported ground-based incidents, forest fire.*	TWR					X						
TOPIC ATM 2: COMMUNICATION															
Sub-topic ATM 2.1 — Effective communication															
TWR ATM 2.1.1	Use approved phraseology.	3	Doc 4444 *Content support: Doc 9432 RTF manual, standard words and phrases as contained in Annex 10, Volume II.*	ALL				X							
TWR ATM 2.1.2	Ensure effective communication.	4	Communication techniques, readback/verification of readback.	ALL				X							

How to use the table is more fully described in the Appendix 1 to Chapter 4.

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CHAPTER 4 - Appendix 1 – Examples of ATC Initial Training Syllabi

(Chapter 4, 4.1.6.1 refers)

This appendix contains examples of ATC initial training syllabi that have been aligned with the PANS-TRG ATCO competency framework. It includes the following:

- a basic training matrix (see Chapter 4 – Appendix 1a);

and five rating training matrices for:

- aerodrome control (ADC) rating training (see Chapter 4 – Appendix 1b);
- approach control procedural (APP) rating training (see Chapter 4 – Appendix 1c);
- approach control surveillance (APS) rating training (see Chapter 4 – Appendix 1d);
- area control procedural (ACP) rating training (see Chapter 4 – Appendix 1e);
- area control surveillance (ACS) rating training (see Chapter 4 – Appendix 1f).

1. **Basic training**

The basic training matrix was designed to provide the under-pinning knowledge and some basic practical skills that will enable a learner to progress to rating training. The objectives were developed primarily from the Annex 1 requirements and are enabling objectives for many of the performance criteria contained in the PANS-TRG ATCO competency framework in.

Within the framework of this example, basic training is completed by all trainees only once. The objectives contained in the basic training matrix are designed to give all learners an overall appreciation and some exposure to all the ATC ratings. To do this, the basic training includes uncomplicated practical objectives for the performance of aerodrome control and approach and area control surveillance tasks.

The basic training objectives were developed with the assumption that the learner had completed at least a secondary school education but that they had not had any education in aviation-related subjects.

2. **Rating training**

There are five separate rating training matrices that are mapped across to the PANS-TRG ATCO competency framework. Each matrix contains two types of training objectives: the first type represents enabling objectives that provide the under-pinning knowledge needed to meet certain performance criteria; and the second type contains objectives that directly support the attainment of the stated performance criteria.

For all training, there is a list of subjects to be covered (see an example in Chapter 2 – Appendix F). In all the matrices there are two subjects that are not directly linked to the PANS-TRG ATCO competency framework but are nonetheless part of each matrix. These subjects are:

Subject 1: Introduction to the course

The objectives in this subject are aimed at ensuring that learners have a comprehensive understanding of the training programme that they will be following and that they are aware of how and where to obtain information and assistance during the course. The objectives also ensure that the learners are acquainted with the assessment process for the training.

Subject 9: Professional environment

The objectives in this subject are two-fold: they are designed to give the learner an appreciation of the wider context of aviation and an appreciation of other contributors to civil and military ATS operations, such as airline operations, engineering services, aeronautical information services, rescue co-ordination centres, air defence units, etc. It would be in the context of professional development that formative visits to ATC operations room and other contributors would be arranged. Secondly, the objectives in this subject are aimed at giving learners an appreciation of the environmental constraints in aviation and the way in which aviation's impact on the environment can be minimized.

3. Terminology used

The following table illustrates the matrix but provides expanded column names to assist in the description of the terminology used.

	Objective			Repeated or common objectives	**PANS-TRG ATCO competencies**										
# of the Objective	Corpus - Description of required performance	level	Content – shaded = explicit content italics = content support	Applicable operational position	SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC ATM 1: PROVISION OF SERVICES															
Sub-topic ATM 1.1 — Aerodrome control service															
TWR ATM 1.1.1	Appreciate areas of responsibility.	3	Control Zone, traffic circuit, manoeuvring area, movement area, vicinity. *Content support: ATZ.*	TWR	X	X									X

The matrix refers to two categories of training objectives which are defined below:

Subject Objective:		Describes the general direction to move in rather than a detailed quantitative objective.
Objective:		A clear statement based on a corpus, level and content.
	Corpus:	A description of the required performance. It always contains an action verb to ensure that the outcome is observable. The action verb is always associated with a defined taxonomy.
	Level:	Highlights numerically the taxonomy level of the action verb.
	Content:	May be implicit or explicit. (This concept will be explained below).

Corpus

The corpus is a description of the required performance. Where possible, objectives relate to single activities and therefore should begin with a single action verb.

Level

The level contained in this column, relates directly to a defined taxonomy for classifying training objectives. The level is always associated with an action verb contained within the corpus. There are five levels. The levels are defined as follows:

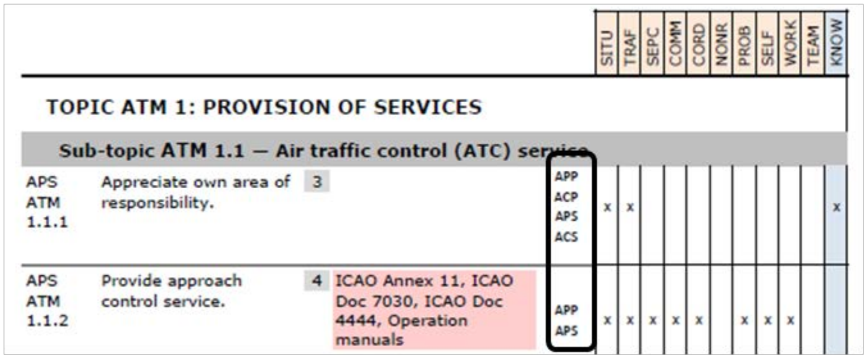
Level 1	A basic knowledge of the subject. It is the ability to remember essential points, to memorize data and retrieve it.
Level 2	The ability to understand and to discuss the subject matter intelligently in order to represent and act upon certain objects and events.
Level 3	A thorough knowledge of the subject and the ability to apply it with accuracy. The ability to make use of the repertoire of knowledge to develop plans and activate them.
Level 4	The ability to establish a line of action within a unit of known applications following the correct chronology and the adequate method to resolve a problem situation. This involves the integration of known applications in a familiar situation.
Level 5	The ability to analyse new situations in order to elaborate and apply one or another relevant strategy to solve a complex problem. The defining feature is that the situation is qualitatively different to those previously met, requiring judgement and evaluation of options.

Content

The content illustrates and details the performance. The content may be implicit and explicit. The explicit content is what is written in the content field proper to the objective, while the implicit content is not written in the content field of each objective but rather implied in the corpus of the objective and other elements (subject, topic, etc.). Items following **'***Content support'* are provided to help training designers develop their training material. This support suggests possible references documents that could be used and sometimes elaborates on the content with specific examples.

3. Repeat and Common objectives

Repeated and common objectives are only applicable to rating training matrices. To the right of each objective there is an indication of which other ratings contain this particular objective. This indication is the first step to help the training organization in identifying the potential commonalities between the various matrices. As a second step, the training provider must determine, at the level of local implementation, whether the objective is to **be regarded as repeated or common.**



TOPIC ATM 1: PROVISION OF SERVICES

Sub-topic ATM 1.1 — Air traffic control (ATC) service

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 1.1.1	Appreciate own area of responsibility.	3		APP ACP APS ACS	x	x									x
APS ATM 1.1.2	Provide approach control service.	4	ICAO Annex 11, ICAO Doc 7030, ICAO Doc 4444, Operation manuals	APP APS	x	x	x	x	x		x	x	x		

Figure 1: Indication of repeated and common objectives.

3.1 Repeated objectives

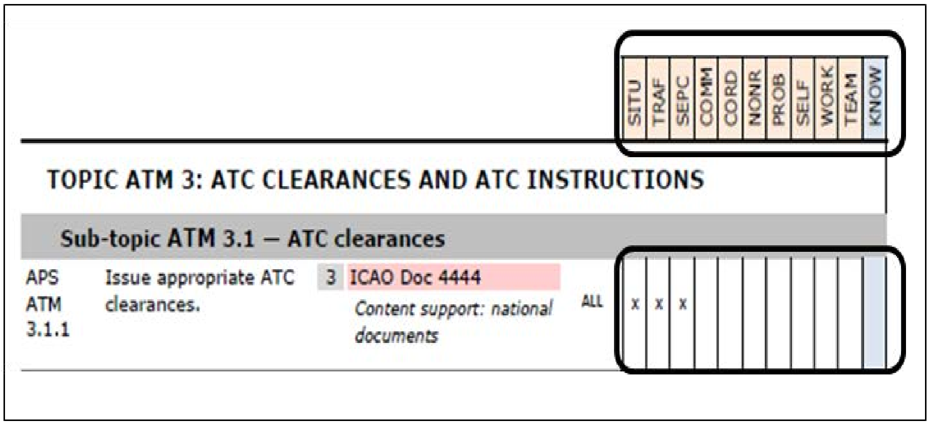
All the objectives appearing in a matrix are implicitly appropriate to that rating matrix (as aligned to the PANS-TRG ATCO competency framework). As a consequence, objectives may be repeated 'verbatim' in different matrices and nevertheless specify a different performance. The designer always needs to mentally add the sentence 'in this rating context' at the end of each objective. For example, the objective 'use approved phraseology' is repeated (same level, same corpus, same content) in all the rating matrices but is different because the context is different in each matrix (a learner able to use approved phraseology for en-route traffic will need additional training before mastering the phraseology in the provision of aerodrome control).

3.2 Common objectives

Common objectives are verbatim the same objectives that appear in more than one matrix in the same context so that they do not need to be taught again in case of combined or successively organized courses. For example, the objective 'describe the human information processing model' is common to all the matrices because the context is non-specific and is therefore not determined by the type of rating.

4. Relationship with the PANS-TRG ATCO competency framework

All the rating training objectives have been mapped to the competency units contained within the PANS-TRG ATCO competency framework. Where an objective is underpinning knowledge or an Annex 1 knowledge requirement, it has been indicated as 'KNOW', in a differently shaded column to differentiate this objective from the competency unit objectives. The competency units are listed in columns to the right of the training objectives. Competency units that are associated with a training objective are indicated with a check mark (x) in the appropriate column.



					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC ATM 3: ATC CLEARANCES AND ATC INSTRUCTIONS															
Sub-topic ATM 3.1 — ATC clearances															
APS ATM 3.1.1	Issue appropriate ATC clearances.	3	ICAO Doc 4444 *Content support: national documents*	ALL	x	x	x								

Figure 2: Objectives mapped to PANS-TRG ATCO competency framework

The following abbreviations are used for the competency units:

Competency unit	Abbreviation
Situational awareness	SITU
Traffic and capacity management	TRAF
Separation and conflict resolution	SEPC
Communication	COMM
Coordination	CORD
Management of non-routine situations	NONR
Problem solving and decision making	PROB
Self-management and continuous development	SELF
Workload management	WORK
Teamwork	TEAM
ICAO Annex 1	KNOW

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CHAPTER 4 - Appendix 1a – Example Basic Training Syllabus

SUBJECT 1: INTRODUCTION TO THE COURSE

The subject objective is:

Learners shall understand the training programme that they will follow and how to obtain the appropriate information, and recognize the potential for development of their careers in ATC.

TOPIC INTRB 1: COURSE MANAGEMENT

Sub-topic INTRB 1.1 — Course introduction			
BASIC INTRB 1.1.1	Explain the aims and main objectives of the course.	2	
Sub-topic INTRB 1.2 — Course administration			
BASIC INTRB 1.2.1	State course administration.	1	
Sub-topic INTRB 1.3 — Study material and training documentation			
BASIC INTRB 1.3.1	Use appropriate documentation and their sources for the course.	3	*Optional content: Training documentation, library, CBT library, web, learning management server.*
BASIC INTRB 1.3.2	Integrate appropriate information into course studies.	4	Training documentation. *Optional content: Supplementary information, library.*

TOPIC INTRB 2: INTRODUCTION TO THE ATC TRAINING COURSE

Sub-topic INTRB 2.1 — Course content and organization			
BASIC INTRB 2.1.1	State the different training methods applied in the course.	1	Theoretical training, practical training, self-study, types of training events.
BASIC INTRB 2.1.2	State the subjects of the course and their purpose.	1	
BASIC INTRB 2.1.3	Describe the organization of theoretical training.	2	*Optional content: Course programme.*
BASIC INTRB 2.1.4	Describe the organization of practical training.	2	*Optional content: PTP, simulation, briefing, debriefing, course programme.*

Sub-topic INTRB 2.2 — Training ethos			
BASIC INTRB 2.2.1	Recognize the feedback mechanisms available.	1	*Optional content: Instructor discussions, training progress, assessment, examinations, results, briefing, debriefing.*
BASIC INTRB 2.2.2	Describe the positive effect of working and learning together with course participants.	2	Team work in theoretical and practical training.

Sub-topic INTRB 2.3 — Assessment process			
BASIC INTRB 2.3.1	Describe the assessment process.	2	

TOPIC INTRB 3: INTRODUCTION TO ATCO'S FUTURE

Sub-topic INTRB 3.1 — Job prospects			
BASIC INTRB 3.1.1	Recognize an ATCO's working environment.	1	Area control unit, approach control unit, aerodrome control unit.
BASIC INTRB 3.1.2	Recognize career developments.	1	*Optional content: OJT instructor, supervisor, operational managerial posts, non-operational posts.*

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SUBJECT 2: AVIATION LAW

The subject objective is:

Learners shall apply the regulations governing rules of the air, airspace and flight planning and explain their development and, where applicable, incorporation into national legislation.

TOPIC LAWB 1: INTRODUCTION TO AVIATION LAW

Sub-topic LAWB 1.1 — Relevance of aviation law			
BASIC LAWB 1.1.1	State the necessity for air law, the sources and development of aviation law.	1	*Optional content: ICAO Annex 2, National Aviation Law.*
BASIC LAWB 1.1.2	Name the key national and international aviation organizations.	*1*	*Optional content: ICAO, national authority.*
BASIC LAWB 1.1.3	Describe the impact these organizations have on ATC and their interaction with each other.	2	

TOPIC LAWB 2: INTERNATIONAL ORGANIZATIONS

Sub-topic LAWB 2.1 — ICAO			
BASIC LAWB 2.1.1	Explain the purpose and function of ICAO.	2	
BASIC LAWB 2.1.2	Describe the methods by which ICAO notifies and implements legislation.	2	SARPs, PANS, ICAO Annexes, ICAO documents. *Optional content: Regional offices.*
Sub-topic LAWB 2.2 — Other agencies			
BASIC LAWB 2.2.1	State the purpose and function of other international agencies and their relevance to air traffic operations.	1	*Optional content: ITU, WMO.*
Sub-topic LAWB 2.3 — Aviation associations			
BASIC LAWB 2.3.1	State the purpose of international controller, pilot, airline and airspace user associations and their interaction with ATC.	1	*Content support: AEA, IACA, IATA, IFALPA, IFATCA, IAOPA.*

TOPIC LAWB 3: NATIONAL ORGANIZATIONS

Sub-topic LAWB 3.1 — Purpose and function

BASIC LAWB 3.1.1	Describe the purpose and function of appropriate national agencies and their relevance to air traffic operations.	2	*Content support: Civil aviation administration agencies, government agencies.*

Sub-topic LAWB 3.2 — National legislative procedures

BASIC LAWB 3.2.1	Describe the means by which legislation is implemented, notified and updated.	2	*Content support: ICAO Annex 15, AIS, AIPs, AICs, AIRAC SUP, NOTAMs, integrated aeronautical information package, national legislation, letters of agreement, operations manual.*
BASIC LAWB 3.2.2	Recognize the information contained in the different parts of the AIP.	1	

Sub-topic LAWB 3.3 — Regulatory authority

BASIC LAWB 3.3.1	Name the regulatory authority responsible for licensing and enforcing legislation and operational procedures.	1	
BASIC LAWB 3.3.2	Describe how the regulatory authority carries out its safety regulation responsibilities.	2	

TOPIC LAWB 4: ATS SAFETY MANAGEMENT

Sub-topic LAWB 4.1 — Safety regulation

BASIC LAWB 4.1.1	Describe the need for safety regulation.	2	ICAO Annex 19 *Optional content: ICAO Doc 9859, national regulation.*
BASIC LAWB 4.1.2	Describe the general principles of the safety organization.	2	Safety regulation *Optional content: National regulation, ICAO Annex 19, ICAO Doc 9859.*
BASIC LAWB 4.1.3	Explain the impact of safety regulation on the controller.	2	

Sub-topic LAWB 4.2 — Safety management system

BASIC LAWB 4.2.1	Explain the regulatory requirements of safety management systems in ATM.	2	Annex 19 *Content support: National regulations, ICAO Doc 9859.*
BASIC LAWB 4.2.2	Explain the principles of the safety management systems.	2	*Content support: ICAO Annex 19, ICAO Doc 9859, national regulations.*

BASIC LAWB 4.2.3	Describe the safety assessment methodology.	2	*Optional content: ICAO Annex 19, ICAO Doc 9859, national regulations.*

TOPIC LAWB 5: RULES AND REGULATIONS

Sub-topic LAWB 5.1 — Units of measurement			
BASIC LAWB 5.1.1	Describe the units of measurement used in aviation.	2	ICAO Annex 5
Sub-topic LAWB 5.2 — ATCO licensing/certification			
BASIC LAWB 5.2.1	Explain the ATCO licensing/certification process.	2	ICAO Annex 1 *Optional content: National processes.*
BASIC LAWB 5.2.2	Explain the privileges and limitations of controller licences.	2	ICAO Annex 1 *Optional content: National licensing regulations.*
Sub-topic LAWB 5.3 — Overview of ANS and ATS			
BASIC LAWB 5.3.1	Differentiate between the Air Navigation Services.	2	ICAO Doc 9161
BASIC LAWB 5.3.2	Explain the considerations which determine the need for the ATS.	2	ICAO Annex 11
BASIC LAWB 5.3.3	Differentiate between the ATS.	2	ATCS, ADVS, FIS, ALRS
BASIC LAWB 5.3.4	Explain the objectives of ATS.	2	ICAO Annex 11
Sub-topic LAWB 5.4 — Rules of the air			
BASIC LAWB 5.4.1	Explain the Rules of the Air.	2	ICAO Annex 2
BASIC LAWB 5.4.3	Appreciate the influence of relevant flight rules on ATC.	3	General flight rules, instrument flight rules, visual flight rules.
BASIC LAWB 5.4.4	Appreciate the differences between flying in accordance with VFR and IFR, in VMC and IMC.	3	ICAO Annex 2

Sub-topic LAWB 5.5 — Airspace and ATS routes

BASIC LAWB 5.5.1	Explain airspace classification.	2	ICAO Classes A-G, ICAO Annex 11
BASIC LAWB 5.5.2	Differentiate between the different types of airspace.	2	*Content support: Control zones, control areas, airways, upper and lower airspace, restricted areas, prohibited and danger areas, FIR, aerodrome traffic zone, special use airspace, etc.*
BASIC LAWB 5.5.3	Differentiate between the different types of ATS routes.	2	Airway, arrival route, departure route, advisory route, controlled route, uncontrolled route, etc.
BASIC LAWB 5.5.4	Decode information from aeronautical charts.	3	*Content support: Control zones, control areas, ATS routes, upper and lower airspace, restricted areas, prohibited and danger areas, FIR, aerodrome traffic zone, etc.*

Sub-topic LAWB 5.6 — Flight plan

BASIC LAWB 5.6.1	Explain the functions of a flight plan.	2	ICAO Doc 4444
BASIC LAWB 5.6.2	Explain the different types of flight plans and associated update messages.	2	ICAO Doc 4444
BASIC LAWB 5.6.3	Explain the pilot’s responsibilities in relation to adherence to flight plan.	2	Inadvertent changes, intended changes, position reporting.
BASIC LAWB 5.6.4	Describe flight plan processing.	2	*Content support: AFTN, IFPS.*

Sub-topic LAWB 5.7 — Aerodromes

BASIC LAWB 5.7.1	Describe the general design and layout of an aerodrome.	2	Runway(s), taxiways, apron, movement area, manoeuvring area, designated positions on an aerodrome.
BASIC LAWB 5.7.2	Explain the numbering system and orientation of runways.	2	ICAO Annex 14
BASIC LAWB 5.7.3	Differentiate between different types of aerodromes.	2	Controlled, uncontrolled. *Content support: Military, international, regional.*
BASIC LAWB 5.7.4	Describe designated positions in the traffic circuit.	2	
BASIC LAWB 5.7.5	List the factors affecting the selection of runway in use.	1	

Sub-topic LAWB 5.8 — Holding procedures for IFR flights

BASIC LAWB 5.8.1	Describe the purpose of holding.	2	Traffic management, weather, pilot request, ICAO Doc 4444, ICAO Doc 8168.

BASIC LAWB 5.8.2	Describe types of holding patterns.	2	Published, Non-published.
BASIC LAWB 5.8.3	Describe an ICAO holding pattern.	2	ICAO Doc 8168 - Parts of an IFR holding pattern, entry/exit procedures, dimensions of patterns, protected airspace, holding areas, alignment, rates of turns, holding times, expect further clearance, expected approach times (EATs).
BASIC LAWB 5.8.4	Describe the factors affecting holding pattern.	2	Effect of speed, effect of level used, effect of navigation aid in use, turbulence.
Sub-topic LAWB 5.9 — Holding procedures for VFR flights			
BASIC LAWB 5.9.1	Describe VFR holding.	2	

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SUBJECT 3: AIR TRAFFIC MANAGEMENT

The subject objective is:

Learners shall describe the basic principles of air traffic management and apply basic operational procedures.

TOPIC ATMB 1: AIR TRAFFIC MANAGEMENT

Sub-topic ATMB 1.1 — Application of units of measurement

BASIC ATMB 1.1.1	Apply the units of measurement appropriate to ATM.	3	

Sub-topic ATMB 1.2 — Air traffic control (ATC) service

BASIC ATMB 1.2.1	Define ATC service.	1	ICAO Annex 11
BASIC ATMB 1.2.2	Explain the division of the ATC service.	2	ICAO Annex 11
BASIC ATMB 1.2.3	Explain the responsibility for the provision of the ATC service.	2	ICAO Annex 11
BASIC ATMB 1.2.4	Differentiate between the different methods of providing ATC services.	2	Aerodrome, surveillance, procedural.

Sub-topic ATMB 1.3 — Flight information service (FIS)

BASIC ATMB 1.3.1	Define FIS.	1	ICAO Annex 11
BASIC ATMB 1.3.2	Describe the scope of the FIS.	2	ICAO Annex 11
BASIC ATMB 1.3.3	Explain the responsibility for the provision of the FIS.	2	ICAO Doc 4444
BASIC ATMB 1.3.4	State the methods of transmitting information.	1	*Content support: RTF, data link, ATIS, VOLMET, etc.*
BASIC ATMB 1.3.5	List the content of ATIS and VOLMET.	1	ICAO Annex 11, ICAO Annex 3 *Content support: Meteorological data obtained by data link.*

BASIC ATMB 1.3.6	Issue information to aircraft.	3	*Content support: SIGMET, serviceability of NAVAIDS, weather, flight safety information, essential traffic, essential local traffic, information related to aerodrome conditions, etc.*
Sub-topic ATMB 1.4 — Alerting service			
BASIC ATMB 1.4.1	Define ALRS.	1	ICAO Doc 4444
BASIC ATMB 1.4.2	Describe the scope of the ALRS.	2	ICAO Annex 11
BASIC ATMB 1.4.3	Explain the responsibility for the provision of the ALRS.	2	ICAO Doc 4444
BASIC ATMB 1.4.4	Differentiate between the phases of emergency.	2	Uncertainty, alert, distress.
BASIC ATMB 1.4.5	Describe the organization of an ALRS.	2	Responsibilities, local organization.
BASIC ATMB 1.4.6	Describe the cooperation between units providing the alerting services and the SAR units.	2	
BASIC ATMB 1.4.7	Differentiate between distress and urgency signals.	2	Mayday, Pan Pan, Pan Pan Medical. *Content support: Visual signals, etc.*
Sub-topic ATMB 1.5 — Air traffic advisory service			
BASIC ATMB 1.5.1	Define Air Traffic Advisory Service.	1	ICAO Annex 11
BASIC ATMB 1.5.2	Describe the scope of the Air Traffic Advisory Service.	2	ICAO Doc 4444
BASIC ATMB 1.5.3	Explain the responsibility for the provision of the Air Traffic Advisory Service.	2	ICAO Doc 4444
BASIC ATMB 1.5.4	State to which flights Air Traffic Advisory Service shall be provided.	1	ICAO Doc 4444
Sub-topic ATMB 1.6 — ATS system capacity and air traffic flow management			
BASIC ATMB 1.6.1	Define ATFM.	1	ICAO Doc 4444
BASIC ATMB 1.6.2	State the scope of capacity management.	1	ICAO Doc 4444
BASIC ATMB 1.6.3	Describe the scope of ATFCM.	2	ICAO Doc 4444, national documents.

BASIC ATMB 1.6.4	Explain the responsibility for the provision of ATFCM.	2	ICAO Doc 4444, national documents.
BASIC ATMB 1.6.5	Explain the methods of providing ATFCM.	2	ICAO Doc 4444, national documents.
Sub-topic ATMB 1.7 — Airspace management (ASM)			
BASIC ATMB 1.7.1	Define ASM.	1	National documents.
BASIC ATMB 1.7.2	Describe the scope of ASM.	2	
BASIC ATMB 1.7.3	Explain the responsibility for the provision of ASM.	2	
BASIC ATMB 1.7.4	Explain the methods of managing airspace.	2	*Content support: Flexible use of airspace, airspace design.*

TOPIC ATMB 2: ALTIMETRY AND LEVEL ALLOCATION

Sub-topic ATMB 2.1 — Altimetry			
BASIC ATMB 2.1.1	Appreciate the relationship between height, altitude and flight level.	3	QFE, QNH, standard pressure.
Sub-topic ATMB 2.2 — Transition level			
BASIC ATMB 2.2.1	Appreciate the relationship between transition level, transition altitude and transition layer.	3	ICAO Doc 4444, ICAO Doc 8168.
BASIC ATMB 2.2.2	Calculate appropriate levels.	3	*Content support: Transition level , transition layer, height, lowest useable flight level, vertical distance to airspace boundaries.*
Sub-topic ATMB 2.3 — Level allocation			
BASIC ATMB 2.3.1	Describe the cruising level allocation system.	2	ICAO Annex 2, tables of cruising levels.
BASIC ATMB 2.3.2	Choose appropriate levels.	3	Flight levels, altitudes, heights.

TOPIC ATMB 3: RADIOTELEPHONY (RTF)

Sub-topic ATMB 3.1 — RTF general operating procedures

BASIC ATMB 3.1.1	Explain the need for approved phraseology.	2	
BASIC ATMB 3.1.2	Use approved phraseology.	3	Parts of the following documents relevant to the Basic course: ICAO Doc 4444, ICAO Doc 9432 RTF manual - standard words and phrases, ICAO Annex 10, Volume II.
BASIC ATMB 3.1.3	Perform communication effectively.	3	Communication techniques readback/verification of readback.

TOPIC ATMB 4: ATC CLEARANCES AND ATC INSTRUCTIONS

Sub-topic ATMB 4.1 — Type and content of ATC clearances

BASIC ATMB 4.1.1	Define ATC clearance.	1	ICAO Annex 2
BASIC ATMB 4.1.2	Describe the contents of an ATC clearance.	2	ICAO Doc 4444, ICAO Annex 11
BASIC ATMB 4.1.3	Issue appropriate ATC clearances.	3	ICAO Doc 4444 *Content support: National documents.*

Sub-topic ATMB 4.2 — ATC instructions

BASIC ATMB 4.2.1	Define ATC Instructions.	1	ICAO Doc 4444
BASIC ATMB 4.2.2	Describe the contents of an ATC instructions.	2	ICAO Doc 4444, ICAO Annex 11
BASIC ATMB 4.2.3	Issue appropriate ATC instructions.	3	ICAO Doc 4444 *Content support: National documents.*

TOPIC ATMB 5: COORDINATION

Sub-topic ATMB 5.1 — Principles, types and content of coordination

BASIC ATMB 5.1.1	Explain the principles, types and content of coordination.	2	ICAO Doc 4444, ICAO Annex 11. *Content support: Notification, negotiation, agreement, transfer of flight data and local agreements, etc.*

Sub-topic ATMB 5.2 — Necessity for coordination

BASIC ATMB 5.2.1	Appreciate the need for coordination.	3	*Content support: ICAO Doc 4444, local procedures, letters of agreements.*
BASIC ATMB 5.2.2	Differentiate between transfer of control and transfer of communication procedures.	2	

Sub-topic ATMB 5.3 — Means of coordination

BASIC ATMB 5.3.1	Describe the means of coordination	2	*Content support: Data link, telephone, intercom, voice, etc.*
BASIC ATMB 5.3.2	Use the available means for coordination..	3	

TOPIC ATMB 6: DATA DISPLAY

Sub-topic ATMB 6.1 — Data extraction

BASIC ATMB 6.1.1	Encode and decode an appropriate selection of standard ICAO abbreviations.	3	*Content support: ICAO Doc 8585, ICAO Doc 8643, ICAO Doc 7910.*
BASIC ATMB 6.1.2	Extract pertinent data from relevant sources to produce a flight progress display.	3	Pilot reports, coordination, data exchange. *Content support: Flight plan.*
BASIC ATMB 6.1.3	Encode and decode flight plans (including supplementary information).	3	ICAO format, AFTN format

Sub-topic ATMB 6.2 — Data management

BASIC ATMB 6.2.1	Update the situation display to accurately reflect the traffic situation.	3	*Content support: Strip marking symbols, strip movement procedures, electronic data, label.*

TOPIC ATMB 7: SEPARATIONS

Sub-topic ATMB 7.1 — Vertical separation and procedures

BASIC ATMB 7.1.1	State the vertical separation minima.	1	ICAO Doc 4444
BASIC ATMB 7.1.2	Explain the vertical separation procedures.	2	ICAO Doc 4444

Sub-topic ATMB 7.2 — Horizontal separation and procedures

BASIC ATMB 7.2.1	State the longitudinal separation standards and procedures based on time and distance.	1	ICAO Doc 4444

BASIC ATMB 7.2.2	State the lateral separation standards and procedures.	1	ICAO Doc 4444
Sub-topic ATMB 7.3 — Visual separation			
BASIC ATMB 7.3.1	State the occasions when clearance to fly maintaining own separation while in VMC can be used.	1	
Sub-topic ATMB 7.4 — Aerodrome separation and procedures			
BASIC ATMB 7.4.1	State the aerodrome separation standards.	1	Separation on the manoeuvring area, in the traffic circuit, for departing and arriving aircraft and in the vicinity of the aerodrome.
BASIC ATMB 7.4.2	Explain the aerodrome separation procedures.	2	ICAO Doc 4444
BASIC ATMB 7.4.3	Define essential local traffic.	1	ICAO Doc 4444
Sub-topic ATMB 7.5 — Separation based on ATS surveillance systems			
BASIC ATMB 7.5.1	Explain the use of ATS surveillance systems in ATS.	2	Separation, identification, monitoring, vectoring, expedition and assistance to traffic. *Content support: ICAO Doc 4444.*
BASIC ATMB 7.5.2	Explain the ATS surveillance systems separation standards and procedures.	2	
Sub-topic ATMB 7.6 — Wake turbulence separation			
BASIC ATMB 7.6.1	Explain the wake turbulence separations.	2	ICAO Doc 4444

TOPIC ATMB 8: AIRBORNE COLLISION AVOIDANCE SYSTEMS AND GROUND-BASED SAFETY NETS

Sub-topic ATMB 8.1 — Airborne collision avoidance systems			
BASIC ATMB 8.1.1	Explain the main characteristics of airborne warning systems and their relevance to ATC operations.	2	ACAS, TAWS *Content support: TCAS, EGPWS, Wind shear alerts.*
BASIC ATMB 8.1.2	Explain the function of ACAS Traffic Alerts and Resolution Advisories.	2	ICAO Doc 8168
BASIC ATMB 8.1.3	List the actions of the pilot in case of TA and RA.	1	ICAO Doc 8168
BASIC ATMB 8.1.4	List the ACAS limitations.	1	ICAO Doc 9863

Sub-topic ATMB 8.2 — Ground-based safety nets			
BASIC ATMB 8.2.1	Explain the main characteristics of ground-based safety nets and their relevance to ATC operations.	2	*Content support: STCA, MSAW, APW, APM.*

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TOPIC ATMB 9: BASIC PRACTICAL SKILLS

Sub-topic ATMB 9.1 — Traffic management process			
BASIC ATMB 9.1.1	Consider human information processing in the provision of ATC.	2	Situational awareness, conflict detection, planning, decision making, prioritisation, execution.
BASIC ATMB 9.1.2	Consider the need for verification that actions are carried out.	2	Monitoring
Sub-topic ATMB 9.2 — Basic practical skills applicable to all ratings			
BASIC ATMB 9.2.1	Verify that settings of the working position are appropriate.	3	
BASIC ATMB 9.2.2	Operate the available working position equipment.	3	
BASIC ATMB 9.2.3	Maintain situational awareness by monitoring traffic.	3	Information gathering, scanning, planning.
BASIC ATMB 9.2.4	Appreciate priority of actions.	3	
BASIC ATMB 9.2.5	Execute selected plan.	3	
BASIC ATMB 9.2.6	Apply the prescribed procedures for the area of responsibility.	3	*Content support: LOPs, transfer of control and communication, level allocation, inbound and outbound procedures.*
BASIC ATMB 9.2.7	Appreciate relative velocity between aircraft.	3	
BASIC ATMB 9.2.8	Identify separation problems.	3	
BASIC ATMB 9.2.9	Choose appropriate separation methods.	3	
BASIC ATMB 9.2.10	Apply separation.	3	*Content support: Vertical, longitudinal, lateral, aerodrome, based on ATS surveillance systems, distances from airspace boundaries.*
Sub-topic ATMB 9.3 — Basic practical skills applicable to aerodrome			
BASIC ATMB 9.3.1	Perform the basic functions of aerodrome control.	3	
BASIC ATMB 9.3.2	Perform the control of aerodrome traffic..	3	Single runway operations including VFR and IFR traffic.

Sub-topic ATMB 9.4 — Basic practical skills applicable to surveillance			
BASIC ATMB 9.4.1	Explain the methods and procedures of establishing identification.	2	ICAO Doc 4444
BASIC ATMB 9.4.2	Apply the procedures of establishing identification.	3	Any of the ATS surveillance systems identification methods.
BASIC ATMB 9.4.3	Estimate heading for a new track and the distance to the next way point.	3	
BASIC ATMB 9.4.4	Apply vectoring techniques.	3	
BASIC ATMB 9.4.5	Conduct level changes.	3	*Content support: Cruising level allocation, requested level change, climb/descent to exit level, descent to an altitude or a height.*

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SUBJECT 4: METEOROLOGY

The subject objective is:

Learners shall describe how meteorology affects ATS operations and aircraft performance and apply meteorological information in the basic operational procedures of ATS.

TOPIC METB 1: INTRODUCTION TO METEOROLOGY

Sub-topic METB 1.1 — Application of units of measurement			
BASIC METB 1.1.1	Apply the units of measurement appropriate to meteorology.	3	
Sub-topic METB 1.2 — Aviation and meteorology			
BASIC METB 1.2.1	Explain the relevance of meteorology in aviation.	2	
BASIC METB 1.2.2	Explain the requirements for the provision of meteorological information available to operators, flight crew members, and to air traffic services.	2	ICAO Annex 3, ICAO Annex 11
BASIC METB 1.2.3	State the meteorological hazards to aviation.	1	Turbulence, thunderstorms, icing, micro bursts, squall, macro burst, wind shear.
Sub-topic METB 1.3 — Organization of meteorological service			
BASIC METB 1.3.1	Name the basic duties, organization and working methods of meteorological offices.	1	*Content support: WAFS, WAFC, MWO, VAAC, TCAC, SADIS.*
BASIC METB 1.3.2	State the International and National standards for coordination between ATS and MET services.	1	

TOPIC METB 2: ATMOSPHERE

Sub-topic METB 2.1 — Composition and structure			
BASIC METB 2.1.1	State the composition and structure of the atmosphere.	1	Gases, layers
BASIC METB 2.1.2	Describe the basic characteristics of the atmospheric parameters measured.	2	Temperature, pressure, wind, humidity, density.
BASIC METB 2.1.3	List the tools used for the collection of meteorological data.	1	*Content support: Barometer, thermometer, ceilometer, anemometer, weather balloons, transmissometer, radar, satellites, etc.*

Sub-topic METB 2.2 — Standard atmosphere

BASIC METB 2.2.1	Describe the elements of the ISA.	2	Temperature, pressure, density
BASIC METB 2.2.2	State the reasons why the ISA has been defined.	1	

Sub-topic METB 2.3 — Heat and temperature

BASIC METB 2.3.1	Define the processes by which heat is transferred and how the atmosphere is heated.	1	Radiation, convection, advection, conduction, water cycle.
BASIC METB 2.3.2	Describe how temperature varies.	2	Adiabatic processes, lapse rates, stability, instability.
BASIC METB 2.3.3	State the influencing factors on surface temperature.	1	

Sub-topic METB 2.4 — Water in the atmosphere

BASIC METB 2.4.1	Differentiate between the different processes related to atmospheric moisture.	2	Condensation, evaporation, sublimation, saturation.
BASIC METB 2.4.2	Characterize relative humidity, dew point and latent heat.	2	

Sub-topic METB 2.5 — Air pressure

BASIC METB 2.5.1	Describe the relationship between pressure, temperature, density and height.	2	
BASIC METB 2.5.2	Explain the relationship between pressure settings.	2	QFE, QNH, standard pressure
BASIC METB 2.5.3	Explain the effect of air pressure and temperature on altimeter readings and the true altitude of aircraft.	2	
BASIC METB 2.5.4	State how atmospheric pressure is measured.	1	

TOPIC METB 3: ATMOSPHERIC CIRCULATION

Sub-topic METB 3.1 — General air circulation

BASIC METB 3.1.1	State the major atmospheric circulation features on the Earth.	1	*Content support: Hadley cells, high and low belts, polar fronts, westerly winds, upper level jet streams.*

Sub-topic METB 3.2 — Air masses and frontal systems

BASIC METB 3.2.1	Describe the origin and movement of typical air masses and their general effect on weather.	2	Polar, arctic, tropical, equatorial (maritime and continental).
BASIC METB 3.2.2	Describe the main isobaric features.	2	Cyclones, anticyclones, ridge, trough.
BASIC METB 3.2.3	Describe the difference between various fronts and the associated weather.	2	Warm front, cold front, occluded front.

Sub-topic METB 3.3 — Mesoscale systems

BASIC METB 3.3.1	Describe the main phenomena caused by mesoscale systems.	2	Mountain waves, Slope and valley winds, thunderstorm, squall line. *Content support: land/sea breezes, tornadoes, land spouts, waterspouts.*
BASIC METB 3.3.2	Explain the relevance of mesoscale systems to aviation.	2	

Sub-topic METB 3.4 — Wind

BASIC METB 3.4.1	Explain the significance of wind phenomena and types.	2	*Content support: Veering, backing, gusting, jet streams, land/sea breezes, surface, upper.*
BASIC METB 3.4.2	State how wind is measured.	1	
BASIC METB 3.4.3	Explain effect of forces which influence wind.	2	

TOPIC METB 4: METEOROLOGICAL PHENOMENA

Sub-topic METB 4.1 — Clouds

BASIC METB 4.1.1	Explain the different conditions for the formation of clouds.	2	
BASIC METB 4.1.2	Recognize different cloud types.	1	

BASIC METB 4.1.3	State the cloud types main characteristics.	1	
BASIC METB 4.1.4	State how the cloud base and the amount of cloud are measured and/or observed.	1	
BASIC METB 4.1.5	Define cloud base and ceiling.	1	
BASIC METB 4.1.6	Differentiate between cloud base and ceiling.	2	
Sub-topic METB 4.2 — Types of precipitation			
BASIC METB 4.2.1	Explain the significance of precipitation in aviation.	2	
BASIC METB 4.2.2	Describe types of precipitation and their corresponding cloud families.	2	*Content support: Rain, snow, snow grains, hail, ice pellets, ice crystals, drizzle.*
Sub-topic METB 4.3 — Visibility			
BASIC METB 4.3.1	Explain the causes of atmospheric obscurity.	2	
BASIC METB 4.3.2	Differentiate between different types of visibility.	2	Horizontal visibility, slant visibility, prevailing visibility, RVR.
BASIC METB 4.3.3	State how visibility is measured.	1	
BASIC METB 4.3.4	Explain the significance of visibility in aviation.	2	
Sub-topic METB 4.4 — Meteorological hazards			
BASIC METB 4.4.1	Explain the meteorological hazards to aviation.	2	Turbulence, icing, micro bursts, macro burst, wind shear. *Content support: Thunderstorms, squalls.*
BASIC METB 4.4.2	Describe the effect of meteorological hazards on aviation.	2	

TOPIC METB 5: METEOROLOGICAL INFORMATION FOR AVIATION

Sub-topic METB 5.1 — Messages and reports			
BASIC METB 5.1.1	Decode the content of weather reports and forecasts.	3	METAR, SPECI, TAF, SIGMET. *Content support: Local reports.*

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SUBJECT 5: NAVIGATION

The subject objective is:

Learners shall explain the basic principles of navigation and use this knowledge in ATS operations.

TOPIC NAVB 1: INTRODUCTION TO NAVIGATION

Sub-topic NAVB 1.1 — Application of units of measurement			
BASIC NAVB 1.1.1	Apply the units of measurement appropriate to navigation.	3	
Sub-topic NAVB 1.2 — Purpose and use of navigation			
BASIC NAVB 1.2.1	Explain the need for navigation in aviation.	2	
BASIC NAVB 1.2.2	Characterize navigation methods.	2	*Content support: Historical overview, celestial, on-board, radio, satellites.*

TOPIC NAVB 2: THE EARTH

Sub-topic NAVB 2.1 — Place and movement of the Earth			
BASIC NAVB 2.1.1	Explain the Earth's properties and their effects.	2	*Content support: Form, size, rotation, revolution in space, seasons, day, night, twilight, units of time, time zones, UTC.*
Sub-topic NAVB 2.2 — System of coordinates, direction and distance			
BASIC NAVB 2.2.1	Characterize the general principles of a grid system.	2	*Content support: Degrees, minutes, seconds, WGS-84, latitude/longitude.*
BASIC NAVB 2.2.2	Explain direction and distance on a globe.	2	*Content support: Great circle, small circle, rhumb line, cardinal points, inter-cardinal points.*
BASIC NAVB 2.2.3	Estimate position on the Earth's surface.	3	*Content support: Latitude/longitude.*
BASIC NAVB 2.2.4	Estimate distance and direction between two points.	3	
Sub-topic NAVB 2.3 — Magnetism			
BASIC NAVB 2.3.1	Explain the general principles of the Earth's magnetism.	2	True north, magnetic north, variation, deviation, inclination.

BASIC NAVB 2.3.2	Calculate conversions between the three north designations.	3	True north, magnetic north, compass north.

TOPIC NAVB 3: MAPS AND AERONAUTICAL CHARTS

Sub-topic NAVB 3.1 — Map making and projections			
BASIC NAVB 3.1.1	State how the Earth is projected to create a map.	1	Types of projection.
BASIC NAVB 3.1.2	Describe the properties of a map.	2	Projection, scale.
BASIC NAVB 3.1.3	Describe the properties of an ideal map.	2	*Content support: Conformality, constant scale, true azimuth, rhumb lines and great circles.*
BASIC NAVB 3.1.4	State the properties and use of different projections.	1	*Content support: Lambert, mercator, stereographic.*
Sub-topic NAVB 3.2 — Maps and charts used in aviation			
BASIC NAVB 3.2.1	Differentiate between the various maps and charts.	2	
BASIC NAVB 3.2.2	State the specific use of various maps and charts.	1	
BASIC NAVB 3.2.3	Decode symbols and information displayed on maps and charts.	3	*Content support: Topographical features, NAV aids, fixes etc.*

TOPIC NAVB 4: NAVIGATIONAL BASICS

Sub-topic NAVB 4.1 — Influence of wind			
BASIC NAVB 4.1.1	Appreciate the influence of wind on the flight path.	3	Heading, track, drift, wind vector.
Sub-topic NAVB 4.2 — Speed			
BASIC NAVB 4.2.1	Explain the relationship between various speeds used in aviation.	2	True air speed, ground speed, indicated air speed (including Mach number).
BASIC NAVB 4.2.2	Appreciate the use of various speeds in ATC.	3	
Sub-topic NAVB 4.3 — Visual navigation			
BASIC NAVB 4.3.1	Differentiate between the methods of visual navigation.	2	Map reading, visual reference. *Content support: Dead-reckoning.*

Sub-topic NAVB 4.4 — Navigational aspects of flight planning

BASIC NAVB 4.4.1	Describe the navigational aspects affecting flight planning.	2	*Content support: Fuel/time calculations, min altitudes, alternative routes.*

TOPIC NAVB 5: INSTRUMENT NAVIGATION

Sub-topic NAVB 5.1 — Ground-based systems

BASIC NAVB 5.1.1	Explain the basic working principles of ground-based systems.	2	VDF, NDB, VOR, DME, ILS. *Content support: TACAN, MLS.*
BASIC NAVB 5.1.2	State the use of ground-based systems.	1	VDF, NDB, VOR, DME, ILS. *Content support: TACAN, MLS.*
BASIC NAVB 5.1.3	Characterize the main radio navigation techniques based on ground-based systems.	2	*Content support: Homing, inbound/outbound tracking, instrument approach procedures, holding, drift assessment.*
BASIC NAVB 5.1.4	Explain the effects of precision and limitations of ground-based systems on the flight.	2	VDF, NDB, VOR, DME, ILS. *Content support: TACAN, MLS.*

Sub-topic NAVB 5.2 — Inertial navigation systems

BASIC NAVB 5.2.1	Explain the basic working principles, precision and limitations of on-boards systems.	2	*Content support: INS/IRS.*
BASIC NAVB 5.2.2	State the use of on-board systems.	1	

Sub-topic NAVB 5.3 — Satellite-based systems

BASIC NAVB 5.3.1	Explain the basic working principles of positioning systems.	2	*Content support: Beidou, GPS, GLONASS, Galileo.*
BASIC NAVB 5.3.2	State the basic principles of GNSS concept.	1	Basic, ABAS, SBAS, GBAS.
BASIC NAVB 5.3.3	Explain the effects of precision and limitations of satellite-based systems.	2	*Content support: RAIM, GPS NOTAMS.*

Sub-topic NAVB 5.4 — Instrument approach procedures

BASIC NAVB 5.4.1	Recognize various types of instrument approach using aeronautical charts.	1	
BASIC NAVB 5.4.2	Differentiate between precision approach and non-precision approach procedures.	2	
BASIC NAVB 5.4.3	Recognize the different minima used during an instrument approach.	1	

BASIC NAVB 5.4.4	Define the terms obstacle clearance altitude/height and minimum descent altitude/height.	1	
BASIC NAVB 5.4.5	List the instrumental approach fixes.	1	IAF, IF, FAF, FAP, MAPt.

TOPIC NAVB 6: PERFORMANCE BASED NAVIGATION

Sub-topic NAVB 6.1 — Principles and benefits of area navigation			
BASIC NAVB 6.1.1	Explain the basic principles of area navigation.	2	*Content support: ICAO Doc 9613.*
BASIC NAVB 6.1.2	State the benefits of area navigation.	1	*Content support: ICAO Doc 9613.*
BASIC NAVB 6.1.3	State the effects of navigational performance accuracy of RNAV systems on the flight.	1	TSE, PDE, NSE, FTE. *Content support: ICAO Doc 9613.*
BASIC NAVB 6.1.4	Characterize the main aircraft and avionics functionalities used in area navigation.	2	*Content support: Waypoints transitions (FRT) and path terminators (including RF), fly over and fly by a waypoint, parallel offset.*
BASIC NAVB 6.1.5	Characterize the navigational functions of FMS.	2	*Content support: VNAV, LNAV.*
Sub-topic NAVB 6.2 — Introduction to PBN			
BASIC NAVB 6.2.1	State the general concept of PBN.	1	*Content support: ICAO Doc 9613.*
BASIC NAVB 6.2.2	Differentiate between RNAV and RNP.	2	On board performance monitoring and alerting.
BASIC NAVB 6.2.3	State the navigation infrastructure that may be used in PBN.	1	VOR, DME, GNSS. *Content support: Functionality IRS/INS.*
BASIC NAVB 6.2.4	State the benefits of PBN concept.	1	*Content support: Global interoperability, limited number of navigation specifications.*

Sub-topic NAVB 6.3 — PBN applications

BASIC NAVB 6.3.1	List the navigation applications in use in the region.	1	En-route, terminal/approach.

TOPIC NAVB 7: DEVELOPMENTS IN NAVIGATION

Sub-topic NAVB 7.1 — Future developments

BASIC NAVB 7.1.1	State future developments in navigation.	1	

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SUBJECT 6: AIRCRAFT

The subject objective is:

Learners shall describe the basic principles of the theory of flight and aircraft characteristics and how these influence ATS operations.

TOPIC ACFTB 1: INTRODUCTION TO AIRCRAFT

Sub-topic ACFTB 1.1 — Application of units of measurement

BASIC ACFTB 1.1.1	Apply the units of measurement appropriate to aircraft and principles of flight.	3	

Sub-topic ACFTB 1.2 — Aviation and aircraft

BASIC ACFTB 1.2.1	Explain the relevance of theory of flight and aircraft characteristics in ATS operations.	2	

TOPIC ACFTB 2: PRINCIPLES OF FLIGHT

Sub-topic ACFTB 2.1 — Forces acting on aircraft

BASIC ACFTB 2.1.1	Explain the forces acting on an aircraft in flight and their interaction.	2	Lift, thrust, drag, weight during level flight. *Content support: During climb, descent, turn.*
BASIC ACFTB 2.1.2	Explain causes and effects of wake turbulence.	2	Induced drag.

Sub-topic ACFTB 2.2 — Structural components and control of an aircraft

BASIC ACFTB 2.2.1	Describe the main structural components of an aircraft.	2	Rotary and fixed wing, tail plane, fuselage, flap, aileron, elevator, rudder, landing gear.
BASIC ACFTB 2.2.2	Explain how the pilot controls the movements of an aircraft.	2	*Content support: Rudder, aileron, elevator, throttle, rotary wing controls.*
BASIC ACFTB 2.2.3	Explain the factors affecting aircraft stability.	2	

Sub-topic ACFTB 2.3 — Flight envelope

BASIC ACFTB 2.3.1	Characterize the critical factors which affect aircraft performance.	2	Maximum speeds, minimum and stall speeds, ceiling, critical angle of attack, maximum ROC.

TOPIC ACFTB 3: AIRCRAFT CATEGORIES

Sub-topic ACFTB 3.1 — Aircraft categories

BASIC ACFTB 3.1.1	List the different categories of aircraft.	1	*Content support: Fixed wing, rotary wing, balloon, glider.*

Sub-topic ACFTB 3.2 — Wake turbulence categories

BASIC ACFTB 3.2.1	List the wake turbulence categories.	1	ICAO wake turbulence categories.

Sub-topic ACFTB 3.3 — ICAO approach categories

BASIC ACFTB 3.3.1	List the ICAO approach categories.	1	ICAO Doc 8168

Sub-topic ACFTB 3.4 — Environmental categories

BASIC ACFTB 3.4.1	List ICAO noise classification.	1	ICAO Annex 16

TOPIC ACFTB 4: AIRCRAFT DATA

Sub-topic ACFTB 4.1 — Recognition

BASIC ACFTB 4.1.1	Recognize the most commonly used aircraft.	1	

Sub-topic ACFTB 4.2 — Performance data

BASIC ACFTB 4.2.1	State the ICAO aircraft type designators and categories for the most commonly used aircraft.	1	Type designators, approach and wake turbulence categories.
BASIC ACFTB 4.2.2	State the standard average performance data of the most commonly used aircraft.	1	Rate of climb/descent, cruising speed, ceiling.

TOPIC ACFTB 5: AIRCRAFT ENGINES

Sub-topic ACFTB 5.1 — Piston engines

BASIC ACFTB 5.1.1	Explain the operating principles, advantages and disadvantages of the piston engine and propeller.	2	Piston engines, fixed pitch, variable pitch, number of blades.

Sub-topic ACFTB 5.2 — Jet engines

BASIC ACFTB 5.2.1	Explain the operating principles, advantages and disadvantages of the jet engine.	2	
BASIC ACFTB 5.2.2	List the different types of jet engines.	1	

Sub-topic ACFTB 5.3 — Turboprop engines

BASIC ACFTB 5.3.1	Explain the operating principles, advantages and disadvantages of the turboprop engine and propeller.	2	

Sub-topic ACFTB 5.4 — Aviation fuels

BASIC ACFTB 5.4.1	List the most common aviation fuels.	1	

TOPIC ACFTB 6: AIRCRAFT SYSTEMS AND INSTRUMENTS

Sub-topic ACFTB 6.1 — Flight instruments

BASIC ACFTB 6.1.1	Explain the basic operating principles and interpretation of the information displayed by flight instruments.	2	Altimeter, air speed indicator, vertical speed indicator, turn and bank indicator, artificial horizon, gyrosyn compass.
BASIC ACFTB 6.1.2	Explain the impact of errors and abnormal indications of flight instruments on aircraft operations.	2	*Content support: Pitot-static failures, unreliable gyro source.*

Sub-topic ACFTB 6.2 — Navigational instruments

BASIC ACFTB 6.2.1	Describe the basic on-board operating principles and interpretation of the information displayed by navigational instruments/systems.	2	*Content support: ADF, VOR (TACAN), DME, ILS, MLS, inertial reference system, satellite-based systems.*

Sub-topic ACFTB 6.3 — Engine instruments

BASIC ACFTB 6.3.1	List the vital engine monitoring parameters and their associated instruments.	1	*Content support: Oil pressure and temperature, engine temperature, RPM, fuel state and flow.*

Sub-topic ACFTB 6.4 — Aircraft systems

BASIC ACFTB 6.4.1	Explain the use of the most common aircraft systems.	2	SSR transponder, GPWS, EFIS, Flight director, autopilot, FMS, ice protection systems. *Content support: ADS capability, head up display, wind shear indicator, weather radar, hydraulic system, electrical system, environmental system.*
BASIC ACFTB 6.4.2	Explain the impact of degradation/failure of the most common aircraft systems on aircraft operations.	2	Engine failure *Content support: Hydraulic failure, electrical failure, environmental system failure, degradation of aircraft position source data*

TOPIC ACFTB 7: FACTORS AFFECTING AIRCRAFT PERFORMANCE

Sub-topic ACFTB 7.1 — Take-off factors

BASIC ACFTB 7.1.1	Explain the factors affecting aircraft during take-off.	2	Runway conditions, runway slope, wind, temperature, aerodrome elevation, aircraft mass.

Sub-topic ACFTB 7.2 — Climb factors

BASIC ACFTB 7.2.1	Explain the factors affecting aircraft during climb.	2	Speed, mass, wind, temperature, cabin pressurization, air density.

Sub-topic ACFTB 7.3 — Cruise factors

BASIC ACFTB 7.3.1	Explain the factors affecting aircraft during cruise.	2	Level, cruising speed, wind, mass, cabin pressurization.

Sub-topic ACFTB 7.4 — Descent and initial approach factors

BASIC ACFTB 7.4.1	Explain the factors affecting aircraft during descent.	2	Wind, speed, rate of descent, aircraft configuration, cabin pressurization.
BASIC ACFTB 7.4.2	Explain the factors affecting an aircraft in a holding pattern.	2	Speed, level, turbulence, icing.

Sub-topic ACFTB 7.5 — Final approach and landing factors

BASIC ACFTB 7.5.1	Explain the factors affecting aircraft during final approach and landing.	2	Aircraft configuration, mass, wind, wind shear, aerodrome elevation, runway conditions, runway slope.

Sub-topic ACFTB 7.6 — Economic factors

BASIC ACFTB 7.6.1	Explain the economic consequences of ATC changes on the flight profile of an aircraft.	2	Routing, flight level, speed, rates of climb or descent.

Sub-topic ACFTB 7.7 — Environmental factors

BASIC ACFTB 7.7.1	Explain performance restrictions due to environmental constraints.	2	*Content support: Continuous descent operation (CDO), fuel dumping, noise abatement procedures, minimum flight levels.*

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SUBJECT 7: HUMAN FACTORS

The subject objective is:

Learners shall characterize factors which affect personal and team performance.

TOPIC HUMB 1: INTRODUCTION TO HUMAN FACTORS

Sub-topic HUMB 1.1 — Learning techniques			
BASIC HUMB 1.1.1	Appreciate appropriate learning techniques.	3	How the influence of interactive techniques can lead to improved learning.
Sub-topic HUMB 1.2 — Relevance of Human Factors for ATC			
BASIC HUMB 1.2.1	Explain the relevance and importance of Human Factors.	2	Historical background, safety impact on ATM, licensing requirements, incidents.
Sub-topic HUMB 1.3 — Human Factors and ATC			
BASIC HUMB 1.3.1	Define Human Factors.	1	*Content support: ICAO Human Factors Training Manual.*
BASIC HUMB 1.3.2	Explain the relationship between Human Factors and the aviation environment.	2	*Content support: ICAO Human Factors Training Manual, visits to the simulator and operational room, SHELL model, PEAR model.*
BASIC HUMB 1.3.3	Explain the concept of systems.	2	People, procedures, equipment.
BASIC HUMB 1.3.4	Explain ATM in systems terms.	2	
BASIC HUMB 1.3.5	Explain the consequences of a systems failure in ATS.	2	
BASIC HUMB 1.3.6	Explain the need for matching human and equipment.	2	*Content support: ICAO Human Factors Training Manual.*
BASIC HUMB 1.3.7	Explain the information requirement of ATC.	2	Relevant, timely, accurate.
BASIC HUMB 1.3.8	Describe the role of the human in the evolution of ATC.	2	*Content support: History of ATC, airspace, communications, radar, advanced ATS systems, the future of ATC.*
BASIC HUMB 1.3.9	Explain the importance of situational awareness for decision making.	2	

TOPIC HUMB 2: HUMAN PERFORMANCE

Sub-topic HUMB 2.1 — Individual behaviour			
BASIC HUMB 2.1.1	Explain the differences and commonalities that exist between people.	2	*Content support: Attitudes, cultural, language.*
BASIC HUMB 2.1.2	Explain the dangers of boredom.	2	
BASIC HUMB 2.1.3	Explain the dangers of overconfidence and complacency.	2	
BASIC HUMB 2.1.4	Explain the dangers of fatigue.	2	Sleep disturbance, heavy workload.
Sub-topic HUMB 2.2 — Safety culture and professional conduct			
BASIC HUMB 2.2.1	Characterize the role of air traffic controller for positive safety culture.	2	
BASIC HUMB 2.2.2	Describe the need for professional standards in ATC.	2	*Content support: Adherence to rules and regulations etc.*
BASIC HUMB 2.2.3	Appreciate the needed basic professional attitudes appropriate to a high level of safety.	3	*Content support: Punctuality, rigour, adherence to rules, teamwork attitude.*
BASIC HUMB 2.2.4	Describe the impact of responsibility on controllers action(s).	2	Responsibility as a guidance for appropriate action.
BASIC HUMB 2.2.5	Recognize the different responsibilities of a controller.	1	Prospective and retrospective responsibility, guilt and obligation, types of responsibility (moral, welfare, legal, task, role responsibility etc.).
Sub-topic HUMB 2.3 — Health and well-being			
BASIC HUMB 2.3.1	Consider the effect of health on performance.	2	*Content support: Fitness, sleep, diet, drugs, alcohol.*
Sub-topic HUMB 2.4 — Teamwork			
BASIC HUMB 2.4.1	Describe the differences between social human relations and professional interactions.	2	
BASIC HUMB 2.4.2	Describe the different types and characters in a team.	2	*Content support: Leader, follower.*
BASIC HUMB 2.4.3	Appreciate the principles of teamwork.	3	*Content support: Team membership, group dynamics, advantages/disadvantages of teamwork, conflicts and their solutions.*

BASIC HUMB 2.4.4	Describe leader style and group interaction.	2	
Sub-topic HUMB 2.5 — Basic needs of people at work			
BASIC HUMB 2.5.1	List basic needs of people at work.	1	*Content support: Balance between: individual ability and workload, working time and rest periods. Adequate physical working conditions, positive working environment.*
BASIC HUMB 2.5.2	Characterize the factors of work satisfaction.	2	*Content support: Money, achievement, recognition, advancement, challenge.*
Sub-topic HUMB 2.6 — Stress			
BASIC HUMB 2.6.1	Define stress.	1	Stress definition.
BASIC HUMB 2.6.2	Describe stress symptoms and sources.	2	Behavioural changes, lifestyle changes, physical symptoms, crisis events, main causes of stress.
BASIC HUMB 2.6.3	Describe the stages of stress.	2	Stress performance curve.
BASIC HUMB 2.6.4	Appreciate techniques for stress management.	3	*Content support: Relaxation techniques, diet and lifestyle, exercise.*

TOPIC HUMB 3: HUMAN ERROR

Sub-topic HUMB 3.1 — Dangers of error			
BASIC HUMB 3.1.1	Recognize the dangers of error in ATC.	1	
Sub-topic HUMB 3.2 — Definition of human error			
BASIC HUMB 3.2.1	Define human error.	1	
BASIC HUMB 3.2.2	Describe the factors which contribute to cause error.	2	Fatigue, lack of skill, misunderstanding, multitasking, lack of information, distraction, lack of work satisfaction.
Sub-topic HUMB 3.3 — Classification of human error			
BASIC HUMB 3.3.1	State the types of errors.	1	*Content support: Slips, lapses, mistakes.*
BASIC HUMB 3.3.2	Define violations.	1	

BASIC HUMB 3.3.3	Differentiate between errors and violations of rules.	2	
BASIC HUMB 3.3.4	Describe the three levels of performance according to the Rasmussen model.	2	Skill based, knowledge based, rule based.

Sub-topic HUMB 3.4 — Risk analysis and risk management

BASIC HUMB 3.4.1	Describe risk analysis and risk management of human systems and error.	2	Active failures and latent conditions. *Content support: Reason model, HFACS (Human Factors Analysis & Classification System) model, Heinrich Theory.*
BASIC HUMB 3.4.2	Apply one risk analysis model on error during a case study.	3	

TOPIC HUMB 4: COMMUNICATION

Sub-topic HUMB 4.1 — Importance of good communications in ATC

BASIC HUMB 4.1.1	Appreciate the importance of good communications in ATC.	3	

Sub-topic HUMB 4.2 — Communication process

BASIC HUMB 4.2.1	Define communication.	1	
BASIC HUMB 4.2.2	Define the communication process.	1	*Content support: Sender, encoder, transmitter, signal, interference, reception, decoder, receiver, feedback.*

Sub-topic HUMB 4.3 — Communication modes

BASIC HUMB 4.3.1	Describe the factors which affect verbal communication.	2	*Content support: Word choice, intonation, speed, tone, distortion, load, expectation, noise, interruption, language knowledge (i.e. accent, dialect, vocabulary).*
BASIC HUMB 4.3.2	Describe the factors which affect non-verbal communication.	2	*Content support: Touch, choice, expectation, noise, interruption.*
BASIC HUMB 4.3.3	Apply good communication practices.	3	Speaking and listening.

TOPIC HUMB 5: THE WORK ENVIRONMENT

Sub-topic HUMB 5.1 — Ergonomics and the need for good design			
BASIC HUMB 5.1.1	Define ergonomics.	1	
BASIC HUMB 5.1.2	Recognize the need for good building design.	1	*Content support: Light, insulation, decor, space, facilities.*
BASIC HUMB 5.1.3	Explain the need for good work position design.	2	*Content support: Anthropometry (seating, work station design, input device, etc.).*
Sub-topic HUMB 5.2 — Equipment and tools			
BASIC HUMB 5.2.1	Characterize the equipment and tools that will be used in simulation in accordance with the SHELL model.	2	The physical environment, visual displays, suites, input devices, communications equipment, console profile and layout.
Sub-topic HUMB 5.3 — Automation			
BASIC HUMB 5.3.1	Explain the reasons for automation.	2	
BASIC HUMB 5.3.2	Describe the advantages and constraints of automation.	2	

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SUBJECT 8: EQUIPMENT AND SYSTEMS

The subject objective is:

Learners shall explain the basic working principles of equipment that is in general use in ATC and appreciate how this equipment aids the controller in providing safe and efficient ATS.

TOPIC EQPSB 1: ATC EQUIPMENT

Sub-topic EQPSB 1.1 — Main types of ATC equipment

BASIC EQPSB 1.1.1	Explain the relevance of ATC equipment.	2	CWP, Communication equipment, ATS surveillance systems.

TOPIC EQPSB 2: RADIO

Sub-topic EQPSB 2.1 — Radio theory

BASIC EQPSB 2.1.1	State the principles of radio waves.	1	
BASIC EQPSB 2.1.2	Describe the characteristics of radio waves.	2	Propagation, limitations.
BASIC EQPSB 2.1.3	State the use, characteristics and limitations of frequency bands.	1	Use in ATC, navigation and communications, use and application in the aeronautical mobile service, HF, VHF, UHF.
BASIC EQPSB 2.1.4	State the different uses of radio wave spectrum.	1	

Sub-topic EQPSB 2.2 — Direction finding

BASIC EQPSB 2.2.1	State the principles and use of VDF/UDF.	1	VDF/UDF, QDM, QDR, QTF.
BASIC EQPSB 2.2.2	State the precision of VDF/UDF used in the State system.	1	

TOPIC EQPSB 3: COMMUNICATION EQUIPMENT

Sub-topic EQPSB 3.1 — Radio communications

BASIC EQPSB 3.1.1	State the use of the radio in ATC.	1	
BASIC EQPSB 3.1.2	Describe the working principles of a transmitting and receiving system.	2	
BASIC EQPSB 3.1.3	Explain the effect of antenna shadowing on RTF communications.	2	

Sub-topic EQPSB 3.2 — Voice communication between ATS units/positions

BASIC EQPSB 3.2.1	Describe the use of other voice communications in ATC.	2	*Content support: Telephone, interphone, intercom.*

Sub-topic EQPSB 3.3 — Data link communications

BASIC EQPSB 3.3.1	Explain the use and benefits of controller pilot datalink communications (CPDLC).	2	

Sub-topic EQPSB 3.4 — Airline communications

BASIC EQPSB 3.4.1	State the use of SELCAL.	1	
BASIC EQPSB 3.4.2	Explain the use and benefits of Aircraft Communications Addressing and Reporting System (ACARS).	2	

TOPIC EQPSB 4: INTRODUCTION TO SURVEILLANCE

Sub-topic EQPSB 4.1 — Surveillance concept in ATS

BASIC EQPSB 4.1.1	Describe the concept of surveillance for the provision of ATS.	2	

TOPIC EQPSB 5: RADAR

Sub-topic EQPSB 5.1 — Principles of radar

BASIC EQPSB 5.1.1	State the principles of radar.	1	
BASIC EQPSB 5.1.2	Recognize the characteristics of radar wavelengths.	1	
BASIC EQPSB 5.1.3	Recognize the use, characteristics and limitations of different radar types.	1	*Content support: Frequency bands, long and short-range radar, weather radar, high-resolution radar.*

Sub-topic EQPSB 5.2 — Primary radar

BASIC EQPSB 5.2.1	Explain the working principles of PSR.	2	

Sub-topic EQPSB 5.3 — Secondary radar

BASIC EQPSB 5.3.1	Explain the working principles of SSR.	2	Mode A, Mode C
BASIC EQPSB 5.3.2	Explain SSR code management	2	Discrete, non-discrete codes, special codes.
BASIC EQPSB 5.3.3	Explain the effect of antenna shadowing on SSR operation.	2	

Sub-topic EQPSB 5.4 — Use of radars

BASIC EQPSB 5.4.1	Explain the use of PSR/SSR in ATC.	2	Area, approach, aerodrome, surface movement radar, DFTI.
BASIC EQPSB 5.4.2	Explain the advantages and disadvantages of PSR/SSR.	2	

Sub-topic EQPSB 5.5 — Mode S

BASIC EQPSB 5.5.1	Explain the principles of Mode S.	2	
BASIC EQPSB 5.5.2	Explain the use of Mode S in ATC systems.	2	

TOPIC EQPSB 6: AUTOMATIC DEPENDENT SURVEILLANCE

Sub-topic EQPSB 6.1 — Principles of automatic dependent surveillance

BASIC EQPSB 6.1.1	State the different applications of ADS.	1	ADS-B, ADS-C
BASIC EQPSB 6.1.2	Explain the working principles of ADS.	2	

Sub-topic EQPSB 6.2 — Use of automatic dependent surveillance

BASIC EQPSB 6.2.1	Describe the use of ADS in ATC.	2	Area, approach, aerodrome ICAO Doc 4444.
BASIC EQPSB 6.2.2	Explain the limitations of ADS.	2	Dependency on GNSS, dependency on airborne equipment.

TOPIC EQPSB 7: MULTILATERATION

Sub-topic EQPSB 7.1 — Principles of multilateration

BASIC EQPSB 7.1.1	State the different applications of MLAT.	1	*Content support: ATC, environmental management, aeroport operations, LAM, WAM.*
BASIC EQPSB 7.1.2	Explain the working principles of MLAT.	2	*Content support: Passive and active MLAT.*

Sub-topic EQPSB 7.2 — Use of multilateration

BASIC EQPSB 7.2.1	Describe the use of MLAT in ATC.	2	Area, approach, aerodrome.
BASIC EQPSB 7.2.2	Explain the limitations of MLAT.	2	Dependency on airborne equipment.

TOPIC EQPSB 8: SURVEILLANCE DATA PROCESSING

Sub-topic EQPSB 8.1 — Surveillance data networking

BASIC EQPSB 8.1.1	Explain the advantages and disadvantages of different surveillance technologies.	2	Data quality, coverage, refresh rate, reliability, redundancy, cost-effectiveness.
BASIC EQPSB 8.1.2	Describe the implementation of surveillance data networks.	2	*Content support: Different technologies/sensors, network.*

Sub-topic EQPSB 8.2 — Working principles of surveillance data networking			
BASIC EQPSB 8.2.1	Explain the working principles of surveillance data processing.	2	Track fusion process, Surveillance information presented on CWP.
BASIC EQPSB 8.2.2	State other use of processed surveillance data.	1	*Content support: Safety nets, airport operations, environmental management.*

TOPIC EQPSB 9: FUTURE EQUIPMENT

Sub-topic EQPSB 9.1 — New developments			
BASIC EQPSB 9.1.1	State the developments in the equipment field for introduction in the near future.	1	

TOPIC EQPSB 10: AUTOMATION IN ATS

Sub-topic EQPSB 10.1 — Principles of automation			
BASIC EQPSB 10.1.1	Describe the principles of automation in communication and datalinks in ATS.	2	
Sub-topic EQPSB 10.2 — Aeronautical fixed telecommunication network (AFTN)			
BASIC EQPSB 10.2.1	Describe the principles of AFTN.	2	
Sub-topic EQPSB 10.3 — On-line data interchange			
BASIC EQPSB 10.3.1	Describe the benefits of automatic exchange of ATS data in coordination and transfer processes.	2	Accuracy, speed and safety, non-verbal communications.
BASIC EQPSB 10.3.2	Describe the limitations of automatic exchange of ATS data in coordination.	2	Non-recognition of a systems failure.
Sub-topic EQPSB 10.4 — Systems used for the automatic dissemination of information			
BASIC EQPSB 10.4.1	State the working principles of broadcasting systems.	1	*Content support: ATIS, D-ATIS, VOLMET.*
BASIC EQPSB 10.4.2	Explain the use of ATIS and VOLMET in ATS.	2	

TOPIC EQPSB 11: WORKING POSITIONS

Sub-topic EQPSB 11.1 — Working position equipment			
BASIC EQPSB 11.1.1	Recognize equipment in a working position.	1	*Content support: FPB, radio, telephone and other communication equipment, relevant maps and charts, strip printer, teleprinter, clock, information monitors, situation displays.*
Sub-topic EQPSB 11.2 — Aerodrome control			
BASIC EQPSB 11.2.1	Recognize equipment to be found specifically in a TWR.	1	*Content support: Wind indicator, aerodrome traffic monitor, SMR, crash alarm, signalling lamp, lighting control panel, runway-in-use indicator, binoculars, signalling/flare gun, IRVR and altimeter setting indicators, local information systems.*
Sub-topic EQPSB 11.3 — Approach control			
BASIC EQPSB 11.3.1	Recognize equipment to be found specifically in an APP.	1	*Content support: Sequencing system, PAR, RVR indicators.*
Sub-topic EQPSB 11.4 — Area control			
BASIC EQPSB 11.4.1	Recognize equipment to be found specifically in an ACC.	1	

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SUBJECT 9: PROFESSIONAL ENVIRONMENT

The subject objective is:

Learners shall recognize the need for close cooperation with other parties concerning ATM operations and aspects of environmental protection.

TOPIC PENB 1: FAMILIARIZATION

Sub-topic PENB 1.1 — ATS and aerodrome facilities

BASIC PENB 1.1.1	Recognize civil and military ATS facilities.	1	*Content support: TWR, APP, ACC, AIS, RCC, air defence unit.*
BASIC PENB 1.1.2	Recognize airport facilities and local operators.	1	*Content support: Fire and emergency services, airline operations.*

TOPIC PENB 2: AIRSPACE USERS

Sub-topic PENB 2.1 — Civil aviation

BASIC PENB 2.1.1	Describe airspace usage by civil aircraft.	2	*Content support: Commercial flying, recreational flying, gliders, balloons, calibration flights, aerial photography, parachute dropping, UASs.*

Sub-topic PENB 2.2 — Military

BASIC PENB 2.2.1	Describe airspace usage by the military.	2	Airspace reservations, training, interception, in-flight refuelling, UASs. *Content support: Low-level flying, test flights, special military operations.*

Sub-topic PENB 2.3 — Expectations and requirements of pilots

BASIC PENB 2.3.1	Recognize the expectations and requirements of pilots.	1	
BASIC PENB 2.3.2	State the use of standard operating procedures (SOPs) by aircraft operators.	1	

TOPIC PENB 3: CUSTOMER RELATIONS

Sub-topic PENB 3.1 — Customer relations			
BASIC PENB 3.1.1	State the role of ATC as a service provider.	1	
BASIC PENB 3.1.2	Recognize the means by which ATC is funded.	1	

TOPIC PENB 4: ENVIRONMENTAL PROTECTION

Sub-topic PENB 4.1 — Environmental protection			
BASIC PENB 4.1.1	Describe the impact aviation has on the environment.	2	Noise, air quality, climate change, third-party risks.
BASIC PENB 4.1.2	Explain the role of ATC in the concept of sustainable development.	2	*Content support: ICAO Annex 16.*
BASIC PENB 4.1.3	State how to measure, monitor and mitigate the impact aviation has on the environment.	1	*Content support: Continuous descent operations (CDO), collaborative environmental management (CEM).*

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CHAPTER 4 - Appendix 1b – Example Aerodrome Control Rating Syllabus

SUBJECT 1: INTRODUCTION TO THE COURSE

The subject objective is:

Learners shall know and understand the training programme that they will follow and learn how to obtain the appropriate information.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC INTR 1: COURSE MANAGEMENT															
Sub-topic INTR 1.1 — Course introduction															
TWR INTR 1.1.1	Explain the aims and main objectives of the course.	2		ALL											
Sub-topic INTR 1.2 — Course administration															
TWR INTR 1.2.1	State course administration.	1		ALL											
Sub-topic INTR 1.3 — Study material and training documentation															
TWR INTR 1.3.1	Use appropriate documentation and their sources for course studies.	3	*Content support: Training documentation, library, CBT library, web, learning management server.*	ALL											
TWR INTR 1.3.2	Integrate appropriate information into course studies.	4	Training documentation. *Content support: Supplementary information, library.*	ALL											
TOPIC INTR 2: INTRODUCTION TO THE ATC TRAINING COURSE															
Sub-topic INTR 2.1 — Course content and organization															
TWR INTR 2.1.1	State the different training methods applied in the course.	1	Theoretical training, practical training, self-study, types of training events.	ALL											
TWR INTR 2.1.2	State the subjects of the course and their purpose.	1		ALL											

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					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR INTR 2.1.4	Describe the organization of practical training.	2	*Content support: PTP, simulation, briefing, debriefing, course programme.*	ALL											
Sub-topic INTR 2.2 — Training ethos															
TWR INTR 2.2.1	Recognize the feedback mechanisms available.	1	Training progress, assessment, briefing, debriefing, learner/instructor feedback, Instructor/instructor feedback.	ALL											
Sub-topic INTR 2.3 — Assessment process															
TWR INTR 2.3.1	Describe the assessment process.	2		ALL											

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SUBJECT 2: AVIATION LAW

The subject objective is:

Learners shall know, understand and apply the rules of the air and the regulations regarding reporting, airspace and appreciate the licensing and competence principles.

TOPIC LAW 1: ATCO LICENSING/CERTIFICATE OF COMPETENCE

Sub-topic LAW 1.1 — Privileges and conditions

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR LAW 1.1.1	Appreciate the conditions which shall be met to issue an aerodrome control rating.	3	ICAO Annex 1 *Content support: National documents.*	TWR											X
TWR LAW 1.1.2	Explain how to maintain and update professional knowledge and skills to retain competence in the operational environment.	2		ALL											X
TWR LAW 1.1.3	Explain the conditions for suspension/revocation of ATCO licence.	2		ALL											X

TOPIC LAW 2: RULES AND REGULATIONS

Sub-topic LAW 2.1 — Reports

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR LAW 2.1.1	List the standard forms for reports.	1	Air traffic incident report. *Content support: Routine air reports, breach of regulations, watch/log book, records.*	ALL											X
TWR LAW 2.1.2	Describe the functions of, and processes for, reporting.	2	Reporting culture, air traffic incident report. *Content support: Breach of regulations, watch/log book, records, voluntary reporting.*	ALL											X

Sub-topic LAW 2.2 — Airspace

TWR LAW 2.2.1	Appreciate classes and structure of airspace and their relevance to the aerodrome control rating.	3		TWR											X
TWR LAW 2.2.2	Provide planning, coordination and control actions appropriate to the airspace classification and structure.	4	*Content support: ICAO Annex 2, ICAO Annex 11, international requirements, civil requirements, military requirements, areas of responsibility, sectorization, national requirements.*	ALL	X	X	X		X		X				

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR LAW 2.2.3	Appreciate responsibility for terrain clearance.	3		ALL	X	X					X				

TOPIC LAW 3: ATC SAFETY MANAGEMENT

Sub-topic LAW 3.1 — Feedback process

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR LAW 3.1.1	State the importance of controller contribution to the feedback process.	1	*Content support: Voluntary reporting.*	ALL											X
TWR LAW 3.1.2	Describe how reported occurrences are analysed.	2	*Content support: Local procedures.*	ALL											X
TWR LAW 3.1.3	Name the means used to disseminate recommendations.	1	*Content support: Safety letters, safety boards web pages.*	ALL											X
TWR LAW 3.1.4	Appreciate the 'Just Culture' concept.	3	Benefits, prerequisites, constraints.	ALL											X

Sub-topic LAW 3.2 — Safety Investigation

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR LAW 3.2.1	Describe role and mission of safety investigation in the improvement of safety.	2		ALL											X
TWR LAW 3.2.2	Define working methods of safety investigation.	1		ALL											X

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SUBJECT 3: AIR TRAFFIC MANAGEMENT

The subject objective is:

Learners shall manage air traffic to ensure safe, orderly and expeditious services.

TOPIC ATM 1: PROVISION OF SERVICES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 1.1 — Aerodrome control service															
TWR ATM 1.1.1	Appreciate areas of responsibility.	3	Control zone, traffic circuit, manoeuvring area, movement area, vicinity. *Content support: ATZ.*	TWR	X	X									X
TWR ATM 1.1.2	Provide aerodrome control service.	4	ICAO Annex 11, ICAO Doc 7030, ICAO Doc 4444, Operation manuals.	TWR	X	X	X	X	X		X	X	X	X	
Sub-topic ATM 1.2 — Flight information service (FIS)															
TWR ATM 1.2.1	Describe the information that shall be passed to aircraft by an aerodrome controller.	2	ICAO Annex 11	TWR											
TWR ATM 1.2.2	Provide FIS.	4	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X		X	X	X	X	X	X	X	
TWR ATM 1.2.3	Issue appropriate information.	3	ICAO Doc 4444, essential local traffic, traffic information.	TWR		X									
TWR ATM 1.2.4	Appreciate the use of ATIS for the provision of flight information service by aerodrome controller.	3		TWR		X									

Sub-topic ATM 1.3 — Alerting service (ALRS)

TWR ATM 1.3.1	Provide ALRS.	4	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X		X	X	X				X	
TWR ATM 1.3.2	Respond to distress and urgency messages and signals.	3	ICAO Annex 10, ICAO Doc 4444 *Content support: Guidelines for controller training in the handling of unusual/emergency situations.*	ALL						X					

Sub-topic ATM 1.4 — ATS system capacity and air traffic flow management

TWR ATM 1.4.1	Appreciate principles of ATS system capacity and air traffic flow management.	3	*Content support: Slot management, slot allocation procedures*	TWR		X							X		X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 1.4.2	Organize traffic to take account of flow management.	4	*Content support: Departure sequence.*	TWR	X	X					X				
TWR ATM 1.4.3	Inform appropriate authority.	3	*Content support: Abnormal situations, decrease in sector capacity, limitations on systems and equipment, changes in workload/-capacity, unusual meteorological conditions, relevant information: reported ground-based incidents, forest fire.*	TWR					X						

TOPIC ATM 2: COMMUNICATION

Sub-topic ATM 2.1 — Effective communication

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 2.1.1	Use approved phraseology.	3	ICAO Doc 4444 *Content support: ICAO Doc 9432 RTF manual, Standard words and phrases as contained in ICAO Annex 10, Volume II.*	ALL				X							
TWR ATM 2.1.2	Ensure effective communication.	4	Communication techniques, readback/verification of readback.	ALL				X							

TOPIC ATM 3: ATC CLEARANCES AND ATC INSTRUCTIONS

Sub-topic ATM 3.1 — ATC clearances

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 3.1.1	Issue appropriate ATC clearances.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X	X								
TWR ATM 3.1.2	Integrate appropriate ATC clearances in control service.	4		ALL		X	X								
TWR ATM 3.1.3	Ensure the agreed course of action is carried out.	4		ALL		X									

Sub-topic ATM 3.2 — ATC instructions

TWR ATM 3.2.1	Issue appropriate ATC instructions.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X									
TWR ATM 3.2.2	Integrate appropriate ATC instructions in control service.	4		ALL		X									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 3.2.3	Ensure the agreed course of action is carried out.	4		ALL		X									
TOPIC ATM 4: COORDINATION															
Sub-topic ATM 4.1 — Necessity for coordination															
TWR ATM 4.1.1	Identify the need for coordination.	3		ALL	X	X			X						
Sub-topic ATM 4.2 — Tools and methods for coordination															
TWR ATM 4.2.1	Use the available tools for coordination.	3	*Content support: Electronic transfer of flight data, telephone, interphone, intercom, direct speech, radiotelephone (RTF), local agreements, automated system coordination.*	ALL					X						
Sub-topic ATM 4.3 — Coordination procedures															
TWR ATM 4.3.1	Initiate appropriate coordination.	3	Delegation/transfer of responsibility for air-ground communications and separation, transfer of control ICAO Doc 4444. *Content support: Release point.*	ALL					X						
TWR ATM 4.3.2	Analyse effect of coordination requested by an adjacent position/unit.	4	*Content support: Delegation/transfer of responsibility for air-ground communications and separation, release point, transfer of control.*	ALL	X				X						
TWR ATM 4.3.3	Select, after negotiation, an appropriate course of action.	5		ALL	X	X			X						

Sub-topic ATM 4.3 — Coordination procedures

TWR ATM 4.3.4	Ensure the agreed course of action is carried out.	4		ALL		X									
TWR ATM 4.3.5	Coordinate in the provision of FIS.	4	ICAO Doc 4444	ALL					X						
TWR ATM 4.3.6	Coordinate in the provision of ALRS.	4	ICAO Doc 4444	ALL					X	X					

TOPIC ATM 5: ALTIMETRY AND LEVEL ALLOCATION

Sub-topic ATM 5.1 — Altimetry

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 5.1.1	Allocate levels according to altimetry data.	4	ICAO Doc 8168, ICAO Doc 4444	ALL		X									
TWR ATM 5.1.2	Ensure separation according to altimetry data.	4	*Content support: Transition level, transition altitude, transition layer, height, flight level, altitude, vertical distance to airspace boundaries.*	ALL			X								

Sub-topic ATM 5.2 — Terrain clearance

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 5.2.1	Provide planning, coordination and control actions appropriate to the rules for minimum safe height and terrain clearance.	4	*Content support: Terrain clearance dimensions, minimum safe altitudes, transition level, minimum flight level, minimum sector altitude.*	TWR	X	X	X		X						

TOPIC ATM 6: SEPARATIONS

Sub-topic ATM 6.1 — Separation between departing aircraft

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 6.1.1	Provide separation between departing aircraft.	4	ICAO Doc 4444	TWR	X	X	X				X				

Sub-topic ATM 6.2 — Separation of departing aircraft from arriving aircraft

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 6.2.1	Provide separation of departing aircraft from arriving aircraft.	4	ICAO Doc 4444	TWR	X	X	X				X				

Sub-topic ATM 6.3 — Separation of landing aircraft and preceding landing or departing aircraft

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 6.3.1	Provide separation of landing aircraft and preceding landing or departing aircraft.	4	ICAO Doc 4444	TWR	X	X	X				X				

Sub-topic ATM 6.4 — Time-based wake turbulence longitudinal separation															
TWR ATM 6.4.1	Provide time-based wake turbulence longitudinal separation.	4	ICAO Doc 4444	TWR	X	X	X				X				
Sub-topic ATM 6.5 — Reduced separation minima															
TWR ATM 6.5.1	Provide reduced separation minima.	4	ICAO Doc 4444	TWR	X	X	X				X				

TOPIC ATM 7: AIRBORNE COLLISION AVOIDANCE SYSTEMS AND GROUND-BASED SAFETY NETS

Sub-topic ATM 7.1 — Airborne collision avoidance systems

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 7.1.1	Differentiate between ACAS advisory thresholds and aerodrome separation standards.	2	ICAO Doc 9863	TWR											X
TWR ATM 7.1.2	Describe the controller responsibility during and following an ACAS RA reported by pilot.	2	ICAO Doc 4444	ALL											X

Sub-topic ATM 7.1 — Airborne collision avoidance systems

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 7.1.3	Respond to pilot notification of actions based on airborne systems warnings.	3	ACAS, TAWS	ALL	X	X				X					

Sub-topic ATM 7.2 — Ground-based safety nets

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 7.2.1	Respond to available ground-based safety nets warnings.	3	*Content support: Anti-incursion.*	TWR	X	X				X					

TOPIC ATM 8: DATA DISPLAY

Sub-topic ATM 8.1 — Data management

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 8.1.1	Update the data display to accurately reflect the traffic situation.	3	*Content support: Information displayed, strip marking procedures, electronic information data displays, actions based on traffic display information, calculation of EETs.*	ALL	X	X									
TWR ATM 8.1.2	Analyse pertinent data on data displays.	4		ALL	X										
TWR ATM 8.1.3	Organize pertinent data on data displays.	4		ALL	X	X									

TWR ATM 8.1.4	Obtain flight plan information.	3	CPL, FPL, supplementary information. *Content support: RPL, AFIL.*	ALL		X									
TWR ATM 8.1.5	Use flight plan information.	3		ALL		X									

TOPIC ATM 9: OPERATIONAL ENVIRONMENT (SIMULATED)

Sub-topic ATM 9.1 — Integrity of the operational environment

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 9.1.1	Obtain information concerning the operational environment.	3	*Content support: Briefing, notices, local orders, verification of information.*	ALL	X										
TWR ATM 9.1.2	Ensure the integrity of the operational environment.	4	*Content support: Frequency, VOLMET, ATIS, SIGMET, systems set-up, integrity of displays.*	TWR	X	X									

Sub-topic ATM 9.2 — Verification of the currency of operational procedures

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 9.2.1	Check all relevant documentation before managing traffic.	3	*Content support: Briefing, LOAs, NOTAM, AICs*	ALL											

Sub-topic ATM 9.3 — Handover-takeover

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 9.3.1	Transfer information to the relieving controller.	3		ALL	X			X	X						
TWR ATM 9.3.2	Obtain information from the controller handing over.	3		ALL	X			X	X						

TOPIC ATM 10: PROVISION OF AN AERODROME CONTROL SERVICE

Sub-topic ATM 10.1 — Responsibility for the provision

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 10.1.1	Explain the responsibility for the provision of an aerodrome control service.	2	ICAO Doc 4444, ICAO Annex 11	TWR											X
TWR ATM 10.1.2	Describe the division of responsibility between air traffic control units.	2	ICAO Doc 4444	ALL											X
TWR ATM 10.1.3	Describe the responsibility in regard to military traffic.	2	ICAO Doc 4444 *Content support: ICAO Doc 9554.*	ALL											X

TWR ATM 10.1.4	Describe the responsibility in regard to unmanned free balloons.	2	ICAO Doc 4444	TWR											X
TWR ATM 10.1.5	Appreciate the influence of operational requirements.	3	*Content support: Military flying, calibration flights, aerial photography.*	ALL	X										

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 10.2 — Functions of aerodrome control tower															
TWR ATM 10.2.1	Manage the general functions of aerodrome control.	4	ICAO Doc 4444	TWR	X										
TWR ATM 10.2.2	Manage the suspension of VFR operations.	4	ICAO Doc 4444	TWR	X					X					
Sub-topic ATM 10.3 — Traffic management process															
TWR ATM 10.3.1	Ensure that situational awareness is maintained.	4	Information gathering, observation, traffic projection.	TWR	X										
TWR ATM 10.3.2	Detect conflicts in time for appropriate resolution.	4		ALL	X	X	X				X				
TWR ATM 10.3.3	Identify potential solutions to achieve a safe and effective flow of aerodrome traffic.	3		TWR							X				
TWR ATM 10.3.4	Evaluate possible outcomes of different control actions.	5		TWR							X				
TWR ATM 10.3.5	Select an appropriate plan in time to achieve safe and effective flow of aerodrome traffic.	5		TWR		X	X				X				
TWR ATM 10.3.6	Ensure an adequate priority of actions.	4		ALL		X	X				X				
TWR ATM 10.3.7	Execute plan in a timely manner.	3		TWR		X	X				X				
TWR ATM 10.3.8	Ensure a safe and efficient outcome is achieved.	4	Traffic monitoring, adaptability and follow up.	ALL		X	X				X				
Sub-topic ATM 10.4 — Aeronautical ground lights															
TWR ATM	Select appropriate aeronautical ground lights.	5	ICAO Doc 4444	TWR	X										

10.4.1																	
Sub-topic ATM 10.5 — Information to aircraft by aerodrome control tower																	
TWR ATM 10.5.1	Provide information related to the operation of aircraft.	4	ICAO Doc 4444	TWR	X												

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 10.5.2	Provide information on aerodrome conditions.	4	ICAO Doc 4444	TWR	X										
Sub-topic ATM 10.6 — Control of aerodrome traffic															
TWR ATM 10.6.1	Predict positions of aircraft in the aerodrome traffic and taxi circuits.	4	ICAO Doc 4444	TWR	X	X	X								
TWR ATM 10.6.2	Manage traffic on the manoeuvring area.	4	ICAO Doc 4444, Aircraft, vehicles. *Content support: Runway inspection.*	TWR	X	X									
TWR ATM 10.6.3	Manage traffic in accordance with procedural changes.	4	*Content support: Taxiway closure.*	TWR	X	X									
TWR ATM 10.6.4	Balance the workload against personal capacity.	5	*Content support: Re-planning, prioritizing solutions, denying requests, delaying traffic.*	TWR								X	X		
Sub-topic ATM 10.7 — Control of traffic in the traffic circuit															
TWR ATM 10.7.1	Manage traffic in the traffic circuit.	4	ICAO Doc 4444, Meteorological phenomena, geographical knowledge, environmental factors.	TWR	X	X	X								
Sub-topic ATM 10.7 — Control of traffic in the traffic circuit															
TWR ATM 10.7.2	Manage arriving and departing traffic.	4	ICAO Doc 4444, Allocation of the order of priority, meteorological phenomena, wake turbulence, environmental factors.	TWR	X	X	X								
TWR ATM 10.7.3	Integrate the serviceability of radio aids in the management of aerodrome traffic.	4	*Content support: UDF, VDF, MLS, ILS, NDB, VOR, DME.*	TWR	X										
TWR ATM 10.7.4	Integrate surface conditions into the control of aerodrome traffic.	4	*Content support: Damp, wet, water patches, flooding, snow, slush, ice, braking action.*	TWR	X										

TWR ATM 10.7.5	Integrate information about meteorological phenomena into the control of aerodrome traffic.	4	*Content support: Clouds, precipitation, visibility, wind, meteorological hazards.*	TWR	X										

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 10.7.6	Integrate the information provided by situation displays.	4	Use, advantages, disadvantages.	TWR	X										
TWR ATM 10.7.7	Initiate missed approach.	3	*Content support: Obstructed runway.*	TWR	X	X	X								
TWR ATM 10.7.8	Select the runway in use.	5	ICAO Doc 4444	TWR	X										
Sub-topic ATM 10.7 — Control of traffic in the traffic circuit															
TWR ATM 10.7.9	Coordinate runway in use.	4	*Content support: Approach control, area control, runway selection, change of runway*	TWR					X						
TWR ATM 10.7.10	Manage traffic in the event of runway-in-use change.	4		TWR	X	X									

TOPIC ATM 11: PROVISION OF AERODROME CONTROL - INSTRUMENT

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 11.1 — Low visibility operations and special VFR															
TWR ATM 11.1.1	Manage SVFR traffic.	4	ICAO Doc 4444	TWR	X	X									
TWR ATM 11.1.2	Describe the Procedures for Low Visibility Operations.	2	ICAO Doc 4444	TWR											X
Sub-topic ATM 11.2 — Departing traffic															
TWR ATM 11.2.1	Manage control of departing aircraft.	4	ICAO Doc 4444, Use of situation displays, Wake turbulence, Appropriate departure clearances, SIDs.	TWR	X	X									
TWR ATM 11.2.2	Integrate departure sequence into the control of aerodrome traffic.	4	ICAO Doc 4444	TWR	X	X									

Sub-topic ATM 11.2 — Departing traffic															
TWR ATM 11.2.3	Provide appropriate information to departing traffic.	4	ICAO Doc 4444, Use of situation displays, Wake turbulence.	TWR	X										
Sub-topic ATM 11.3 — Arriving traffic															
TWR ATM 11.3.1	Manage control of arriving aircraft.	4	ICAO Doc 4444, Wake turbulence.	TWR	X	X									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ATM 11.3.2	Integrate the approach sequence into the control of aerodrome traffic.	4	ICAO Doc 4444	TWR	X	X									
TWR ATM 11.3.3	Integrate aircraft on visual approach into the aerodrome traffic.	4	ICAO Doc 4444	TWR	X	X									
TWR ATM 11.3.4	Integrate aircraft on missed approach into the aerodrome traffic.	4	ICAO Doc 4444, Use of air traffic monitors.	TWR	X	X	X								
TWR ATM 11.3.5	Integrate aircraft performing circling approach into the aerodrome traffic.	4	ICAO Doc 8168	TWR	X	X	X								
TWR ATM 11.3.6	Provide appropriate information to arriving aircraft.	4	ICAO Doc 4444	TWR	X	X									
Sub-topic ATM 11.4 — Aerodrome control service with advanced system support															
TWR ATM 11.4.1	Appreciate the impact of advanced systems on the provision of aerodrome control service.	3	*Content support: Surface manager (SMAN), departure manager (DMAN), automated conflicts/incursions tools, alarms and resolution advisory tools, automated assistance for surface movement planning and routing, enhanced vision technology.*	TWR											X

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SUBJECT 4: METEOROLOGY

The subject objective is:

Learners shall acquire, decode and make proper use of meteorological information relevant to the provision of ATS.

TOPIC MET 1: METEOROLOGICAL PHENOMENA

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic MET 1.1 — Meteorological phenomena															
TWR MET 1.1.1	Appreciate the impact of different cloud types.	3	Cumulus, cumulonimbus. *Content support: Stratus, nimbostratus, etc.*	TWR	X										
TWR MET 1.1.2	Appreciate the impact of precipitation.	3	Precipitation and microphysics. *Content support: Rain, snow, sleet, hail.*	TWR	X										
TWR MET 1.1.3	Appreciate the impact of atmospheric obscurity.	3	*Content support: Advection fog, radiation fog, mixing, evaporation, mist, drizzle.*	TWR	X										
TWR MET 1.1.4	Appreciate the effect and impact of wind.	3	Gusting, Veering, backing. *Content support: Land breezes, sea breezes.*	TWR	X										
TWR MET 1.1.5	Appreciate the effect and danger of hazardous meteorological phenomena.	3	Wind shear, Turbulence, thunderstorms, i Icing, microbursts	TWR	X					X					
TWR MET 1.1.6	Appreciate the effect of a frontal system on aerodrome operations.	3		TWR						X					
Sub-topic MET 1.1 — Meteorological phenomena															
TWR MET 1.1.7	Integrate data about meteorological phenomena into provision of ATS.	4	Clearances, instructions and transmitted information. *Content support: Relevant meteorological phenomena.*	ALL	X	X									

TOPIC MET 2: SOURCES OF METEOROLOGICAL DATA

Sub-topic MET 2.1 — Meteorological instruments																
TWR MET 2.1.1	Extract information from meteorological instruments.	3	*Content support: Anemometer, RVR indicator, cloud base indicator, ceilometer, barometer.*	TWR	X											
Sub-topic MET 2.2 — Other sources of meteorological data																
TWR MET 2.2.1	Decode information from meteorological data displays.	3		TWR	X											

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR MET 2.2.2	Use appropriate communication tools and networks to obtain meteorological data.	3		TWR					X						
TWR MET 2.2.3	Relay meteorological information.	3	ICAO Doc 4444 *Content support: Flight information centre, adjacent ATS unit.*	TWR					X						

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SUBJECT 5: NAVIGATION

The subject objective is:

Learners shall analyse all navigational aspects in order to organize the traffic.

TOPIC NAV 1: MAPS AND AERONAUTICAL CHARTS

Sub-topic NAV 1.1 — Maps and charts

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR NAV 1.1.1	Decode symbols and information displayed on aeronautical maps and charts.	3	Instrument approach charts (STARs), SID charts, aerodrome charts, visual approach charts. *Content support: Military maps and charts.*	TWR APP APS	X										
TWR NAV 1.1.2	Use relevant maps and charts.	3	Instrument approach charts, SID charts, aerodrome charts, visual approach charts. *Content support: Military maps and charts.*	TWR	X										

TOPIC NAV 2: INSTRUMENT NAVIGATION

Sub-topic NAV 2.1 — Navigational systems

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR NAV 2.1.1	Describe the possible operational status of navigational systems.	2	*Content support: NDB, VOR, DME, ILS, MLS, ABAS, SBAS, GBAS, RNP.*	TWR											X
TWR NAV 2.1.2	Decode operational status displays of navigational systems.	3	*Content support: NDB, VOR, DME, ILS, MLS, D-GPS, RNAV, P-RNAV.*	TWR	X										
TWR NAV 2.1.3	Appreciate the effect of precision, limitations and change of the operational status of navigational systems.	3	*Content support: Limitations, status, degraded procedures.*	ALL	X										

Sub-topic NAV 2.1 — Navigational systems

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR NAV	Manage traffic in case of change in the operational	4	*Content support: Limitations, status of*	TWR						X					

2.1.4	status of navigational systems.		*ground-based systems.*												
Sub-topic NAV 2.2 — Stabilized approach															
TWR NAV 2.2.1	Describe the concept of stabilized approach.	2	ICAO Doc 8168 *Content support*:	TWR APP APS											X
TWR NAV 2.2.2	Appreciate the effect of late change of runway-in-use for landing aircraft.	3		TWR	X										X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic NAV 2.3 — Instrument departures and arrivals															
TWR NAV 2.3.1	Characterize SIDs.	2		TWR APP APS											X
TWR NAV 2.3.2	Describe the phases of an instrument approach procedure.	2		TWR											X
TWR NAV 2.3.3	Describe the relevant minima applicable for a precision/ non-precision and visual approach.	2		TWR APP APS											X
Sub-topic NAV 2.4 — Satellite-based systems															
TWR NAV 2.4.1	State the different applications of satellite-based systems relevant for aerodrome operations.	1	*Content support: NPA, APV-baro VNAV, APV, LPV, Precision approach, ICAO Doc 8168, Volume II.*	TWR											X
Sub-topic NAV 2.5 — PBN applications															
TWR NAV 2.5.1	State future PBN developments.	1	A-RNP, APV. *Content support: RNP 3D, RNP 4D.*	TWR APP ACP APS ACS											X

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SUBJECT 6: AIRCRAFT

The subject objective is:

Learners shall assess and integrate aircraft performance in the provision of ATS.

TOPIC ACFT 1: AIRCRAFT INSTRUMENTS

Sub-topic ACFT 1.1 — Aircraft instruments

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ACFT 1.1.1	Integrate information from aircraft instruments provided by the pilot in the provision of ATS.	4		ALL	X										
TWR ACFT 1.1.2	Explain the operation of aircraft radio equipment.	2	*Content support: Radios (number of), emergency radios.*	ALL											X
TWR ACFT 1.1.3	Explain the operation of on-board surveillance equipment.	2	Transponders: equipment Mode A, Mode C, Mode S, ADS capability.	TWR APS ACS											X

TOPIC ACFT 2: AIRCRAFT CATEGORIES

Sub-topic ACFT 2.1 — Wake turbulence

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ACFT 2.1.1	Explain the wake turbulence effect and associated hazards to the succeeding aircraft.	2		ALL											X
TWR ACFT 2.1.2	Appreciate the techniques used to prevent hazards associated with wake turbulence on succeeding aircraft.	3		ALL	X	X									

Sub-topic ACFT 2.2 — Application of ICAO approach categories

TWR ACFT 2.2.1	Describe the use of ICAO approach categories.	2	ICAO Doc 8168	TWR APP APS											X
TWR ACFT 2.2.2	Appreciate the effect of ICAO approach categories on the traffic organization.	3		TWR APP APS	X	X									

TOPIC ACFT 3: FACTORS AFFECTING AIRCRAFT PERFORMANCE

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ACFT 3.1 — Take-off factors															
TWR ACFT 3.1.1	Integrate the influence of factors affecting aircraft on take-off.	4	*Content support: Runway conditions, runway slope, aerodrome elevation, wind, temperature, aircraft configuration, airframe contamination and aircraft mass.*	TWR	X	X									
Sub-topic ACFT 3.2 — Climb factors															
TWR ACFT 3.2.1	Appreciate the influence of factors affecting aircraft during climb.	3	*Content support: Speed, mass, air density, wind and temperature.*	TWR	X	X									
Sub-topic ACFT 3.3 — Final approach and landing factors															
TWR ACFT 3.3.1	Integrate the influence of factors affecting aircraft during final approach and landing.	4	*Content support: Wind, aircraft configuration, mass, runway conditions, runway slope, aerodrome elevation.*	TWR	X	X									
Sub-topic ACFT 3.4 — Economic factors															
TWR ACFT 3.4.1	Integrate consideration of economic factors affecting aircraft.	4	*Content support: Starting up, taxiing, routing, departure sequence.*	TWR	X	X									
Sub-topic ACFT 3.5 — Environmental factors															
TWR ACFT 3.5.1	Appreciate the performance restrictions due to environmental constraints.	3	*Content support: Noise abatement procedures, minimum flight altitudes, bird hazard.*	TWR	X	X									

TOPIC ACFT 4: AIRCRAFT DATA

Sub-topic ACFT 4.1 — Recognition of aircraft types

TWR ACFT 4.1.1	Characterize a representative sample of aircraft which will be encountered in the operational/working environment.	2	Recognition, ICAO type designators, wake turbulence categories. *Content support: ICAO approach categories.*	TWR											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ACFT 4.1.2	Integrate the average performance data of a representative sample of aircraft which will be encountered in the operational/working environment into the provision of a control service.	4	Performance data under a representative variety of circumstances.	TWR	X	X									

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SUBJECT 7: HUMAN FACTORS

The subject objective is:

Learners shall recognize the necessity to constantly extend their knowledge and analyse factors which affect personal and team performance.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC HUM 1: PSYCHOLOGICAL FACTORS															
Sub-topic HUM 1.1 — Cognitive															
TWR HUM 1.1.1	Describe the human information processing model.	2	Attention, perception, memory, situational awareness, decision making, response.	ALL											X
TWR HUM 1.1.2	Describe the factors which influence human information processing.	2	Confidence, stress, learning, knowledge, experience, fatigue, alcohol/drugs, distraction, interpersonal relations.	ALL											X
TWR HUM 1.1.3	Monitor the effect of human information processing factors on decision making.	3	*Content support: Workload, stress, interpersonal relations, distraction, confidence.*	ALL							X				
TOPIC HUM 2: MEDICAL AND PHYSIOLOGICAL FACTORS															
Sub-topic HUM 2.1 — Fatigue															
TWR HUM 2.1.1	State factors that cause fatigue.	1	Shift work. *Content support: Night shifts and rosters.*	ALL											X
Sub-topic HUM 2.1 — Fatigue															
TWR HUM 2.1.2	Describe the onset of fatigue.	2	*Content support: Lack of concentration, listlessness, irritability, frustration, ICAO Circular 241 – AN/145* Human Factors in ATC.	ALL											X

TWR HUM 2.1.3	Recognize the onset of fatigue in self.	1	*Content support: ICAO Circular 241 – AN/145* Human Factors in ATC*.*	ALL								X	X		
TWR HUM 2.1.4	Recognize the onset of fatigue in others.	1		ALL										X	
TWR HUM 2.1.5	Describe appropriate action when recognizing fatigue.	2		ALL											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 2.2 — Fitness															
TWR HUM 2.2.1	Recognize signs of lack of personal fitness.	1		ALL								X		X	
TWR HUM 2.2.2	Describe actions when aware of a lack of personal fitness.	2		ALL											X

TOPIC HUM 3: SOCIAL AND ORGANIZATIONAL FACTORS

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 3.1 — Team resource management (TRM)															
TWR HUM 3.1.1	State the relevance of TRM.	1		ALL											X
TWR HUM 3.1.2	State the content of the TRM concept.	1	*Content support: Team work, human error, team roles, stress, decision making, communication, situational awareness.*	ALL											X
Sub-topic HUM 3.2 — Teamwork and team roles															
TWR HUM 3.2.1	Identify reasons for conflict.	3		ALL											X
TWR HUM 3.2.2	Describe actions to prevent human conflicts.	2	*Content support: TRM team roles.*	ALL											X
TWR HUM 3.2.3	Describe strategies to cope with human conflicts.	2	*Content support: In your team, in the simulator.*	ALL											X
Sub-topic HUM 3.3 — Responsible behaviour															
TWR HUM 3.3.1	Consider the factors which influence responsible behaviour.	2	*Content support: Situation, team, personal situation and judgement, instance of justification, moral motivation, personality.*	ALL								X			
TWR HUM 3.3.2	Apply responsible judgement.	3	Case study and discussion about a dilemma situation.	ALL								X			

TOPIC HUM 4: STRESS

Sub-topic HUM 4.1 — Stress

TWR HUM 4.1.1	Recognize the effects of stress on performance.	1	Stress and its symptoms in self and in others.	ALL								X	X	X	

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 4.2 — Stress management															
TWR HUM 4.2.1	Act to reduce stress.	3	The effect of personality in coping with stress, The benefits of active stress management.	ALL								X		X	
TWR HUM 4.2.2	Respond to stressful situation by offering, asking or accepting assistance.	3	*Content support: The benefits of offering, accepting and asking for help in stressful situations.*	ALL								X		X	
TWR HUM 4.2.3	Recognize the effect of shocking and stressful events.	1	Self and others, abnormal situations, CISM.	ALL								X		X	
TWR HUM 4.2.4	Consider the benefits of Critical Incident Stress Management (CISM).	2		ALL											X
TWR HUM 4.2.5	Explain procedures used following an incident/accident.	2	*Content support: CISM, counselling, human element.*	ALL											X

TOPIC HUM 5: HUMAN ERROR

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 5.1 — Human error															
TWR HUM 5.1.1	Explain the relationship between error and safety.	2	Number and combination of errors, proactive versus reactive approach to discovery of error. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X
TWR HUM 5.1.2	Differentiate between the types of error.	2	Slips, lapses, mistakes *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X
TWR HUM 5.1.3	Describe error-prone conditions.	2	*Content support: Increase in traffic, changes in procedures, complexities of systems or traffic, weather, unusual occurrences.*	ALL											X

TWR HUM 5.1.4	Collect examples of different error types, their causes and consequences in ATC.	3	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR HUM 5.1.5	Explain how to detect errors to compensate for them.	2	STCA, MSAW, individual and collective strategy *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X
TWR HUM 5.1.6	Execute corrective actions.	3	Error compensation *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL	X	X	X						X		
Sub-topic HUM 5.1 — Human error															
TWR HUM 5.1.7	Explain the importance of error management.	2	*Content support: Prevention of incidents, safety improvement, revision of procedures and/or working practises.*	ALL											X
TWR HUM 5.1.8	Describe the impact on an ATCO following an occurrence/incident.	2	*Content support: Reporting, SMS, investigation, CISM.*	ALL											X
Sub-topic HUM 5.2 — Violation of rules															
TWR HUM 5.2.1	Explain the causes and dangers of violation of rules becoming accepted as a practice.	2	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X

TOPIC HUM 6: COLLABORATIVE WORK

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 6.1 — Communication															
TWR HUM 6.1.1	Use communication effectively in ATC.	3		ALL				X							
TWR HUM 6.1.2	Analyse examples of pilot and controller communication for effectiveness.	4		ALL											X

Sub-topic HUM 6.2 — Collaborative work within the same area of responsibility

TWR HUM 6.2.1	List communication means between controllers in charge of the same area of responsibility (sector or tower).	1	*Content support: Electronic, written, verbal and non-verbal communication*	ALL											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR HUM 6.2.2	Explain consequences of the use of communication means on effectiveness.	2	*Content support: Strips legibility and encoding, labels designation, feedback.*	ALL											X
TWR HUM 6.2.3	List possible actions to provide a safe position handover.	1	*Content support: Rigour, preparation, overlap time.*	ALL											X
TWR HUM 6.2.4	Explain consequences of a missed position handover process.	2		ALL											X
Sub-topic HUM 6.3 — Collaborative work between different areas of responsibility															
TWR HUM 6.3.1	List factors and means for an effective coordination between sectors and/or tower positions.	1	*Content support: Other sectors constraints, electronic coordination tools.*	ALL											X
Sub-topic HUM 6.4 — Controller/pilot cooperation															
TWR HUM 6.4.1	Describe parameters affecting controller/pilot cooperation.	2	*Content support: Workload, mutual knowledge, controller vs pilot mental picture.*	ALL											X

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SUBJECT 8: EQUIPMENT AND SYSTEMS

The subject objective is:

Learners shall integrate knowledge and understanding of the basic working principles of equipment and systems and comply with the equipment and system degradation procedures in the provision of ATS.

TOPIC EQPS 1: VOICE COMMUNICATIONS

Sub-topic EQPS 1.1 — Radio communications

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR EQPS 1.1.1	Operate two-way communication equipment.	3	Transmit/receive switches, procedures. *Content support: Frequency selection, standby equipment.*	ALL				X							
TWR EQPS 1.1.2	Identify indications of operational status of radio equipment.	3	*Content support: Indicator lights, serviceability displays, selector/-frequency displays.*	ALL				X							

Sub-topic EQPS 1.2 — Other voice communications

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR EQPS 1.2.1	Operate landline communications.	3	*Content support: Telephone, interphone and intercom equipment.*	ALL				X							

TOPIC EQPS 2: AUTOMATION IN ATS

Sub-topic EQPS 2.1 — Aeronautical fixed telecommunication network (AFTN)

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR EQPS 2.1.1	Decode AFTN messages.	3	*Content support: Movement and control messages, NOTAM, SNOWTAM, BIRDTAM.*	ALL				X							

TOPIC EQPS 3: CONTROLLER WORKING POSITION

Sub-topic EQPS 3.1 — Operation and monitoring of equipment

TWR EQPS 3.1.1	Monitor the technical integrity of the controller working position.	3	Notification procedures, responsibilities.	ALL				X							
TWR EQPS 3.1.2	Operate the equipment of the controller working position.	3	*Content support: Situation displays, flight progress board, flight data display, radio, telephone, maps and charts, strip-printer, clock, information systems, UDF/VDF.*	ALL				X							
TWR EQPS 3.1.3	Operate available equipment in abnormal and emergency situations.	3		ALL						X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic EQPS 3.2 — Situation displays and information systems															
TWR EQPS 3.2.1	Use situation displays.	3		ALL	X	X									
TWR EQPS 3.2.2	Check availability of information material.	3		ALL	X										
TWR EQPS 3.2.3	Obtain information from equipment.	3	*Content support: Information from wind direction indicator.*	TWR	X										
TWR EQPS 3.2.4	Take account of anti-incursion equipment.	2		TWR	X										
TWR EQPS 3.2.5	Explain the use of ASMGCS.	2		TWR											X
Sub-topic EQPS 3.3 — Flight data systems															
TWR EQPS 3.3.1	Use the flight data information at controller working position.	3		ALL	X										
TOPIC EQPS 4: FUTURE EQUIPMENT															
Sub-topic EQPS 4.1 — New developments															
TWR EQPS 4.1.1	Recognize future developments.	1	New advanced systems.	ALL											X

TOPIC EQPS 5: EQUIPMENT AND SYSTEMS LIMITATIONS AND DEGRADATION

Sub-topic EQPS 5.1 — Reaction to limitations

TWR EQPS 5.1.1	Take account of the limitations of equipment and systems.	2		ALL	X					X					
TWR EQPS 5.1.2	Respond to technical deficiencies of the operational position.	3	Notification procedures, responsibilities.	ALL	X					X					

Sub-topic EQPS 5.2 — Communication equipment degradation

TWR EQPS 5.2.1	Identify that communication equipment has degraded.	3	*Content support: Ground-air, ground-ground and landline communications.*	TWR						X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR EQPS 5.2.2	Integrate contingency procedures in the event of communication equipment degradation.	4	*Content support: Total or partial degradation of ground-air, ground-ground and landline communications; alternative methods of transferring data.*	TWR						X					
Sub-topic EQPS 5.3 — Navigational equipment degradation															
TWR EQPS 5.3.1	Identify when a navigational equipment failure will affect operational ability.	3	*Content support: VOR, navigational aids.*	ALL						X					
TWR EQPS 5.3.2	Apply contingency procedures in the event of a navigational equipment degradation.	3	*Content support: Vertical separation, information to aircraft, navigational assistance, seeking assistance from adjacent units.*	ALL						X					

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SUBJECT 9: PROFESIONAL ENVIRONMENT

The subject objective is:

Learners shall identify the need for close cooperation with other parties concerning ATM operations and appreciate aspects of environmental protection.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW

TOPIC PEN 1: FAMILIARIZATION

Sub-topic PEN 1.1 — Study visit to aerodrome

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR PEN 1.1.1	Appreciate the functions and provision of an operational aerodrome control service.	3	Study visit to a tower.	TWR											

TOPIC PEN 2: AIRSPACE USERS

Sub-topic PEN 2.1 — Contributors to civil ATS operations

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR PEN 2.1.1	Characterize civil ATS activities at aerodrome.	2	Study visit to a tower. *Content support: Familiarization visits to APP, ACC, AIS, RCC.*	TWR											
TWR PEN 2.1.2	Characterize other parties interfacing with ATS operations.	2	*Content support: Familiarization visits to engineering services, fire and emergency services, airline operations offices.*	ALL											

Sub-topic PEN 2.2 — Contributors to military ATS operations

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR PEN 2.2.1	Characterize military ATS activities.	2	*Content support: Familiarization visits to TWR, APP, ACC, AIS, RCC, air defence units.*	ALL											

TOPIC PEN 3: CUSTOMER RELATIONS

Sub-topic PEN 3.1 — Provision of services and user requirements

TWR PEN 3.1.1	Identify the role of ATC as a service provider.	3	ALL	
TWR PEN 3.1.2	Appreciate ATS users requirements.	3	ALL	

TOPIC PEN 4: ENVIRONMENTAL PROTECTION

Sub-topic PEN 4.1 — Environmental protection

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR PEN 4.1.1	Describe the environmental constraints on aerodrome operations.	2	*Content support: ICAO Circular 303 - Operational opportunities to minimize fuel use and reduce emissions.*	TWR APP APS											
TWR PEN 4.1.2	Explain the use of Collaborative Environmental Management (CEM) process at airports.	2		TWR APP APS											
TWR PEN 4.1.3	Appreciate the mitigation techniques used at aerodromes to minimize aviation's impact on the environment.	3	*Content support: Noise abatement procedures, flight efficiency*	TWR											

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SUBJECT 10: ABNORMAL AND EMERGENCY SITUATIONS

The subject objective is:

Learners shall develop professional attitudes to manage traffic in abnormal and emergency situations.

TOPIC ABES 1: ABNORMAL AND EMERGENCY SITUATIONS (ABES)

Sub-topic ABES 1.1 — Overview of ABES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ABES 1.1.1	List common abnormal and emergency situations.	1	*Content support: Any unusual/emergency situations, ambulance flights, ground based safety nets alerts, airframe failure, unreliable instruments, runway incursion.*	ALL											X
TWR ABES 1.1.2	Identify potential or actual abnormal and emergency situations.	3		ALL	X										
TWR ABES 1.1.3	Take into account the procedures for given abnormal and emergency situations.	2	Bird strike, aborted take-off. *Content support: ICAO Doc 4444.*	TWR						X					
TWR ABES 1.1.4	Take into account that procedures don’t exist for all abnormal and emergency situations.	2	*Content support: Real life examples.*	ALL						X					
TWR ABES 1.1.5	Consider how the evolution of a situation may have an impact on safety.	2	*Content support: Separation, information, coordination.*	ALL						X					

TOPIC ABES 2: SKILLS IMPROVEMENT

Sub-topic ABES 2.1 — Communication effectiveness

TWR ABES 2.1.1	Ensure effective communication in all circumstances including the case where standard phraseology is not applicable.	4	Phraseology, vocabulary, readback, silence instruction.	ALL				X		X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR ABES 2.1.2	Apply change of radiotelephony call sign.	3	ICAO Doc 4444	ALL				X		X					
Sub-topic ABES 2.2 — Avoidance of mental overload															
TWR ABES 2.2.1	Describe actions to keep the control of the situation.	2	*Content support: Sector splitting, holding, flow management, task delegation.*	ALL											X
TWR ABES 2.2.2	Organize priority of actions.	4		ALL								X	X		
TWR ABES 2.2.3	Ensure an effective circulation of information.	4	*Content support: Between executive and planner/-coordinator, with the supervisor, between sectors, between ACC, APP and TWR , with ground staff.*	ALL				X	X					X	
TWR ABES 2.2.4	Consider asking for help.	2		ALL					X	X			X	X	
Sub-topic ABES 2.3 — Air / ground cooperation															
TWR ABES 2.3.1	Collect appropriate information relevant for the situation.	3		ALL					X	X					
TWR ABES 2.3.2	Assist the pilot.	3	Pilot workload *Content support: Instructions, information, support, Human Factors.*	ALL						X					

TOPIC ABES 3: PROCEDURES FOR ABNORMAL AND EMERGENCY SITUATIONS

Sub-topic ABES 3.1 — Application of procedures for ABES

TWR ABES 3.1.1	Apply the procedures for given abnormal and emergency situations.	3		ALL						X					

Sub-topic ABES 3.2 — Radio failure

TWR ABES 3.2.1	Describe the procedures followed by a pilot when experiencing complete or partial radio failure.	2	ICAO Doc 7030 *Content support: Military procedures.*	ALL											X
TWR ABES 3.2.2	Apply the procedures to be followed when a pilot experiences complete or partial radio failure.	3	*Content support: Prolonged loss of communication.*	ALL						X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 3.3 — Unlawful interference and aircraft bomb threat															
TWR ABES 3.3.1	Apply ATC procedures associated with unlawful interference and aircraft bomb threat.	3	ICAO Doc 4444	ALL						X					
Sub-topic ABES 3.4 — Strayed or unidentified aircraft															
TWR ABES 3.4.1	Apply the procedures in the case of strayed aircraft.	3	ICAO Doc 4444 *Content support: Inside controlled airspace, outside controlled airspace.*	ALL						X					
TWR ABES 3.4.2	Apply the procedures in the case of unidentified aircraft.	3	ICAO Doc 4444	ALL						X					
TWR ABES 3.4.3	Provide navigational assistance to aircraft.	4	*Content support: Diverted aircraft, aircraft lost or unsure of position, information derived locally or from radar service or from other pilots, nearest most suitable aerodrome, track, heading, distance, aerodrome information, any other.*	TWR						X					
Sub-topic ABES 3.5 — Runway incursion															
TWR ABES 3.5.1	Apply ATC procedures associated with runway incursion.	3	ICAO Doc 4444	TWR						X					

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SUBJECT 11: AERODROMES

The subject objective is: Learners shall recognize and understand the design and layout of aerodromes.

TOPIC AGA 1: AERODROME DATA, LAYOUT AND COORDINATION

Sub-topic AGA 1.1 — Definitions

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR AGA 1.1.1	Define aerodrome data.	1	ICAO Annex 14 *Content support: Aerodrome elevation, reference point, apron, movement area, manoeuvring area, hot spot.*	TWR APP APS											X

Sub-topic AGA 1.2 — Coordination

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR AGA 1.2.1	Identify the information that has to be passed between Air Traffic Services (ATS) and the airport authority.	3	Airport conditions, fire/rescue category, condition of ground equipment and NAVAIDs, AIRAC, ICAO Annex 14.	TWR APP APS	X										

TOPIC AGA 2: MOVEMENT AREA

Sub-topic AGA 2.1 — Movement area

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR AGA 2.1.1	Describe movement area.	2	ICAO Annex 14	TWR APP APS											X
TWR AGA 2.1.2	Describe the marking of obstacles and unusable or unserviceable areas.	2	Flags, signs on pavement, lights.	TWR APP APS											X

Sub-topic AGA 2.1 — Movement area

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR AGA 2.1.3	Identify the information on conditions of the movement area that have to be passed to aircraft.	3	Essential information on aerodrome conditions.	TWR APP APS	X										

Sub-topic AGA 2.2 — Manoeuvring area

TWR AGA 2.2.1	Describe manoeuvring area.	2	ICAO Annex 14	TWR APP APS											X
TWR AGA 2.2.2	Describe taxiway.	2		TWR APP APS											X
TWR AGA 2.2.3	Describe the daylight marking on taxiways.	2		TWR APP APS											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TWR AGA 2.2.4	Describe taxiway lighting.	2		TWR APP APS											X
Sub-topic AGA 2.3 — Runways															
TWR AGA 2.3.1	Describe runway.	2	Runway, runway surface, runway strip, shoulder, runway end safety areas, clearways, stopways.	TWR APP APS											X
TWR AGA 2.3.2	Describe instrument runway.	2	ICAO Annex 14	TWR APP APS											X
TWR AGA 2.3.3	Describe non-instrument runway.	2	ICAO Annex 14	TWR APP APS											X
TWR AGA 2.3.4	Explain declared distances.	2	TORA, TODA, ASDA, LDA	TWR APP APS											X
TWR AGA 2.3.5	Explain the differences between ACN and PCN.	2	Strength of pavements.	TWR APP APS											X
TWR AGA 2.3.6	Describe the daylight markings on runways.	2	Content support: Runway designator, centre line, threshold, aiming point, fixed distance, touchdown zone, side strip, colour.	TWR APP APS											X
TWR AGA 2.3.7	Describe runway lights.	2	Content support: Colour, centre line, intensity, edge, touchdown zone, threshold barettes.	TWR APP APS											X
TWR AGA 2.3.8	Explain the functions of visual landing aids.	2	Content support: AVASI, VASI, PAPI.	TWR APP APS											X
TWR AGA 2.3.9	Describe the approach lighting systems.	2	Centre line, cross bars, stroboscopic lights, colours, intensity and brightness.	TWR APP APS											X
TWR AGA 2.3.10	Characterize the effect of water/ice on runways.	2		TWR APP APS											X
TWR AGA 2.3.11	Explain braking action.	2	Braking action coefficient	TWR APP APS											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic AGA 2.3 — Runways															
TWR AGA 2.3.12	Explain the effect of runway visual range on aerodrome operation	2		TWR APP APS											X

TOPIC AGA 3: OBSTACLES

Sub-topic AGA 3.1 — Obstacle-free airspace around aerodromes															
TWR AGA 3.1.1	Explain the necessity for establishing and maintaining an obstacle-free airspace around aerodromes.	2		TWR APP APS											X

TOPIC AGA 4: MISCELLANEOUS EQUIPMENT

Sub-topic AGA 4.1 — Location															
TWR AGA 4.1.1	Explain the location of different aerodrome ground equipment.	2	*Content support: LLZ, GP, VDF, radio communication or ATS surveillance systems sensors, stopbars, AVASI, VASI, PAPI.*	TWR APP APS											X

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CHAPTER 4 - Appendix 1c – Example Approach Control Procedural Rating Syllabus

SUBJECT 1: INTRODUCTION TO THE COURSE

The subject objective is:

Learners shall know and understand the training programme that they will follow and learn how to obtain the appropriate information.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC INTR 1: COURSE MANAGEMENT															
Sub-topic INTR 1.1 — Course introduction															
APP INTR 1.1.1	Explain the aims and main objectives of the course.	2		ALL											
Sub-topic INTR 1.2 — Course administration															
APP INTR 1.2.1	State course administration.	1		ALL											
Sub-topic INTR 1.3 — Study material and training documentation															
APP INTR 1.3.1	Use appropriate documentation and their sources for course studies.	3	*Content support: Training documentation, library, CBT library, web, learning management server.*	ALL											
APP INTR 1.3.2	Integrate appropriate information into course studies.	4	Training documentation *Content support: supplementary information, library.*	ALL											
TOPIC INTR 2: INTRODUCTION TO THE ATC TRAINING COURSE															
Sub-topic INTR 2.1 — Course content and organization															
APP INTR 2.1.1	State the different training methods applied in the course.	1	Theoretical training, practical training, self-study, types of training events.	ALL											

APP INTR 2.1.2	State the subjects of the course and their purpose.	1		ALL	
APP INTR 2.1.3	Describe the organization of theoretical training.	2	*Content support: Course programme.*	ALL	
APP INTR 2.1.4	Describe the organization of practical training.	2	*Content support: Part-task trainer PTT, simulation, briefing, debriefing, course programme.*	ALL	

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic INTR 2.2 — Training ethos															
APP INTR 2.2.1	Recognize the feedback mechanisms available.	1	Training progress, assessment, briefing, debriefing, learner/instructor feedback, Instructor/instructor feedback.	ALL											
Sub-topic INTR 2.3 — Assessment process															
APP INTR 2.3.1	Describe the assessment process.	2		ALL											

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SUBJECT 2: AVIATION LAW

The subject objective is:

Learners shall know, understand and apply the rules of the air and the regulations regarding reporting, airspace and appreciate the Licensing and Competence principles.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC LAW 1: ATCO LICENSING/CERTIFICATE OF COMPETENCE															
Sub-topic LAW 1.1 — Privileges and conditions															
APP LAW 1.1.1	Appreciate the conditions which shall be met to issue an approach control procedural rating	3	*Content support: National documents.*	APP											x
APP LAW 1.1.2	Explain how to maintain and update professional knowledge and skills to retain competence in the operational environment.	2		ALL											x
APP LAW 1.1.3	Explain the conditions for suspension/revocation of ATCO licence.	2		ALL											x
TOPIC LAW 2: RULES AND REGULATIONS															
Sub-topic LAW 2.1 — Reports															
APP LAW 2.1.1	List the standard forms for reports.	1	Air traffic incident report. *Content support: routine air reports, breach of regulations, watch/log book, records.*	ALL											x
APP LAW 2.1.2	Describe the functions of, and processes for, reporting.	2	Reporting culture, air traffic incident report. *Content support: Breach of regulations, watch/log book, records, voluntary reporting.*	ALL											x

APP LAW 2.1.3	Use forms for reporting.	3	Air traffic incident reporting form(s). *Content support: ICAO Doc 4444 Appendix 4, routine air reports, breach of regulations, watch/log book, records.*	ALL						x					
Sub-topic LAW 2.2 — Airspace															
APP LAW 2.2.1	Appreciate classes and structure of airspace and their relevance to approach control procedural rating operations.	3		APP											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP LAW 2.2.2	Provide planning, coordination and control actions appropriate to the airspace classification and structure.	4	*Content support: ICAO Annex 2, ICAO Annex 11, international requirements, civil requirements, military requirements, areas of responsibility, sectorization, national requirements.*	ALL	x	x	x		x		x				
APP LAW 2.2.3	Appreciate responsibility for terrain clearance.	3		ALL	x	x					x				x

TOPIC LAW 3: ATC SAFETY MANAGEMENT

Sub-topic LAW 3.1 — Feedback process

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP LAW 3.1.1	State the importance of controller contribution to the feedback process.	1	*Content support: Voluntary reporting.*	ALL											x
APP LAW 3.1.2	Describe how reported occurrences are analysed.	2	*Content support: Local procedures.*	ALL											x
APP LAW 3.1.3	Name the means used to disseminate recommendations.	1	*Content support: Safety letters, safety boards web pages.*	ALL											x
APP LAW 3.1.4	Appreciate the 'Just Culture' concept.	3	Benefits, prerequisites, constraints.	ALL											x

Sub-topic LAW 3.2 — Safety Investigation

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP LAW 3.2.1	Describe role and mission of Safety Investigation in the improvement of safety.	2		ALL											x
APP LAW 3.2.2	Define working methods of safety investigation.	1		ALL											x

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SUBJECT 3: AIR TRAFFIC MANAGEMENT

The subject objective is:

Learners shall manage air traffic to ensure safe, orderly and expeditious services.

TOPIC ATM 1: PROVISION OF SERVICES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 1.1 — Air traffic control (ATC) service															
APP ATM 1.1.1	Appreciate own area of responsibility.	3		APP ACP APS ACS	x	x									x
APP ATM 1.1.2	Provide approach control service.	4	ICAO Annex 11, ICAO Doc 7030, ICAO Doc 4444, Operation Manuals.	APP APS	x	x	x	x	x		x	x	x	x	
Sub-topic ATM 1.2 — Flight information service (FIS)															
APP ATM 1.2.1	Provide FIS.	4	ICAO Doc 4444. *Content support: National documents.*	ALL	x	x			x	x					
APP ATM 1.2.2	Issue appropriate information concerning the location of conflicting traffic.	3	ICAO Doc 4444, traffic information, essential traffic information.	APS ACS APP ACP	x	x									
APP ATM 1.2.3	Appreciate the use of ATIS for the provision of flight information service by approach controller.	3		APS APP		x									
Sub-topic ATM 1.3 — Alerting service (ALRS)															
APP ATM 1.3.1	Provide ALRS.	4	ICAO Doc 4444 *Content support: National documents.*	ALL	x	x				x					
Sub-topic ATM 1.3 — Alerting service (ALRS)															
APP ATM 1.3.2	Respond to distress and urgency messages and signals.	3	ICAO Annex 10, ICAO Doc 4444 *Content support:*	ALL						x					

Sub-topic ATM 1.4 — ATS system capacity and air traffic flow management

APP ATM 1.4.1	Appreciate principles of ATS system capacity and air traffic flow management.	3	*Content support: Flexible use of airspace, free flight.*	APP ACP APS ACS		x							x		x
APP ATM 1.4.2	Apply flow management procedures in the provision of ATC.	3		APP ACP APS ACS	x	x							x		

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 1.4.3	Organize traffic flows and patterns to take account of airspace boundaries.	4	*Content support: Civil and military, controlled, uncontrolled, advisory, restricted, danger, prohibited, special rules, sector boundaries, national boundaries, FIR boundaries, delegated airspace, transfer of control, transfer of communications, en route. off route.*	APP ACP APS ACS	x	x					x				
APP ATM 1.4.4	Organize traffic flows and patterns to take account of areas of responsibility.	4		APP ACP APS ACS	x	x					x				
Sub-topic ATM 1.4 — ATS system capacity and air traffic flow management															
APP ATM 1.4.5	Inform supervisor of situation.	3	*Content support: Abnormal situations, decrease in sector capacity, limitations on systems and equipment, changes in workload/-capacity, unusual meteorological conditions, relevant information like: reported ground-based incidents, forest fire, smoke and oil pollution.*	APP ACP APS ACS	x			x	x	x				x	
Sub-topic ATM 1.5 — Airspace management (ASM)															
APP ATM 1.5.1	Appreciate the principles and means of ASM.	3	*Content support: ICAO Doc 4444.*	APP ACP APS ACS											x
APP ATM 1.5.2	Organize traffic to take account of ASM.	4	*Content support: Real-time activation, deactivation or reallocation of airspace.*	APP ACP	x	x					x				

TOPIC ATM 2: COMMUNICATION

Sub-topic ATM 2.1 — Effective communication

APP ATM 2.1.1	Use approved phraseology.	3	ICAO Doc 4444 *Content support: ICAO Doc 9432 RTF manual, Standard words and phrases as contained in ICAO Annex 10, Volume II.*	ALL				x							
APP ATM 2.1.2	Ensure effective communication.	4	Communication techniques, readback/verification of readback.	ALL				x							

TOPIC ATM 3: ATC CLEARANCES AND ATC INSTRUCTIONS

Sub-topic ATM 3.1 — ATC clearances

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 3.1.1	Issue appropriate ATC clearances.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	x	x	x								
APP ATM 3.1.2	Integrate appropriate ATC clearances in control service.	4		ALL		x	x								
APP ATM 3.1.3	Ensure the agreed course of action is carried out.	4		ALL		x									

Sub-topic ATM 3.2 — ATC instructions

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 3.2.1	Issue appropriate ATC instructions.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	x	x									
APP ATM 3.2.2	Integrate appropriate ATC instructions in control service.	4		ALL		x									
APP ATM 3.2.3	Ensure the agreed course of action is carried out.	4		ALL		x									

TOPIC ATM 4: COORDINATION

Sub-topic ATM 4.1 — Necessity for coordination

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 4.1.1	Identify the need for coordination.	3		ALL	x	x			x						

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 4.2 — Tools and methods for coordination															
APP ATM 4.2.1	Use the available tools for coordination.	3	*Content support: Electronic transfer of flight data, telephone, interphone, intercom, direct speech, radiotelephone (RTF), local agreements, automated system coordination.*	ALL					x						

Sub-topic ATM 4.3 — Coordination procedures

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 4.3.1	Initiate appropriate coordination.	3	Delegation/transfer of responsibility for air-ground communications and separation, transfer of control, ICAO Doc 4444. *Content support: Release point.*	ALL					x						
APP ATM 4.3.2	Analyse effect of coordination requested by an adjacent position/unit.	4	*Content support: Delegation/transfer of responsibility for air-ground communications and separation, release point, transfer of control.*	ALL	x				x						
APP ATM 4.3.3	Select, after negotiation, an appropriate course of action.	5		ALL	x	x			x						
APP ATM 4.3.4	Ensure the agreed course of action is carried out.	4		ALL		x									
APP ATM 4.3.5	Coordinate in the provision of FIS.	4	ICAO Doc 4444	ALL					x						
APP ATM 4.3.6	Coordinate in the provision of ALRS.	4	ICAO Doc 4444	ALL					x	x					

TOPIC ATM 5: ALTIMETRY AND LEVEL ALLOCATION

Sub-topic ATM 5.1 — Altimetry

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 5.1.1	Allocate levels according to altimetry data.	4	ICAO Doc 8168, ICAO Doc 4444	ALL		x									
APP ATM 5.1.2	Ensure separation according to altimetry data.	4	*Content support: Transition level, transition altitude, transition layer, height, flight level, altitude, vertical distance to airspace boundaries.*	ALL			x								

Sub-topic ATM 5.2 — Terrain clearance

APP ATM 5.2.1	Provide planning, coordination and control actions appropriate to the rules for minimum safe levels and terrain clearance.	4	*Content support: Terrain clearance dimensions, minimum safe altitudes, transition level, minimum flight level, minimum sector altitude.*	APP ACP	x	x	x		x						

TOPIC ATM 6: SEPARATIONS

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 6.1 — Vertical separation															
APP ATM 6.1.1	Provide standard vertical separation.	4	ICAO Doc 4444, ICAO Doc 7030, level allocation, during climb/descent, rate of climb/descent, holding pattern.	APP APS	x		x								
APP ATM 6.1.2	Provide increased vertical separation.	4	ICAO Doc 4444, ICAO Doc 7030 *Content support: Level allocation, during climb/descent, rate of climb/descent.*	APP ACP APS ACS	x		x								
APP ATM 6.1.3	Appreciate the application of vertical emergency separation.	3	ICAO Doc 4444, ICAO Doc 7030	APP ACP APS ACS			x			x					
Sub-topic ATM 6.2 — Longitudinal separation in a surveillance environment															
APP ATM 6.2.1	Provide longitudinal separation.	4	Based on time, based on distance (DME and/or GNSS, RNAV).	APP	x		x								
APP ATM 6.2.2	Provide lateral separation.	4	ICAO Doc 4444, ICAO Doc 7030, holding.	APP ACP	x		x								
APP ATM 6.2.3	Provide track separation.	4		ACP APP	x		x								
APP ATM 6.2.4	Provide geographical separation.	4	Visual, using navigation aids, area navigation.	ACP APP	x		x								

Sub-topic ATM 6.3 — Delegation of separation

APP ATM 6.3.1	Delegate separation to pilots in the case of aircraft executing successive visual approaches.	4		APP APS		x									
APP ATM 6.3.2	Appreciate the conditions which must be met when delegating separation to pilots to fly maintaining own separation while in VMC.	3	ICAO Doc 4444	APP APS	x	x									

TOPIC ATM 7: AIRBORNE COLLISION AVOIDANCE SYSTEMS AND GROUND-BASED SAFETY NETS

Sub-topic ATM 7.1 — Airborne collision avoidance systems

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 7.1.1	Differentiate between ACAS advisory thresholds and separation standards applicable in the approach control environment.	2	ICAO Doc 9863	APP APS											x
APP ATM 7.1.2	Describe the controller responsibility during and following an ACAS RA reported by pilot.	2	ICAO Doc 4444	ALL											x
APP ATM 7.1.3	Respond to pilot notification of actions based on airborne systems warnings.	3	ACAS, TAWS	ALL	x					x					

TOPIC ATM 8: DATA DISPLAY

Sub-topic ATM 8.1 — Data management

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 8.1.1	Update the data display to accurately reflect the traffic situation.	3	*Content support: Information displayed, strip marking procedures, electronic information data displays, actions based on traffic display information, calculation of EETs.*	ALL	x	x									
APP ATM 8.1.2	Analyse pertinent data on data displays.	4		ALL	x										
APP ATM 8.1.3	Organize pertinent data on data displays.	4		ALL	x	x									
APP ATM 8.1.4	Obtain flight plan information.	3	CPL, FPL, supplementary information. *Content support: RPL, AFIL.*	ALL		x									
APP ATM 8.1.5	Use flight plan information.	3		ALL		x									

TOPIC ATM 9: OPERATIONAL ENVIRONMENT (SIMULATED)

Sub-topic ATM 9.1 — Integrity of the operational environment

APP ATM 9.1.1	Obtain information concerning the operational environment.	3	*Content support: Briefing, notices, local orders, verification of information.*	ALL	x										

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 9.1.2	Ensure the integrity of the operational environment.	4	*Content support: Integrity of displays, verification of the information provided by displays.*	APP ACP APS ACS	x	x									
Sub-topic ATM 9.2 — Verification of the currency of operational procedures															
APP ATM 9.2.1	Check all relevant documentation before managing traffic.	3	*Content support: Briefing, LOAs, NOTAM, AICs.*	ALL	x										x
APP ATM 9.2.2	Manage traffic in accordance with procedural changes.	4		APP ACP APS ACS		x	x								
Sub-topic ATM 9.3 — Handover-takeover															
APP ATM 9.3.1	Transfer information to the relieving controller.	3		ALL	x			x	x						
APP ATM 9.3.2	Obtain information from the controller handing over.	3		ALL	x			x	x						

TOPIC ATM 10: PROVISION OF CONTROL SERVICE

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 10.1 — Responsibility and processing of information															
APP ATM 10.1.1	Describe the division of responsibility between air traffic control units.	2	ICAO Doc 4444	ALL											x
APP ATM 10.1.2	Describe the responsibility in regard to military traffic.	2	ICAO Doc 4444 *Content support: ICAO Doc 9554.*	ALL											x
APP ATM 10.1.3	Describe the responsibility in regard to unmanned free balloons.	2	ICAO Doc 4444	APP ACP APS ACS											x
APP ATM 10.1.4	Obtain operational information.	3	ICAO Doc 4444, Local operation manuals.	APP ACP APS ACS	x	x									

APP ATM 10.1.5	Interpret operational information.	5		APP ACP APS ACS	x	x									
APP ATM 10.1.6	Organize forwarding of operational information.	4	*Content support: Including the use of backup procedures.*	APP ACP APS ACS		x		x							
APP ATM 10.1.7	Integrate operational information into control decisions.	4		APP ACP APS ACS		x					x				

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 10.1.8	Appreciate the influence of operational requirements.	3	*Content support: Military flying, calibration flights, aerial photography.*	ALL	x	x									
Sub-topic ATM 10.2 — Approach control															
APP ATM 10.2.1	Explain the responsibility for the provision of an approach procedural control service.	2	ICAO Doc 4444, ICAO Annex 11, Local operation manuals.	APP											x
APP ATM 10.2.2	Provide planning, coordination and control actions appropriate to the VFR, SVFR and IFR in VMC and IMC.	4	ICAO Annex 2, ICAO Annex 11, ICAO Doc 4444.	APP		x	x		x						
Sub-topic ATM 10.3 — Traffic management process															
APP ATM 10.3.1	Ensure that situational awareness is maintained.	4	Information gathering, traffic projection.	APP ACP	x										
APP ATM 10.3.2	Detect conflicts in time for appropriate resolution.	4		ALL	x		x								
APP ATM 10.3.3	Identify potential solutions to achieve a safe and effective traffic flow.	3		APP ACP APS ACS			x				x				
APP ATM 10.3.4	Evaluate possible outcomes of different planning and control actions.	5		APP ACP APS ACS	x										
APP ATM 10.3.5	Select an appropriate plan in time to achieve safe and effective traffic flow.	5		APP ACP APS ACS		x	x								
APP ATM 10.3.6	Ensure an adequate priority of actions.	4		ALL	x	x	x				x		x		

Sub-topic ATM 10.3 — Traffic management process

APP ATM 10.3.7	Execute selected plan in a timely manner.	3		APP ACP APS ACS		x					x		x		
APP ATM 10.3.8	Ensure a safe and efficient outcome is achieved.	4	Traffic monitoring, adaptability and follow up.	ALL		x							x		

Sub-topic ATM 10.4 — Handling traffic

APP ATM 10.4.1	Manage arrivals, departures and overflights.	4		APP ACP APS ACS	x	x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 10.4.2	Balance the workload against personal capacity.	5	*Content support:* *Re-routing, re-planning, prioritizing solutions, denying requests, delegating responsibility for separation.*	APP ACP APS ACS									x		
APP ATM 10.4.3	Manage traffic on different types of approaches.	4	Precision, non-precision, visual.	APP APS		x									
APP ATM 10.4.4	Initiate missed approach.	3	ICAO Doc 4444	APP APS		x									
APP ATM 10.4.5	Integrate aircraft on missed approach into the traffic situation.	4		APP APS		x									

TOPIC ATM 11: HOLDING

Sub-topic ATM 11.1 — General holding procedures

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 11.1.1	Apply holding procedures.	3	ICAO Doc 4444, holding instructions, allocation of holding levels, onward clearance times.	APP ACP APS ACS		x	x								
APP ATM 11.1.2	Appreciate the factors affecting holding patterns.	3	Effect of speed, effect of level used, effect of navigation aid in use, turbulence, aircraft type.	APP ACP APS ACS											x

Sub-topic ATM 11.2 — Approaching aircraft

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ATM 11.2.1	Calculate Expected Approach Times (EATs) and Expected Onward Clearance times.	3		APP APS		x									
APP ATM 11.2.2	Organize the traffic landing sequence in a holding pattern.	4	*Content support: Company preference, aircraft performance, aircraft approach capability, ILS categories, flow control management.*	APP APS	x	x									

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SUBJECT 4: METEOROLOGY

The subject objective is:

Learners shall acquire, decode and make proper use of meteorological information relevant to the provision of ATS.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC MET 1: METEOROLOGICAL PHENOMENA															
Sub-topic MET 1.1 — Meteorological phenomena															
APP MET 1.1.1	Appreciate the impact of adverse weather.	3	Thunderstorms, icing, Clear Air Turbulence (CAT), turbulence, microburst, wind shear, severe mountain waves, line squalls, volcanic ash.	APP APS	x					x					
APP MET 1.1.2	Integrate data about meteorological phenomena into provision of ATS.	4	Clearances, instructions and transmitted information *Content support: Relevant meteorological phenomena.*	ALL		x									
APP MET 1.1.3	Use techniques to avoid adverse weather when necessary/possible.	3	Rerouting, level change	APP ACP APS ACS						x					
TOPIC MET 2: SOURCES OF METEOROLOGICAL DATA															
Sub-topic MET 2.1 — Sources of meteorological information															
APP MET 2.1.1	Obtain meteorological information	3	METAR, TAF, SIGMET, AIRMET. *Content support: AIREP/AIREP Special.*	APP ACP APS ACS		x									
APP MET 2.1.2	Relay meteorological information.	3	ICAO Doc 4444 *Content support: Flight information centre, adjacent ATS unit.*	APP ACP APS ACS		x									

SUBJECT 5: NAVIGATION

The subject objective is:

Learners shall analyse all navigational aspects in order to organize the traffic.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC NAV 1: MAPS AND AERONAUTICAL CHARTS															
Sub-topic NAV 1.1 — Maps and charts															
APP NAV 1.1.1	Decode symbols and information displayed on aeronautical maps and charts.	3	Instrument approach charts, SID charts, aerodrome charts, visual approach charts. *Content support: Military maps and charts.*	TWR APP APS											x
APP NAV 1.1.2	Use relevant maps and charts.	3		APP ACP APS ACS		x									
TOPIC NAV 2: INSTRUMENT NAVIGATION															
Sub-topic NAV 2.1 — Navigational systems															
APP NAV 2.1.1	Manage traffic in case of change in the operational status of navigational systems.	4	*Content support: Limitations, status of ground-based and satellite-based systems.*	APP ACP APS ACS	x	x							x		
APP NAV 2.1.2	Appreciate the effect of precision, limitations and change of the operational status of navigational systems.	3	*Content support: Limitations, status, degraded procedures.*	ALL						x					

Sub-topic NAV 2.2 — Stabilized approach

APP NAV 2.2.1	Describe the concept of stabilized approach.	2	ICAO Doc 8168	TWR APP APS											x
APP NAV 2.2.2	Appreciate the effect of late change of runway-in-use or type of approach for landing aircraft.	3		APP APS		x									
APP NAV 2.2.3	Appreciate controller actions that may contribute to unstabilized approach.	3	Delayed descent.	APP		x									

Sub-topic NAV 2.3 — Instrument departures and arrivals

APP NAV 2.3.1	Characterize SIDs.	2		TWR APP APS											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP NAV 2.3.2	Describe the types and phases of instrument approach procedures.	2		APP APS											x
APP NAV 2.3.3	Describe the relevant minima applicable for a precision/ non-precision and visual approach.	2		TWR APP APS											x
Sub-topic NAV 2.4 — Navigational assistance															
APP NAV 2.4.1	Evaluate the necessary information to be provided to pilots in need of navigational assistance.	5	*Content support: Nearest most suitable aerodrome, track, heading, distance, aerodrome information, any other navigational assistance relevant at the time.*	APP ACP APS ACS	x	x									
Sub-topic NAV 2.5 — Satellite-based systems															
APP NAV 2.5.1	State the different applications of satellite-based systems relevant for approach operations.	1	Content *support: NPA, APV-baro VNAV, APV, LPV, Precision approach, ICAO Doc 8168, Volume II.*	APP APS											x
Sub-topic NAV 2.6 — PBN applications															
APP NAV 2.6.1	State the navigation applications used in approach and terminal environments.	1	Approach-RNP APCH/ RNP AR APCH; Terminal-RNAV-1 (≈P-RNAV). *Content support: ICAO Doc 9613.*	APP APS											x
APP NAV 2.6.2	Explain the principles and designation of navigation specifications in use.	2	*Content support: Performance, functionality, sensors, aircrew and controller requirements.*	APP ACP APS ACS											x
APP NAV 2.6.3	State future PBN developments.	1	A-RNP, APV. *Content support: RNP 3D, RNP 4D.*	TWR APP ACP APS ACS											x

SUBJECT 6: AIRCRAFT

The subject objective is:

Learners shall assess and integrate aircraft performance in the provision of ATS.

TOPIC ACFT 1: AIRCRAFT INSTRUMENTS

Sub-topic ACFT 1.1 — Aircraft instruments

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ACFT 1.1.1	Integrate information from aircraft instruments provided by the pilot in the provision of ATS.	4		ALL	x										
APP ACFT 1.1.2	Explain the operation of aircraft radio equipment.	2	*Content support: Radios (number of), emergency radios.*	ALL											x

TOPIC ACFT 2: AIRCRAFT CATEGORIES

Sub-topic ACFT 2.1 — Wake turbulence

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ACFT 2.1.1	Explain the wake turbulence effect and associated hazards to the succeeding aircraft.	2		ALL											x
APP ACFT 2.1.2	Appreciate the techniques used to prevent hazards associated with wake turbulence on succeeding aircraft.	3		ALL	x	x									

Sub-topic ACFT 2.2 — Application of ICAO approach categories

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ACFT 2.2.1	Describe the use of ICAO approach categories.	2	ICAO Doc 8168	TWR APP APS											x
APP ACFT 2.2.2	Appreciate the effect of ICAO approach categories on the traffic organization.	3		TWR APP APS	x	x									

TOPIC ACFT 3: FACTORS AFFECTING AIRCRAFT PERFORMANCE

Sub-topic ACFT 3.1 — Climb factors

APP ACFT 3.1.1	Integrate the influence of factors affecting aircraft during climb.	4	*Content support: Speed, mass, air density, cabin pressurization, wind and temperature.*	APP ACP APS ACS		x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ACFT 3.1.2	Appreciate the influence of factors affecting aircraft on take-off.	3	*Content support: Runway conditions, runway slope, aerodrome elevation, wind, temperature, aircraft configuration, airframe contamination and aircraft mass.*	APP APS		x									
Sub-topic ACFT 3.2 — Cruise factors															
APP ACFT 3.2.1	Integrate the influence of factors affecting aircraft during cruise.	4	Level, cruising speed, wind, mass, cabin pressurization.	APP ACP APS ACS		x									
Sub-topic ACFT 3.3 — Descent and initial approach factors															
APP ACFT 3.3.1	Integrate the influence of factors affecting aircraft during descent.	4	*Content support: Wind, speed, rate of descent, aircraft configuration, cabin pressurization.*	APP APS		x									
Sub-topic ACFT 3.4 — Final approach and landing factors															
APP ACFT 3.4.1	Integrate the influence of factors affecting aircraft during final approach and landing.	4	*Content support: Wind, aircraft configuration, mass, meteorological conditions, runway conditions, runway slope, aerodrome elevation.*	APP APS		x									
Sub-topic ACFT 3.5 — Economic factors															
APP ACFT 3.5.1	Integrate consideration of economic factors affecting aircraft.	4	*Content support: Routing, level, speed, rate of climb and rate of descent, approach profile.*	APP APS		x									
APP ACFT 3.5.2	Use continuous climb techniques where applicable.	3		APP ACP APS ACS		x									
APP ACFT 3.5.3	Use direct routing where applicable.	3		APP ACP APS ACS		x									

Sub-topic ACFT 3.6 — Environmental factors

APP ACFT 3.6.1	Appreciate the performance restrictions due to environmental constraints.	3	*Content support: Fuel dumping noise abatement procedures, minimum flight levels, bird hazard, continuous descent operations.*	APP APS		x									

TOPIC ACFT 4: AIRCRAFT DATA

Sub-topic ACFT 4.1 — Performance data

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ACFT 4.1.1	Integrate the average performance data of a representative sample of aircraft which will be encountered in the operational/working environment into the provision of a control service.	4	Performance data under a representative variety of circumstances.	APP ACP APS ACS	x	x									

SUBJECT 7: HUMAN FACTORS

The subject objective is:

Learners shall recognize the necessity to constantly extend their knowledge and analyse factors which affect personal and team performance.

TOPIC HUM 1: PSYCHOLOGICAL FACTORS

Sub-topic HUM 1.1 — Cognitive

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP HUM 1.1.1	Describe the human information processing model.	2	Attention, perception, memory, situational awareness, decision making, response.	ALL											x
APP HUM 1.1.2	Describe the factors which influence human information processing.	2	Confidence, stress, learning, knowledge, experience, fatigue, alcohol/drugs, distraction, interpersonal relations.	ALL											x
APP HUM 1.1.3	Monitor the effect of human information processing factors on decision making.	3	*Content support: Workload, stress, interpersonal relations, distraction, confidence.*	ALL								x			

TOPIC HUM 2: MEDICAL AND PHYSIOLOGICAL FACTORS

Sub-topic HUM 2.1 — Fatigue

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP HUM 2.1.1	State factors that cause fatigue.	1	Shift work. *Content support: Night shifts and rosters.*	ALL											x
APP HUM 2.1.2	Describe the onset of fatigue.	2	*Content support: Lack of concentration, listlessness, irritability, frustration, ICAO Circular 241 – AN/145* Human Factors in ATC.	ALL											x
APP HUM 2.1.3	Recognize the onset of fatigue in self.	1	*Content support: ICAO Circular 241 – AN/145* Human Factors in ATC.	ALL								x			

APP HUM 2.1.4	Recognize the onset of fatigue in others.	1	ALL										x	
APP HUM 2.1.5	Describe appropriate action when recognizing fatigue.	2	ALL											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 2.2 — Fitness															
APP HUM 2.2.1	Recognize signs of lack of personal fitness.	1		ALL								x			
APP HUM 2.2.2	Describe actions when aware of a lack of personal fitness.	2		ALL											x
TOPIC HUM 3: SOCIAL AND ORGANIZATIONAL FACTORS															
Sub-topic HUM 3.1 — Team resource management (TRM)															
APP HUM 3.1.1	State the relevance of TRM.	1		ALL											x
APP HUM 3.1.2	State the content of the TRM concept.	1	*Content support: Team work, human error, team roles, stress, decision making, communication, situational awareness.*	ALL											x
Sub-topic HUM 3.2 — Teamwork and team roles															
APP HUM 3.2.1	Identify reasons for conflict.	3		ALL											x
APP HUM 3.2.2	Describe actions to prevent human conflicts.	2	*Content support: TRM team roles.*	ALL											x
APP HUM 3.2.3	Describe strategies to cope with human conflicts.	2	*Content support: In your team, in the simulator.*	ALL											x
Sub-topic HUM 3.3 — Responsible behaviour															
APP HUM 3.3.1	Consider the factors which influence responsible behaviour.	2	*Content support: Situation, team, personal situation and judgement, instance of justification, moral motivation, personality.*	ALL								x			

APP HUM 3.3.2	Apply responsible judgement.	3	Case study and discussion about a dilemma situation.	ALL								x			

TOPIC HUM 4: STRESS

Sub-topic HUM 4.1 — Stress

APP HUM 4.1.1	Recognize the effects of stress on performance.	1	Stress and its symptoms in self and in others.	ALL								x		x	

Sub-topic HUM 4.2 — Stress management

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP HUM 4.2.1	Act to reduce stress.	3	The effect of personality in coping with stress, The benefits of active stress management.	ALL								x			
APP HUM 4.2.2	Respond to stressful situation by offering, asking or accepting assistance.	3	*Content support: The benefits of offering, accepting and asking for help in stressful situations.*	ALL								x		x	
APP HUM 4.2.3	Recognize the effect of shocking and stressful events.	1	Self and others, abnormal situations, CISM.	ALL								x		x	
APP HUM 4.2.4	Consider the benefits of Critical Incident Stress Management (CISM).	2		ALL											x
APP HUM 4.2.5	Explain procedures used following an incident/accident.	2	*Content support: CISM, counselling, human element.*	ALL											x

TOPIC HUM 5: HUMAN ERROR

Sub-topic HUM 5.1 — Human error

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP HUM 5.1.1	Explain the relationship between error and safety.	2	Number and combination of errors, proactive versus reactive approach to discovery of error. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											x
APP HUM 5.1.2	Differentiate between the types of error.	2	Slips, lapses, mistakes *Content support: Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											x

APP HUM 5.1.3	Describe error-prone conditions.	2	*Content support: Increase in traffic, changes in procedures, complexities of systems or traffic, weather, unusual occurrences.*	ALL											x
APP HUM 5.1.4	Collect examples of different error types, their causes and consequences in ATC.	3	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP HUM 5.1.5	Explain how to detect errors to compensate for them.	2	STCA, MSAW, individual and collective strategy. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											x
APP HUM 5.1.6	Execute corrective actions.	3	Error compensation *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL	x	x	x					x			
APP HUM 5.1.7	Explain the importance of error management.	2	*Content support: Prevention of incidents, safety improvement, revision of procedures and/or working practises.*	ALL											x
APP HUM 5.1.8	Describe the impact on an ATCO following an occurrence/incident.	2	*Content support: reporting, SMS, investigation, CISM.*	ALL											x
Sub-topic HUM 5.2 — Violation of rules															
APP HUM 5.2.1	Explain the causes and dangers of violation of rules becoming accepted as a practice.	2	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											x

TOPIC HUM 6: COLLABORATIVE WORK

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 6.1 — Communication															
APP HUM 6.1.1	Use communication effectively in ATC.	3		ALL				x							
APP HUM 6.1.2	Analyse examples of pilot and controller communication for effectiveness.	4		ALL											x

Sub-topic HUM 6.2 — Collaborative work within the same area of responsibility

APP HUM 6.2.1	List communication means between controllers in charge of the same area of responsibility (sector or tower).	1	*Content support: Electronic, written, verbal and non-verbal communication.*	ALL											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP HUM 6.2.2	Explain consequences of the use of communication means on effectiveness.	2	*Content support: Strips legibility and encoding, labels designation, feedback.*	ALL											x
APP HUM 6.2.3	List possible actions to provide a safe position handover.	1	*Content support: Rigour, preparation, overlap time.*	ALL											x
APP HUM 6.2.4	Explain consequences of a missed position handover process.	2		ALL											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 6.3 — Collaborative work between different areas of responsibility															
APP HUM 6.3.1	List factors and means for an effective coordination between sectors and/or tower positions.	1	*Content support: Other sectors constraints, electronic coordination tools.*	ALL											x
Sub-topic HUM 6.4 — Controller/pilot cooperation															
APP HUM 6.4.1	Describe parameters affecting controller/pilot cooperation.	2	*Content support: Workload, mutual knowledge, controller vs pilot mental picture.*	ALL											x

SUBJECT 8: EQUIPMENT AND SYSTEMS

The subject objective is:

Learners shall integrate knowledge and understanding of the basic working principles of equipment and systems and comply with the equipment and system degradation procedures in the provision of ATS.

TOPIC EQPS 1: VOICE COMMUNICATIONS

Sub-topic EQPS 1.1 — Radio communications

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP EQPS 1.1.1	Operate two-way communication equipment.	3	Transmit/receive switches, procedures. *Content support: Frequency selection, standby equipment.*	ALL				x							
APP EQPS 1.1.2	Identify indications of operational status of radio equipment.	3	*Content support: Indicator lights, serviceability displays, selector/-frequency displays.*	ALL				x							
APP EQPS 1.1.3	Consider radio range.	2	*Content support: Transfer to another frequency, apparent radio failure, failure to establish radio contact, frequency protection range.*	APP ACP APS ACS				x							

Sub-topic EQPS 1.2 — Other voice communications

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP EQPS 1.2.1	Operate landline communications.	3	*Content support: Telephone, interphone and intercom equipment.*	ALL				x							

TOPIC EQPS 2: AUTOMATION IN ATS

Sub-topic EQPS 2.1 — Aeronautical fixed telecommunication network (AFTN)

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP EQPS 2.1.1	Decode AFTN messages.	3	*Content support: Movement and control messages, NOTAM, SNOWTAM, BIRDTAM.*	ALL		x									

Sub-topic EQPS 2.2 — Automatic data interchange

APP EQPS 2.2.1	Use automatic data transfer equipment where available.	3	*Content support: Automated information and coordination, OLDI.*	APP ACP					x						

TOPIC EQPS 3: CONTROLLER WORKING POSITION

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic EQPS 3.1 — Operation and monitoring of equipment															
APP EQPS 3.1.1	Monitor the technical integrity of the controller working position.	3	Notification procedures, responsibilities.	ALL		x									
APP EQPS 3.1.2	Operate the equipment of the controller working position.	3	*Content support: Situation displays, flight progress board, flight data display, radio, telephone, maps and charts, strip-printer, clock, information systems, UDF/VDF.*	ALL		x									
APP EQPS 3.1.3	Operate available equipment in abnormal and emergency situations.	3		ALL						x					
Sub-topic EQPS 3.2 — Situation displays and information systems															
APP EQPS 3.2.1	Use situation displays.	3		ALL		x									
APP EQPS 3.2.2	Check availability of information material.	3		ALL	x										
APP EQPS 3.2.3	Obtain information from equipment.	3		APP ACP APS ACS	x										
Sub-topic EQPS 3.3 — Flight data systems															
APP EQPS 3.3.1	Use the flight data information at controller working position.	3		ALL		x									

TOPIC EQPS 4: FUTURE EQUIPMENT

Sub-topic EQPS 4.1 — New developments

APP EQPS 4.1.1	Recognize future developments.	1	New advanced systems.	ALL											x

TOPIC EQPS 5: EQUIPMENT AND SYSTEMS LIMITATIONS AND DEGRADATION

Sub-topic EQPS 5.1 — Reaction to limitations

APP EQPS 5.1.1	Take account of the limitations of equipment and systems.	2		ALL		x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP EQPS 5.1.2	Respond to technical deficiencies of the operational position.	3	Notification procedures, responsibilities.	ALL						x					
Sub-topic EQPS 5.2 — Communication equipment degradation															
APP EQPS 5.2.1	Identify that communication equipment has degraded.	3	*Content support: Ground-air and landline communications.*	APP ACP APS ACS						x					
APP EQPS 5.2.2	Apply contingency procedures in the event of communication equipment degradation.	3	Procedures for total or partial degradation of ground-air and landline communications, alternative methods of transferring data.	APP ACP APS ACS						x					
Sub-topic EQPS 5.3 — Navigational equipment degradation															
APP EQPS 5.3.1	Identify when a navigational equipment failure will affect operational ability.	3	*Content support: VOR, navigational aids.*	ALL						x					
APP EQPS 5.3.2	Apply contingency procedures in the event of a navigational equipment degradation.	3	Content *support: Vertical separation, information to aircraft, navigational assistance, seeking assistance from adjacent units.*	ALL						x					

SUBJECT 9: PROFESSIONAL ENVIRONMENT

The subject objective is:

Learners shall identify the need for close cooperation with other parties concerning ATM operations and appreciate aspects of environmental protection.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC PEN 1: FAMILIARIZATION															
Sub-topic PEN 1.1 — Study visit to approach control unit															
APP PEN 1.1.1	Appreciate the functions and provision of an operational approach control service.	3	Study visit to an approach control unit.	APP APS											
TOPIC PEN 2: AIRSPACE USERS															
Sub-topic PEN 2.1 — Contributors to civil ATS operations															
APP PEN 2.1.1	Characterize civil ATS activities in approach control unit.	2	Study visit to an approach control unit. *Content support: Familiarization visits to TWR, ACC, AIS, RCC.*	APP APS											
APP PEN 2.1.2	Characterize other parties interfacing with ATS operations.	2	*Content support: Familiarization visits to engineering services, fire and emergency services, airline operations offices.*	ALL											
Sub-topic PEN 2.2 — Contributors to military ATS operations															
APP PEN 2.2.1	Characterize military ATS activities.	2	*Content support: Familiarization visits to TWR, APP, ACC, AIS, RCC, air defence units.*	ALL											

TOPIC PEN 3: CUSTOMER RELATIONS

Sub-topic PEN 3.1 — Provision of services and user requirements				
APP PEN 3.1.1	Identify the role of ATC as a service provider.	3	ALL	
Sub-topic PEN 3.1 — Provision of services and user requirements				
APP PEN 3.1.2	Appreciate ATS users requirements.	3	ALL	

TOPIC PEN 4: ENVIRONMENTAL PROTECTION

Sub-topic PEN 4.1 — Environmental protection

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP PEN 4.1.1	Describe the environmental constraints on aerodrome operations.	2	*Content support: ICAO Circular 303* - Operational opportunities to minimize fuel use and reduce emissions.	TWR APP APS											
APP PEN 4.1.2	Explain the use of Collaborative Environmental Management (CEM) process at airports.	2		TWR APP APS											
APP PEN 4.1.3	Appreciate the mitigation techniques used to minimize aviation’s impact on the environment.	3	*Content support: Continuous descent operations (CDO), noise abatement procedures, noise preferential routes, flight efficiency.*	APP APS											

SUBJECT 10: ABNORMAL AND EMERGENCY SITUATIONS

The subject objective is:

Learners shall develop professional attitudes to manage traffic in abnormal and emergency situations.

TOPIC ABES 1: ABNORMAL AND EMERGENCY SITUATIONS (ABES)

Sub-topic ABES 1.1 — Overview of ABES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP ABES 1.1.1	List common abnormal and emergency situations.	1	Content *support: Any unusual/emergency situations, ambulance flights, ground based safety nets alerts, airframe failure, unreliable instruments, runway incursion.*	ALL											x
APP ABES 1.1.2	Identify potential or actual abnormal and emergency situations.	3		ALL	x					x					
APP ABES 1.1.3	Take into account the procedures for given abnormal and emergency situations.	2	*Content support: ICAO Doc 4444.*	APP ACP APS ACS						x					
APP ABES 1.1.4	Take into account that procedures don’t exist for all abnormal and emergency situations.	2	*Content support: Real life examples.*	ALL						x					
APP ABES 1.1.5	Consider how the evolution of a situation may have an impact on safety.	2	*Content support: Separation, information, coordination.*	ALL						x					

TOPIC ABES 2: SKILLS IMPROVEMENT

Sub-topic ABES 2.1 — Communication effectiveness

APP ABES 2.1.1	Ensure effective communication in all circumstances including the case where standard phraseology is not applicable.	4	Phraseology, vocabulary, readback, silence instruction.	ALL				x		x					
APP ABES 2.1.2	Apply change of radiotelephony call sign.	3	ICAO Doc 4444.	ALL				x		x					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 2.2 — Avoidance of mental overload															
APP ABES 2.2.1	Describe actions to keep the control of the situation.	2	*Content support: Sector splitting, holding, flow management, task delegation.*	ALL											x
APP ABES 2.2.2	Organize priority of actions.	4		ALL									x		
APP ABES 2.2.3	Ensure an effective circulation of information.	4	*Content support: Between executive and planner/coordinator, with the supervisor, between sectors, between ACC, APP and TWR , with ground staff.*	ALL					x						
APP ABES 2.2.4	Consider asking for help.	2		ALL										x	
Sub-topic ABES 2.3 — Air / ground cooperation															
APP ABES 2.3.1	Collect appropriate information relevant for the situation.	3		ALL						x					
APP ABES 2.3.2	Assist the pilot.	3	Pilot workload *Content support: Instructions, information, support, Human Factors.*	ALL						x					

TOPIC ABES 3: PROCEDURES FOR ABNORMAL AND EMERGENCY SITUATIONS

Sub-topic ABES 3.1 — Application of procedures for ABES															
APP ABES 3.1.1	Apply the procedures for given abnormal and emergency situations.	3		ALL						x					

Sub-topic ABES 3.2 — Radio failure

APP ABES 3.2.1	Describe the procedures followed by a pilot when he/she experiences complete or partial radio failure.	2	ICAO Doc 7030 *Content support: Military procedures.*	ALL											x
APP ABES 3.2.2	Apply the procedures to be followed when a pilot experiences complete or partial radio failure.	3	*Content support: Prolonged loss of communication.*	ALL						x					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 3.3 — Unlawful interference and aircraft bomb threat															
APP ABES 3.3.1	Apply ATC procedures associated with unlawful interference and aircraft bomb threat.	3	ICAO Doc 4444	ALL						x					
Sub-topic ABES 3.4 — Strayed or unidentified aircraft															
APP ABES 3.4.1	Apply the procedures in the case of strayed aircraft.	3	ICAO Doc 4444 *Content support: Inside controlled airspace, outside controlled airspace.*	ALL						x					
APP ABES 3.4.2	Apply the procedures in the case of unidentified aircraft.	3	ICAO Doc 4444	ALL						x					
Sub-topic ABES 3.5 — Diversions															
APP ABES 3.5.1	Provide navigational assistance to diverting emergency aircraft.	4	Track/heading, distance, other navigational assistance. *Content support: Nearest most suitable aerodrome.*	APP ACP APS ACS						x					

SUBJECT 11: AERODROMES

The subject objective is:

Learners shall recognize and understand the design and layout of aerodromes.

TOPIC 1: Definitions

Sub-topic 1.1 — Define aerodrome data

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP 1.1.1	Coordination														
APP AGA 1.1.2	Identify the information that has to be passed between Air Traffic Services (ATS) and the airport authority.	3	Airport conditions, fire/rescue category, condition of ground equipment and NAVAIDs, AIRAC, ICAO Annex 14.	TWR APP APS											x

TOPIC AGA 2: MOVEMENT AREA

Sub-topic AGA 2.1 — Movement area

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP AGA 2.1.1	Describe movement area.	2	ICAO Annex 14	TWR APP APS											x
APP AGA 2.1.2	Describe the marking of obstacles and unusable or unserviceable areas.	2	Flags, signs on pavement, lights.	TWR APP APS											x
APP AGA 2.1.3	Identify the information on conditions of the movement area that have to be passed to aircraft.	3	Essential information on aerodrome conditions.	TWR APP APS											x

Sub-topic AGA 2.2 — Manoeuvring area

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP AGA 2.2.1	Describe manoeuvring area.	2	ICAO Annex 14	TWR APP APS											x
APP AGA 2.2.2	Describe taxiway.	2		TWR APP APS											x

APP AGA 2.2.3	Describe the daylight marking on taxiways.	2	TWR APP APS											x
APP AGA 2.2.4	Describe taxiway lighting.	2	TWR APP APS											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic AGA 2.3 — Runways															
APP AGA 2.3.1	Describe runway.	2	Runway, runway surface, runway strip, shoulder, runway end safety areas, clearways, stopways.	TWR APP APS											
APP AGA 2.3.2	Describe instrument runway.	2	ICAO Annex 14	TWR APP APS											x
APP AGA 2.3.3	Describe non-instrument runway.	2	ICAO Annex 14	TWR APP APS											x
APP AGA 2.3.4	Explain declared distances.	2	TORA, TODA, ASDA, LDA.	TWR APP APS											x
APP AGA 2.3.5	Explain the differences between ACN and PCN.	2	Strength of pavements.	TWR APP APS											x
APP AGA 2.3.6	Describe the daylight markings on runways.	2	*Content support: Runway designator, centre line, threshold, aiming point, fixed distance, touchdown zone, side strip, colour.*	TWR APP APS											x
Sub-topic AGA 2.3 — Runways															
APP AGA 2.3.7	Describe runway lights.	2	*Content support: Colour, centre line, intensity, edge, touchdown zone, threshold barettes.*	TWR APP APS											x
APP AGA 2.3.8	Explain the functions of visual landing aids.	2	Content *support: AVASI, VASI, PAPI.*	TWR APP APS											x
APP AGA 2.3.9	Describe the approach lighting systems.	2	Centre line, cross bars, stroboscopic lights, colours, intensity and brightness.	TWR APP APS											x
APP AGA 2.3.10	Characterize the effect of water/ice on runways.	2		TWR APP APS											x

APP AGA 2.3.11	Explain braking action.	2	Braking action coefficient.	TWR APP APS											x
APP AGA 2.3.12	Explain the effect of runway visual range on aerodrome operation	2		TWR APP APS											x

TOPIC AGA 3: OBSTACLES

Sub-topic AGA 3.1 — Obstacle-free airspace around aerodromes

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP AGA 3.1.1	Explain the necessity for establishing and maintaining an obstacle-free airspace around aerodromes.	2		TWR APP APS											x

TOPIC AGA 4: MISCELLANEOUS EQUIPMENT

Sub-topic AGA 4.1 — Location

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APP AGA 4.1.1	Explain the location of different aerodrome ground equipment.	2	*Content support: LLZ, GP, VDF, radio communication or ATS surveillance systems sensors, stopbars, AVASI, VASI, PAPI.*	TWR APP APS											x

CHAPTER 4 - Appendix 1d – Example Approach Control Surveillance Rating Syllabus

SUBJECT 1: INTRODUCTION TO THE COURSE

The subject objective is:

Learners shall know and understand the training programme that they will follow and learn how to obtain the appropriate information.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC INTR 1: COURSE MANAGEMENT															
Sub-topic INTR 1.1 — Course introduction															
APS INTR 1.1.1	Explain the aims and main objectives of the course.	2		ALL											
Sub-topic INTR 1.2 — Course administration															
APS INTR 1.2.1	State course administration.	1		ALL											
Sub-topic INTR 1.3 — Study material and training documentation															
APS INTR 1.3.1	Use appropriate documentation and their sources for course studies.	3	*Content support: Training documentation, library, CBT library, web, learning management server.*	ALL											
APS INTR 1.3.2	Integrate appropriate information into course studies.	4	Training documentation. *Content support: Supplementary information, library.*	ALL											

TOPIC INTR 2: INTRODUCTION TO THE ATC TRAINING COURSE

Sub-topic INTR 2.1 — Course content and organization

APS INTR 2.1.1	State the different training methods applied in the course.	1	Theoretical training, practical training, self-study, types of training events.	ALL	
APS INTR 2.1.2	State the subjects of the course and their purpose.	1		ALL	
APS INTR 2.1.3	Describe the organization of theoretical training.	2	*Content support: Course programme.*	ALL	

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS INTR 2.1.4	Describe the organization of practical training.	2	Content *support: PTP, simulation, briefing, debriefing, course programme.*	ALL											
Sub-topic INTR 2.2 — Training ethos															
APS INTR 2.2.1	Recognize the feedback mechanisms available.	1	Training progress, assessment, briefing, debriefing, learner/instructor feedback, Instructor/instructor feedback.	ALL											
Sub-topic INTR 2.3 — Assessment process															
APS INTR 2.3.1	Describe the assessment process.	2		ALL											

SUBJECT 2: AVIATION LAW

The subject objective is:

Learners shall know, understand and apply the rules of the air and the regulations regarding reporting, airspace and appreciate the licensing and competence principles.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC LAW 1: ATCO LICENSING/CERTIFICATE OF COMPETENCE															
Sub-topic LAW 1.1 — Privileges and conditions															
APS LAW 1.1.1	Appreciate the conditions which shall be met to issue an approach control surveillance rating.	3	*Content support: National documents.*	APS											x
APS LAW 1.1.2	Explain how to maintain and update professional knowledge and skills to retain competence in the operational environment.	2		ALL											x
APS LAW 1.1.3	Explain the conditions for suspension/revocation of ATCO licence.	2		ALL											x
TOPIC LAW 2: RULES AND REGULATIONS															
Sub-topic LAW 2.1 — Reports															
APS LAW 2.1.1	List the standard forms for reports.	1	Air traffic incident report. *Content support: Routine air reports, breach of regulations, watch/log book, records.*	ALL											x
APS LAW 2.1.2	Describe the functions of, and processes for, reporting.	2	Reporting culture, air traffic incident report. *Content support: Breach of regulations, watch/log book, records, voluntary reporting.*	ALL											x

APS LAW 2.1.3	Use forms for reporting.	3	Air traffic incident reporting form(s). *Content support: ICAO Doc 4444 Appendix 4, routine air reports, breach of regulations, watch/log book, records.*	ALL						x					
Sub-topic LAW 2.2 — Airspace															
APS LAW 2.2.1	Appreciate classes and structure of airspace and their relevance to approach control surveillance rating operations.	3		APS											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS LAW 2.2.2	Provide planning, coordination and control actions appropriate to the airspace classification and structure.	4	*Content support: ICAO Annex 2, ICAO Annex 11, international requirements, civil requirements, military requirements, areas of responsibility, sectorization, national requirements.*	ALL	x	x	x		x		x				
APS LAW 2.2.3	Appreciate responsibility for terrain clearance.	3		ALL	x	x					x				x

TOPIC LAW 3: ATC SAFETY MANAGEMENT

Sub-topic LAW 3.1 — Feedback process

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS LAW 3.1.1	State the importance of controller contribution to the feedback process.	1	*Content support: Voluntary reporting.*	ALL											x
APS LAW 3.1.2	Describe how reported occurrences are analysed.	2	*Content support: Local procedures.*	ALL											x
APS LAW 3.1.3	Name the means used to disseminate recommendations.	1	*Content support: Safety letters, safety boards web pages.*	ALL											x
APS LAW 3.1.4	Appreciate the 'Just Culture' concept.	3	Benefits, prerequisites, constraints.	ALL											x

Sub-topic LAW 3.2 — Safety Investigation

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS LAW 3.2.1	Describe role and mission of Safety Investigation in the improvement of safety.	2		ALL											x
APS LAW 3.2.2	Define working methods of safety investigation.	1		ALL											x

SUBJECT 3: AIR TRAFFIC MANAGEMENT

The subject objective is:

Learners shall manage air traffic to ensure safe, orderly and expeditious services.

TOPIC ATM 1: PROVISION OF SERVICES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 1.1 — Air traffic control (ATC) service															
APS ATM 1.1.1	Appreciate own area of responsibility.	3		APP ACP APS ACS	x	x									x
APS ATM 1.1.2	Provide approach control service.	4	ICAO Annex 11, ICAO Doc 7030, ICAO Doc 4444, *Operation manuals*.	APP APS	x	x	x	x	x		x	x	x		
Sub-topic ATM 1.2 — Flight information service (FIS)															
APS ATM 1.2.1	Provide FIS.	4	ICAO Doc 4444 *Content support: National documents.*	ALL	x	x	x	x	x	x	x	x	x		
APS ATM 1.2.2	Use ATS surveillance system for the provision of FIS.	3	ICAO Doc 4444, Information to identified aircraft concerning: traffic, navigation. *Content support: Weather.*	APS ACS	x	x									
APS ATM 1.2.3	Issue appropriate information concerning the location of conflicting traffic.	3	ICAO Doc 4444, traffic information, essential traffic information.	APS ACS APP ACP	x	x									
APS ATM 1.2.4	Appreciate the use of ATIS for the provision of flight information service by approach controller.	3		APS APP		x									

Sub-topic ATM 1.3 — Alerting service (ALRS)

APS ATM 1.3.1	Provide ALRS.	4	ICAO Doc 4444 *Content support: National documents.*	ALL	x	x			x	x					
APS ATM 1.3.2	Respond to distress and urgency messages and signals.	3	ICAO Annex 10, ICAO Doc 4444 *Content support: EUROCONTROL Guidelines for Controller Training in the Handling of Unusual/Emergency Situations.*	ALL						x					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 1.3.3	Use ATS surveillance system for the provision of ALRS.	3		APS ACS	x					x					
Sub-topic ATM 1.4 — ATS system capacity and air traffic flow management															
APS ATM 1.4.1	Appreciate principles of ATS system capacity and air traffic flow management.	3	*Content support: Flexible use of airspace, free flight.*	APP ACP APS ACS		x							x		x
APS ATM 1.4.2	Apply flow management procedures in the provision of ATC.	3		APP ACP APS ACS	x	x							x		
APS ATM 1.4.3	Organize traffic flows and patterns to take account of airspace boundaries.	4	*Content support: Civil and military, controlled, uncontrolled, advisory, restricted, danger, prohibited, special rules, sector boundaries, national boundaries, FIR boundaries, delegated airspace, transfer of control, transfer of communication.*	APP ACP APS ACS	x	x					x				
APS ATM 1.4.4	Organize traffic flows and patterns to take account of areas of responsibility.	4		APP ACP APS ACS	x	x					x				
Sub-topic ATM 1.4 — ATS system capacity and air traffic flow management															
APS ATM 1.4.5	Inform supervisor of situation.	3	*Content support: Abnormal situations, decrease in sector capacity, limitations on systems and equipment, changes in workload/-capacity, unusual meteorological conditions, relevant information like: reported ground-based incidents, forms.*	APP ACP APS ACS	x			x	x	x				x	
APS ATM 1.4.6	Organize traffic flows and patterns to take account of ATS surveillance system capability.	4		APS ACS	x	x									

Sub-topic ATM 1.5 — Airspace management (ASM)

APS ATM 1.5.1	Appreciate the principles and means of ASM.	3	*Content support: ICAO Doc 4444.*	APP ACP APS ACS											x
APS ATM 1.5.2	Organize traffic to take account of ASM.	4	Real-time activation, deactivation or reallocation of airspace.	APS ACS	x	x					x				

TOPIC ATM 2: COMMUNICATION

Sub-topic ATM 2.1 — Effective communication

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 2.1.1	Use approved phraseology.	3	ICAO Doc 4444 *Content support: ICAO Doc 9432 RTF manual, Standard words and phrases as contained in ICAO Annex 10, Volume II.*	ALL				x							
APS ATM 2.1.2	Ensure effective communication.	4	Communication techniques, readback/verification of readback.	ALL				x							

TOPIC ATM 3: ATC CLEARANCES AND ATC INSTRUCTIONS

Sub-topic ATM 3.1 — ATC clearances

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 3.1.1	Issue appropriate ATC clearances.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	x	x	x								
APS ATM 3.1.2	Integrate appropriate ATC clearances in control service.	4		ALL		x	x								
APS ATM 3.1.3	Ensure the agreed course of action is carried out.	4		ALL		x									

Sub-topic ATM 3.2 — ATC instructions

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 3.2.1	Issue appropriate ATC instructions.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	x	x									
APS ATM 3.2.2	Integrate appropriate ATC instructions in control service.	4		ALL		x									

Sub-topic ATM 4.3 — Coordination procedures

APS ATM 4.3.1	Initiate appropriate coordination.	3	Delegation/transfer of responsibility for air-ground communications and separation, transfer of control, ICAO Doc 4444. *Content support: Release point.*	ALL					x						
APS ATM 4.3.2	Analyse effect of coordination requested by an adjacent position/unit.	4	*Content support: Delegation/transfer of responsibility for air-ground communications and separation, release point, transfer of control.*	ALL	x				x						

				SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 4.3 — Coordination procedures														
APS ATM 4.3.3	Select, after negotiation, an appropriate course of action.	5	ALL	x	x			x						
APS ATM 4.3.4	Ensure the agreed course of action is carried out.	4	ALL		x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 4.3.5	Coordinate in the provision of FIS.	4	ICAO Doc 4444	ALL					x						
APS ATM 4.3.6	Coordinate in the provision of ALRS.	4	ICAO Doc 4444	ALL					x						
TOPIC ATM 5: ALTIMETRY AND LEVEL ALLOCATION															
Sub-topic ATM 5.1 — Altimetry															
APS ATM 5.1.1	Allocate levels according to altimetry data.	4	ICAO Doc 8168, ICAO Doc 4444	ALL		x									
APS ATM 5.1.2	Ensure separation according to altimetry data.	4	*Content support: Transition level, transition altitude, transition layer, height, flight level, altitude, vertical distance to airspace boundaries.*	ALL			x								
Sub-topic ATM 5.2 — Terrain clearance															
APS ATM 5.2.1	Provide planning, coordination and control actions appropriate to the rules for minimum safe levels and terrain clearance.	4	*Content support: Minimum vectoring altitude, terrain clearance dimensions, minimum safe altitudes, transition level, minimum flight level, minimum sector altitude.*	APS ACS	x	x	x		x						
TOPIC ATM 6: SEPARATIONS															
Sub-topic ATM 6.1 — Vertical separation															
APS ATM 6.1.1	Provide standard vertical separation.	4	ICAO Doc 4444, ICAO Doc 7030, level allocation, during climb/descent, rate of climb/descent, holding pattern	APP APS	x		x								

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 6.1.2	Provide increased vertical separation.	4	ICAO Doc 4444, ICAO Doc 7030. *Content support: Level allocation, during climb/descent, rate of climb/descent.*	APP ACP APS ACS	x		x								
APS ATM 6.1.3	Appreciate the application of vertical emergency separation.	3	ICAO Doc 4444, ICAO Doc 7030.	APP ACP APS ACS			x			x					
APS ATM 6.1.4	Provide vertical separation in a surveillance environment.	4	Pressure altitude-derived information, pilot level reports. *Content support: Into/out of ATS surveillance system coverage.*	APS ACS	x		x								
Sub-topic ATM 6.2 — Longitudinal separation in a surveillance environment															
APS ATM 6.2.1	Provide longitudinal separation in a surveillance environment.	4	Successive departures, successive arrivals, overflights, speed control, silent transfer, ICAO Doc 4444	APS	x		x								
Sub-topic ATM 6.3 — Delegation of separation															
APS ATM 6.3.1	Delegate separation to pilots in the case of aircraft executing successive visual approaches.	4		APP APS	x		x								
APS ATM 6.3.2	Appreciate the conditions which must be met when delegating separation to pilots to fly maintaining own separation while in VMC.	3	ICAO Doc 4444	APP APS			x								
Sub-topic ATM 6.4 — Wake turbulence distance-based separation															
APS ATM 6.4.1	Provide distance-based wake turbulence separation.	4	ICAO Doc 4444 *Content support: National documents.*	APS ACS	x		x								

Sub-topic ATM 6.5 — Separation based on ATS surveillance systems

APS ATM 6.5.1	Describe how separation based on ATS surveillance systems is applied.	2	ICAO Doc 4444	APS ACS											x
APS ATM 6.5.2	Provide horizontal separation.	4	ICAO Doc 4444, ICAO Doc 7030, Local operation manuals, holding.	APS ACS	x		x								

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 6.5.3	Provide horizontal separation by vectoring in a variety of situations.	4	*Content support: Transit, meteorological phenomena, vectoring for approach, departure vs transit vs arrival.*	APS ACS	x		x								
Sub-topic ATM 6.5 — Separation based on ATS surveillance systems															
APS ATM 6.5.4	Ensure horizontal or vertical separation from airspace boundaries.	4	Adjacent sectors, prohibited restricted and danger areas	APS ACS	x		x								

TOPIC ATM 7: AIRBORNE COLLISION AVOIDANCE SYSTEMS AND GROUND-BASED SAFETY NETS

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 7.1 — Airborne collision avoidance systems															
APS ATM 7.1.1	Differentiate between ACAS advisory thresholds and separation standards applicable in the approach control environment.	2	ICAO Doc 9863	APP APS											x
APS ATM 7.1.2	Describe the controller responsibility during and following an ACAS RA reported by pilot.	2	ICAO Doc 4444	ALL											x
APS ATM 7.1.3	Respond to pilot notification of actions based on airborne systems warnings.	3	ACAS, TAWS	ALL	x		x								
Sub-topic ATM 7.2 — Ground-based safety nets															
APS ATM 7.2.1	Describe the controller responsibility during and following safety net warnings.	2	ICAO Doc 4444 *Content support: STCA, MSAW, APW, APM.*	APS ACS											x
APS ATM 7.2.2	Respond to ground-based safety nets warnings.	3	*Content support: STCA, MSAW, APW, APM.*	APS ACS	x		x								

TOPIC ATM 8: DATA DISPLAY

Sub-topic ATM 8.1 — Data management

APS ATM 8.1.1	Update the data display to accurately reflect the traffic situation.	3	*Content support: Information displayed, strip marking procedures, electronic information data displays, actions based on traffic display information, calculation of EETs*	ALL	x	x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 8.1.2	Analyse pertinent data on data displays.	4		ALL	x										
APS ATM 8.1.3	Organize pertinent data on data displays.	4		ALL	x	x									
APS ATM 8.1.4	Obtain flight plan information.	3	CPL, FPL, supplementary information. *Content support: RPL, AFIL.*	ALL		x									
APS ATM 8.1.5	Use flight plan information.	3		ALL		x									

TOPIC ATM 9: OPERATIONAL ENVIRONMENT (SIMULATED)

Sub-topic ATM 9.1 — Integrity of the operational environment

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 9.1.1	Obtain information concerning the operational environment.	3	*Content support: Briefing, notices, local orders, verification of information.*	ALL	x										
APS ATM 9.1.2	Ensure the integrity of the operational environment.	4	*Content support: Integrity of displays, verification of the information provided by displays.*	APP ACP APS ACS	x	x									

Sub-topic ATM 9.2 — Verification of the currency of operational procedures

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 9.2.1	Check all relevant documentation before managing traffic.	3	*Content support: Briefing, LOAs, NOTAM, AICs.*	ALL	x										
APS ATM 9.2.2	Manage traffic in accordance with procedural changes.	4		APP ACP APS ACS		x	x								

Sub-topic ATM 9.3 — Handover-takeover

APS ATM 9.3.1	Transfer information to the relieving controller.	3		ALL	x			x	x						
APS ATM 9.3.2	Obtain information from the controller handing over.	3		ALL	x			x	x						

TOPIC ATM 10: PROVISION OF CONTROL SERVICE

Sub-topic ATM 10.1 — Responsibility and processing of information

APS ATM 10.1.1	Describe the division of responsibility between air traffic control units.	2	ICAO Doc 4444	ALL											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 10.1.2	Describe the responsibility in regard to military traffic.	2	ICAO Doc 4444 *Content support: ICAO Doc 9554.*	ALL											x
APS ATM 10.1.3	Describe the responsibility in regard to unmanned free balloons.	2	ICAO Doc 4444	APP ACP APS ACS											x
APS ATM 10.1.4	Obtain operational information.	3	ICAO Doc 4444, Local operation manuals.	APP ACP APS ACS	x	x									
APS ATM 10.1.5	Interpret operational information.	5		APP ACP APS ACS	x	x									
APS ATM 10.1.6	Organize forwarding of operational information.	4	*Content support: Including the use of backup procedures.*	APP ACP APS ACS		x		x							
APS ATM 10.1.7	Integrate operational information into control decisions.	4		APP ACP APS ACS		x					x				
APS ATM 10.1.8	Appreciate the influence of operational requirements.	3	*Content support: Military flying, calibration flights, aerial photography.*	ALL	x	x									
Sub-topic ATM 10.2 — ATS surveillance service															
APS ATM 10.2.1	Explain the responsibility for the provision of an ATS surveillance service appropriate to APS rating.	2	ICAO Doc 4444, ICAO Annex 11, Local operation manuals.	APS											x
APS ATM 10.2.2	Explain the functions that may be performed with the use of ATS surveillance systems derived information presented on a situation display.	2	ICAO Doc 4444	APS ACS											x
APS ATM 10.2.3	Provide planning, coordination and control actions appropriate to the VFR, SVFR and IFR in VMC and IMC.	4	ICAO Annex 2, ICAO Annex 11, ICAO Doc 4444.	APS	x	x	x		x						

APS ATM 10.2.4	Apply the procedures for termination of ATS surveillance service.	3	ICAO Doc 4444 *Content support: Transfer of control, termination or interruption of ATS surveillance service.*	APS ACS	x	x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 10.3 — Traffic management process															
APS ATM 10.3.1	Ensure that situational awareness is maintained.	4	Information gathering, scanning, traffic projection.	APS ACS	x										
APS ATM 10.3.2	Detect conflicts in time for appropriate resolution.	4		ALL	x		x								
APS ATM 10.3.3	Identify potential solutions to achieve a safe and effective traffic flow.	3		APP ACP APS ACS			x				x				
APS ATM 10.3.4	Evaluate possible outcomes of different planning and control actions.	5		APP ACP APS ACS	x										
APS ATM 10.3.5	Select an appropriate plan in time to achieve safe and effective traffic flow.	5		APP ACP APS ACS		x	x								
APS ATM 10.3.6	Ensure an adequate priority of actions.	4		ALL	x	x	x				x		x		
APS ATM 10.3.7	Execute selected plan in a timely manner.	3		APP ACP APS ACS		x					x		x		
APS ATM 10.3.8	Ensure a safe and efficient outcome is achieved.	4	Traffic monitoring, adaptability and follow up.	ALL		x							x		
Sub-topic ATM 10.4 — Handling traffic															
APS ATM 10.4.1	Manage arrivals, departures and overflights.	4		APP ACP APS ACS	x	x									
APS ATM 10.4.2	Balance the workload against personal capacity.	5	*Content support:* *Re-routing, re-planning, prioritising solutions, denying requests, delegating responsibility for separation.*	APP ACP APS ACS									x		

APS ATM 10.4.3	Define flight path monitoring and vectoring.	1	ICAO Doc 4444	APS ACS											x
Sub-topic ATM 10.4 — Handling traffic															
APS ATM 10.4.4	Explain the requirements for vectoring and termination of vectoring.	2	ICAO Doc 4444	APS ACS											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 10.4.5	Provide vectoring.	4	ICAO Doc 4444 *Content support: Separation, expediting arrivals, departures and/or climb to cruising levels, aircraft leaving the hold, navigation assistance, uncontrolled airspace.*	APS ACS	x	x									
APS ATM 10.4.6	Apply the procedures for termination of vectoring.	3	ICAO Doc 4444	APS ACS	x	x									
APS ATM 10.4.7	Manage traffic on different types of approaches.	4	Precision, non-precision, visual.	APP APS		x									
APS ATM 10.4.8	Initiate missed approach.	3	ICAO Doc 4444	APP APS		x									
APS ATM 10.4.9	Integrate aircraft on missed approach into the traffic situation.	4		APP APS		x									
Sub-topic ATM 10.5 — Control service with advanced system support															
APS ATM 10.5.1	Appreciate the impact of advanced systems on the provision of approach control service.	3	*Content support: Sequencing systems, arrival management, departure management, automated holding lists, vertical traffic displays, conflict detection and decision making tools, automated information and coordination tools.*	APS		x									x

TOPIC ATM 11: HOLDING

Sub-topic ATM 11.1 — General holding procedures

APS ATM 11.1.1	Apply holding procedures.	3	ICAO Doc 4444, holding instructions, allocation of holding levels, onward clearance times.	APP ACP APS ACS		x	x								
APS ATM 11.1.2	Appreciate the factors affecting holding patterns.	3	Effect of speed, effect of level used, effect of navigation aid in use, turbulence, aircraft type.	APP ACP APS ACS											x

Sub-topic ATM 11.2 — Approaching aircraft

APS ATM 11.2.1	Calculate Expected Approach Times (EATs) and Expected Onward Clearance times.	3		APP APS		x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ATM 11.2.2	Organize the traffic landing sequence in a holding pattern.	4	*Content support: Company preference, aircraft performance, aircraft approach capability, ILS categories, flow control management.*	APP APS	x	x									
Sub-topic ATM 11.3 — Holding in a surveillance environment															
APS ATM 11.3.1	Organize traffic to separate other aircraft from holding aircraft.	4		APS ACS	x		x								
APS ATM 11.3.2	Integrate system support, when available.	4	*Content support: Arrival management system, automated holding lists, vertical traffic displays.*	APS ACS	x	x									
TOPIC ATM 12: IDENTIFICATION															
Sub-topic ATM 12.1 — Establishment of identification															
APS ATM 12.1.1	Appreciate the precautions when establishing identification.	3		APS ACS	x	x									x
APS ATM 12.1.2	Identify aircraft.	3	*Content support: PSR, SSR or ADS identification method.*	APS ACS	x	x									
APS ATM 12.1.3	Apply procedures in the case of misidentification.	3		APS ACS	x	x									
Sub-topic ATM 12.2 — Maintenance of identification															
APS ATM 12.2.1	Appreciate the necessity to maintain identification.	3		APS ACS	x	x									x

Sub-topic ATM 12.3 — Loss of identity

APS ATM 12.3.1	Appreciate when an aircraft identification is lost or in doubt.	3	*Content support: Out of ATS surveillance system coverage, failure of ATS surveillance system, weather clutter, other clutter, garbling, holding.*	APS ACS	x										x
APS ATM 12.3.2	Apply methods to re-establish identification.	3		APS ACS	x	x									x
APS ATM 12.3.3	Respond to loss/doubt concerning identification.	3	*Content support: Procedural separation.*	APS ACS	x	x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 12.4 — Position Information															
APS ATM 12.4.1	Appreciate the circumstances when position information should be passed to the aircraft.	3		APS ACS	x	x									x
APS ATM 12.4.2	State the format in which position information can be passed to aircraft.	1	ICAO Doc 4444	APS ACS											x
Sub-topic ATM 12.5 — Transfer of identity															
APS ATM 12.5.1	Apply the methods of transfer of identification.	3		APS ACS	x	x									
APS ATM 12.5.2	Appreciate the precautions when transferring identification.	3		APS ACS	x	x									x

SUBJECT 4: METEOROLOGY

The subject objective is:

Learners shall acquire, decode and make proper use of meteorological information relevant to the provision of ATS.

TOPIC MET 1: METEOROLOGICAL PHENOMENA

Sub-topic MET 1.1 — Meteorological phenomena

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS MET 1.1.1	Appreciate the impact of adverse weather.	3	Thunderstorms, icing, clear air turbulence (CAT), turbulence, microburst, wind shear, severe mountain waves, line squalls, volcanic ash.	APP APS	x					x					
APS MET 1.1.2	Integrate data about meteorological phenomena into provision of ATS.	4	Clearances, instructions and transmitted information. *Content support: Relevant meteorological phenomena.*	ALL		x									
APS MET 1.1.3	Use techniques to avoid adverse weather when necessary/possible.	3	Rerouting, level change.	APP ACP APS ACS						x					

TOPIC MET 2: SOURCES OF METEOROLOGICAL DATA

Sub-topic MET 2.1 — Sources of meteorological information

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS MET 2.1.1	Obtain meteorological information	3	METAR, TAF, SIGMET, AIRMET. *Content support: AIREP/AIREP Special*	APP ACP APS ACS		x									
APS MET 2.1.2	Relay meteorological information.	3	ICAO Doc 4444 *Content support: Flight information centre, adjacent ATS unit.*	APP ACP APS ACS		x									

SUBJECT 5: NAVIGATION

The subject objective is:

Learners shall analyse all navigational aspects in order to organize the traffic.

TOPIC NAV 1: MAPS AND AERONAUTICAL CHARTS

Sub-topic NAV 1.1 — Maps and charts

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS NAV 1.1.1	Decode symbols and information displayed on aeronautical maps and charts.	3	Instrument approach charts, SID charts, aerodrome charts, visual approach charts. *Content support: Military maps and charts.*	TWR APP APS											x
APS NAV 1.1.2	Use relevant maps and charts.	3		APP ACP APS ACS		x									

TOPIC NAV 2: INSTRUMENT NAVIGATION

Sub-topic NAV 2.1 — Navigational systems

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS NAV 2.1.1	Manage traffic in case of change in the operational status of navigational systems.	4	*Content support: Limitations, status of ground-based and satellite-based systems.*	APP ACP APS ACS	x	x							x		
APS NAV 2.1.2	Appreciate the effect of precision, limitations and change of the operational status of navigational systems.	3	*Content support: Limitations, status, degraded procedures.*	ALL						x					

Sub-topic NAV 2.2 — Stabilized approach

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS NAV 2.2.1	Describe the concept of stabilized approach.	2	ICAO Doc 8168	TWR APP APS											x
APS NAV 2.2.2	Appreciate the effect of late change of runway-in-use or type of approach for landing aircraft.	3		APP APS		x									

APS NAV 2.2.3	Appreciate controller actions that may contribute to unstabilized approach.	3	Inappropriate speed control, vectoring for short final, vectoring for approach with significant tailwind, glide path interception from above, lack or incorrect distance to touchdown information, delayed descent.	APS		x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic NAV 2.3 — Instrument departures and arrivals															
APS NAV 2.3.1	Characterize SIDs.	2		TWR APP APS											x
APS NAV 2.3.2	Describe the types and phases of instrument approach procedures.	2		APP APS											x
APS NAV 2.3.3	Describe the relevant minima applicable for a precision/ non-precision and visual approach.	2		TWR APP APS											x
Sub-topic NAV 2.4 — Navigational assistance															
APS NAV 2.4.1	Evaluate the necessary information to be provided to pilots in need of navigational assistance.	5	*Content support: Nearest most suitable aerodrome, track, heading, distance, aerodrome information, any other navigational assistance relevant at the time.*	APP ACP APS ACS	x	x									
APS NAV 2.4.2	Assist aircraft in navigation when required.	3	Aircraft observed to be deviating from its known intended route, on request.	APS ACS		x				x					
Sub-topic NAV 2.5 — Satellite-based systems															
APS NAV 2.5.1	State the different applications of satellite-based systems relevant for approach operations.	1	*Content support: NPA, APV-baro VNAV, APV, LPV, Precision approach, ICAO Doc 8168, Volume II.*	APP APS											x
Sub-topic NAV 2.6 — PBN applications															
APS NAV 2.6.1	State the navigation applications used in approach and terminal environments.	1	Approach-RNP APCH/ RNP AR APCH; Terminal-RNAV-1 (≈P-RNAV) *Content support: ICAO Doc 9613.*	APP APS											x
APS NAV 2.6.2	Explain the principles and designation of navigation specifications in use.	2	Content *support: Performance, functionality, sensors, aircrew and controller requirements.*	APP ACP APS ACS											x

APS NAV 2.6.3	State future PBN developments.	1	A-RNP, APV *Content support: RNP 3D, RNP 4D.*	TWR APP ACP APS ACS											x

SUBJECT 6: AIRCRAFT

The subject objective is:

Learners shall assess and integrate aircraft performance in the provision of ATS.

TOPIC ACFT 1: AIRCRAFT INSTRUMENTS

Sub-topic ACFT 1.1 — Aircraft instruments

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ACFT 1.1.1	Integrate information from aircraft instruments provided by the pilot in the provision of ATS.	4		ALL	x										
APS ACFT 1.1.2	Explain the operation of aircraft radio equipment.	2	*Content support: Radios (number of), emergency radios.*	ALL											x
APS ACFT 1.1.3	Explain the operation of on-board surveillance equipment.	2	Transponders: equipment Mode A, Mode C, Mode S, ADS capability.	TWR APS ACS											x

TOPIC ACFT 2: AIRCRAFT CATEGORIES

Sub-topic ACFT 2.1 — Wake turbulence

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ACFT 2.1.1	Explain the wake turbulence effect and associated hazards to the succeeding aircraft.	2		ALL											x
APS ACFT 2.1.2	Appreciate the techniques used to prevent hazards associated with wake turbulence on succeeding aircraft.	3		ALL	x	x									

Sub-topic ACFT 2.2 — Application of ICAO approach categories

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ACFT 2.2.1	Describe the use of ICAO approach categories.	2	ICAO Doc 8168	TWR APP APS											x

Sub-topic ACFT 2.2 — Application of ICAO approach categories

APS ACFT 2.2.2	Appreciate the effect of ICAO approach categories on the traffic organization.	3	TWR APP APS	x	x									

TOPIC ACFT 3: FACTORS AFFECTING AIRCRAFT PERFORMANCE

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ACFT 3.1 — Climb factors															
APS ACFT 3.1.1	Integrate the influence of factors affecting aircraft during climb.	4	*Content support: Speed, mass, air density, cabin pressurization, wind and temperature.*	APP ACP APS ACS		x									
APS ACFT 3.1.2	Appreciate the influence of factors affecting aircraft on take-off.	3	*Content support: Runway conditions, runway slope, aerodrome elevation, wind, temperature, aircraft configuration, airframe contamination and aircraft mass.*	APP APS		x									
Sub-topic ACFT 3.2 — Cruise factors															
APS ACFT 3.2.1	Integrate the influence of factors affecting aircraft during cruise.	4	Level, cruising speed, wind, mass, cabin pressurization.	APP ACP APS ACS		x									
Sub-topic ACFT 3.3 — Descent and initial approach factors															
APS ACFT 3.3.1	Integrate the influence of factors affecting aircraft during descent.	4	*Content support: Wind, speed, rate of descent, aircraft configuration, cabin pressurization.*	APP APS		x									
Sub-topic ACFT 3.4 — Final approach and landing factors															
APS ACFT 3.4.1	Integrate the influence of factors affecting aircraft during final approach and landing.	4	*Content support: Wind, aircraft configuration, mass, meteorological conditions, runway conditions, runway slope, aerodrome elevation.*	APP APS		x									
Sub-topic ACFT 3.5 — Economic factors															
APS ACFT 3.5.1	Integrate consideration of economic factors affecting aircraft.	4	*Content support: Routing, level, speed, rate of climb and rate of descent, approach profile.*	APP APS		x									

APS ACFT 3.5.2	Use continuous climb techniques where applicable.	3	APP ACP APS ACS		x									
APS ACFT 3.5.3	Use direct routing where applicable.	3	APP ACP APS ACS		x									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ACFT 3.6 — Environmental factors															
APS ACFT 3.6.1	Appreciate the performance restrictions due to environmental constraints.	3	*Content support: Fuel dumping, noise abatement procedures, minimum flight levels, bird hazard, continuous descent operations.*	APP APS		x									
TOPIC ACFT 4: AIRCRAFT DATA															
Sub-topic ACFT 4.1 — Performance data															
APS ACFT 4.1.1	Integrate the average performance data of a representative sample of aircraft which will be encountered in the operational/working environment into the provision of a control service.	4	Performance data under a representative variety of circumstances.	APP ACP APS ACS	x	x									

SUBJECT 7: HUMAN FACTORS

The subject objective is:

Learners shall recognize the necessity to constantly extend their knowledge and analyse factors which affect personal and team performance.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC HUM 1: PSYCHOLOGICAL FACTORS															
Sub-topic HUM 1.1 — Cognitive															
APS HUM 1.1.1	Describe the human information processing model.	2	Attention, perception, memory, situational awareness, decision making, response.	ALL											x
APS HUM 1.1.2	Describe the factors which influence human information processing.	2	Confidence, stress, learning, knowledge, experience, fatigue, alcohol/drugs, distraction, interpersonal relations.	ALL											x
APS HUM 1.1.3	Monitor the effect of human information processing factors on decision making.	3	*Content support: Workload, stress, interpersonal relations, distraction, confidence.*	ALL								x			
TOPIC HUM 2: MEDICAL AND PHYSIOLOGICAL FACTORS															
Sub-topic HUM 2.1 — Fatigue															
APS HUM 2.1.1	State factors that cause fatigue.	1	Shift work. *Content support: Night shifts and rosters.*	ALL											x
Sub-topic HUM 2.1 — Fatigue															
APS HUM 2.1.2	Describe the onset of fatigue.	2	*Content support: Lack of concentration, listlessness, irritability, frustration, ICAO Circular 241 – AN/145* Human Factors in ATC..	ALL											x
APS HUM 2.1.3	Recognize the onset of fatigue in self.	1	*Content support: ICAO Circular 241 – AN/145* Human Factors in ATC.	ALL								x			

APS HUM 2.1.4	Recognize the onset of fatigue in others.	1	ALL										x	
APS HUM 2.1.5	Describe appropriate action when recognizing fatigue.	2	ALL											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 2.2 — Fitness															
APS HUM 2.2.1	Recognize signs of lack of personal fitness.	1		ALL								x			
APS HUM 2.2.2	Describe actions when aware of a lack of personal fitness.	2		ALL											x
TOPIC HUM 3: SOCIAL AND ORGANIZATIONAL FACTORS															
Sub-topic HUM 3.1 — Team resource management (TRM)															
APS HUM 3.1.1	State the relevance of TRM.	1		ALL											x
APS HUM 3.1.2	State the content of the TRM concept.	1	*Content support: Team work, human error, team roles, stress, decision making, communication, situational awareness.*	ALL											x
Sub-topic HUM 3.2 — Teamwork and team roles															
APS HUM 3.2.1	Identify reasons for conflict.	3		ALL											x
APS HUM 3.2.2	Describe actions to prevent human conflicts.	2	*Content support: TRM team roles.*	ALL											x
APS HUM 3.2.3	Describe strategies to cope with human conflicts.	2	*Content support: In your team, in the simulator.*	ALL											x
Sub-topic HUM 3.3 — Responsible behaviour															
APS HUM 3.3.1	Consider the factors which influence responsible behaviour.	2	*Content support: Situation, team, personal situation and judgement, instance of justification, moral motivation, personality.*	ALL								x			
APS HUM 3.3.2	Apply responsible judgement.	3	Case study and discussion about a dilemma situation.	ALL								x			

TOPIC HUM 4: STRESS

Sub-topic HUM 4.1 — Stress

APS HUM 4.1.1	Recognize the effects of stress on performance.	1	Stress and its symptoms in self and in others.	ALL								x		x	

Sub-topic HUM 4.2 — Stress management

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS HUM 4.2.1	Act to reduce stress.	3	The effect of personality in coping with stress, The benefits of active stress management.	ALL								x			
APS HUM 4.2.2	Respond to stressful situation by offering, asking or accepting assistance.	3	*Content support: The benefits of offering, accepting and asking for help in stressful situations.*	ALL								x		x	
APS HUM 4.2.3	Recognize the effect of shocking and stressful events.	1	Self and others, abnormal situations, CISM.	ALL								x		x	
APS HUM 4.2.4	Consider the benefits of Critical Incident Stress Management (CISM).	2		ALL											x
APS HUM 4.2.5	Explain procedures used following an incident/accident.	2	*Content support: CISM, counselling, human element.*	ALL											x

TOPIC HUM 5: HUMAN ERROR

Sub-topic HUM 5.1 — Human error

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS HUM 5.1.1	Explain the relationship between error and safety.	2	Number and combination of errors, proactive versus reactive approach to discovery of error. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											x
APS HUM 5.1.2	Differentiate between the types of error.	2	Slips, lapses, mistakes *Content support: Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											x
APS HUM 5.1.3	Describe error-prone conditions.	2	*Content support: Increase in traffic, changes in procedures, complexities of systems or traffic, weather, unusual occurrences.*	ALL											x

APS HUM 5.1.4	Collect examples of different error types, their causes and consequences in ATC.	3	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS HUM 5.1.5	Explain how to detect errors to compensate for them.	2	STCA, MSAW, individual and collective strategy. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											x
APS HUM 5.1.6	Execute corrective actions.	3	Error compensation. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL	x	x	x					x			

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS HUM 5.1.7	Explain the importance of error management.	2	*Content support: Prevention of incidents, safety improvement, revision of procedures and/or working practises.*	ALL											x
APS HUM 5.1.8	Describe the impact on an ATCO following an occurrence/incident.	2	*Content support: Reporting, SMS, investigation, CISM.*	ALL											x
Sub-topic HUM 5.2 — Violation of rules															
APS HUM 5.2.1	Explain the causes and dangers of violation of rules becoming accepted as a practice.	2	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC*.*	ALL											x
TOPIC HUM 6: COLLABORATIVE WORK															
Sub-topic HUM 6.1 — Communication															
APS HUM 6.1.1	Use communication effectively in ATC.	3		ALL				x							
APS HUM 6.1.2	Analyse examples of pilot and controller communication for effectiveness.	4		ALL											x
Sub-topic HUM 6.2 — Collaborative work within the same area of responsibility															
APS HUM 6.2.1	List communication means between controllers in charge of the same area of responsibility (sector or tower).	1	*Content support: Electronic, written, verbal and non-verbal communication.*	ALL											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS HUM 6.2.2	Explain consequences of the use of communication means on effectiveness.	2	*Content support: Strips legibility and encoding, labels designation, feedback.*	ALL											x
APS HUM 6.2.3	List possible actions to provide a safe position handover.	1	*Content support: Rigour, preparation, overlap time.*	ALL											x
APS HUM 6.2.4	Explain consequences of a missed position handover process.	2		ALL											x
Sub-topic HUM 6.3 — Collaborative work between different areas of responsibility															
APS HUM 6.3.1	List factors and means for an effective coordination between sectors and/or tower positions.	1	*Content support: Other sectors constraints, electronic coordination tools.*	ALL											x
Sub-topic HUM 6.4 — Controller/pilot cooperation															
APS HUM 6.4.1	Describe parameters affecting controller/pilot cooperation.	2	*Content support: Workload, mutual knowledge, controller vs pilot mental picture.*	ALL											x

SUBJECT 8: EQUIPMENT AND SYSTEMS

The subject objective is:

Learners shall integrate knowledge and understanding of the basic working principles of equipment and systems and comply with the equipment and system degradation procedures in the provision of ATS.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC EQPS 1: VOICE COMMUNICATIONS															
Sub-topic EQPS 1.1 — Radio communications															
APS EQPS 1.1.1	Operate two-way communication equipment.	3	Transmit/receive switches, procedures. *Content support: Frequency selection, standby equipment.*	ALL				x							
APS EQPS 1.1.2	Identify indications of operational status of radio equipment.	3	*Content support: Indicator lights, serviceability displays, selector/-frequency displays.*	ALL				x							
APS EQPS 1.1.3	Consider radio range.	2	*Content support: Transfer to another frequency, apparent radio failure, failure to establish radio contact, frequency protection range.*	APP ACP APS ACS				x							
Sub-topic EQPS 1.2 — Other voice communications															
APS EQPS 1.2.1	Operate landline communications.	3	*Content support: Telephone, interphone and intercom equipment.*	ALL				x							
TOPIC EQPS 2: AUTOMATION IN ATS															
Sub-topic EQPS 2.1 — Aeronautical fixed telecommunication network (AFTN)															
APS EQPS 2.1.1	Decode AFTN messages.	3	*Content support: Movement and control messages, NOTAM, SNOWTAM, BIRDTAM.*	ALL		x									

Sub-topic EQPS 2.2 — Automatic data interchange

APS EQPS 2.2.1	Use automatic data transfer equipment where available.	3	*Content support: Sequencing systems, automated information and coordination, OLDI.*	TWR APS ACS					x						

TOPIC EQPS 3: CONTROLLER WORKING POSITION

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic EQPS 3.1 — Operation and monitoring of equipment															
APS EQPS 3.1.1	Monitor the technical integrity of the controller working position.	3	Notification procedures, responsibilities.	ALL		x									
APS EQPS 3.1.2	Operate the equipment of the controller working position.	3	*Content support: Situation displays, flight progress board, flight data display, radio, telephone, maps and charts, strip-printer, clock, information systems, UDF/VDF.*	ALL		x									
APS EQPS 3.1.3	Operate available equipment in abnormal and emergency situations.	3		ALL						x					
Sub-topic EQPS 3.2 — Situation displays and information systems															
APS EQPS 3.2.1	Use situation displays.	3		ALL		x									
APS EQPS 3.2.2	Check availability of information material.	3		ALL	x										
APS EQPS 3.2.3	Obtain information from equipment.	3		APP ACP APS ACS	x										
Sub-topic EQPS 3.3 — Flight data systems															
APS EQPS 3.3.1	Use the flight data information at controller working position.	3		ALL		x									
Sub-topic EQPS 3.4 — Use of ATS surveillance system															
APS EQPS 3.4.1	Use the ATS surveillance system functions.	3		APS ACS	x	x	x				x		x		
APS EQPS 3.4.2	Analyse the information provided by the ATS surveillance system.	4		APS ACS	x										
APS EQPS 3.4.3	Assign codes.	4		APS ACS		x									

APS EQPS 3.4.4	Appreciate the use of advanced surveillance technology.	3	*Content support: Mode S, ADS-B, MLAT.*	APS ACS											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic EQPS 3.5 — Advanced systems															
APS EQPS 3.5.1	Appreciate the use of controller pilot datalink communications when available.	3		APS ACS											x
APS EQPS 3.5.2	Appreciate the use of information provided by advanced systems.	3	*Content support: Trajectory-based information, MTCD, MONA.*	APS ACS											x
TOPIC EQPS 4: FUTURE EQUIPMENT															
Sub-topic EQPS 4.1 — New developments															
APS EQPS 4.1.1	Recognize future developments.	1	New advanced systems.	ALL											x
TOPIC EQPS 5: EQUIPMENT AND SYSTEMS LIMITATIONS AND DEGRADATION															
Sub-topic EQPS 5.1 — Reaction to limitations															
APS EQPS 5.1.1	Take account of the limitations of equipment and systems.	2		ALL		x									
APS EQPS 5.1.2	Respond to technical deficiencies of the operational position.	3	Notification procedures, responsibilities.	ALL						x					
Sub-topic EQPS 5.2 — Communication equipment degradation															
APS EQPS 5.2.1	Identify that communication equipment has degraded.	3	*Content support: Ground-air and landline communications.*	APP ACP APS ACS						x					
APS EQPS 5.2.2	Apply contingency procedures in the event of communication equipment degradation.	3	Procedures for total or partial degradation of ground-air and landline communications, alternative methods of transferring data.	APP ACP APS ACS						x					
Sub-topic EQPS 5.3 — Navigational equipment degradation															
APS EQPS 5.3.1	Identify when a navigational equipment failure will affect operational ability.	3	*Content support: VOR, navigational aids.*	ALL						x					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS EQPS 5.3.2	Apply contingency procedures in the event of navigational equipment degradation.	3	*Content support: Vertical separation, information to aircraft, navigational assistance, seeking assistance from adjacent units.*	TWR ACP APS ACS						x					
Sub-topic EQPS 5.4 — Surveillance equipment degradation															
APS EQPS 5.4.1	Identify that surveillance equipment has degraded.	3	Partial power failure, loss of certain facilities, total failure.	APS ACS	x										
APS EQPS 5.4.2	Apply contingency procedures in the event of surveillance equipment degradation.	3	Content support: Inform adjacent sectors, Inform aircraft, apply vertical separation (emergency), increased horizontal separation, reduce the number of aircraft entering area of responsibility, transfer aircraft to another unit.	APS ACS						x					
Sub-topic EQPS 5.5 — ATC processing system degradation															
APS EQPS 5.5.1	Identify a processing system degradation.	3	*Content support: FDPS, SDPS, software processing of situation display.*	APS ACS	x										
APS EQPS 5.5.2	Apply contingency procedures in the event of a processing system degradation.	3		APS ACS						x					

SUBJECT 9: PROFESSIONAL ENVIRONMENT

The subject objective is:

Learners shall identify the need for close cooperation with other parties concerning ATM operations and appreciate aspects of environmental protection.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC PEN 1: FAMILIARIZATION															
Sub-topic PEN 1.1 — Study visit to approach control unit															
APS PEN 1.1.1	Appreciate the functions and provision of an operational approach control service.	3	Study visit to an approach control unit.	APP APS											
TOPIC PEN 2: AIRSPACE USERS															
Sub-topic PEN 2.1 — Contributors to civil ATS operations															
APS PEN 2.1.1	Characterize civil ATS activities in approach control unit.	2	Study visit to an approach control unit. *Content support: Familiarization visits to TWR, ACC, AIS, RCC.*	APP APS											
APS PEN 2.1.2	Characterize other parties interfacing with ATS operations.	2	*Content support: Familiarization visits to engineering services, fire and emergency services, airline operations offices.*	ALL											
Sub-topic PEN 2.2 — Contributors to military ATS operations															
APS PEN 2.2.1	Characterize military ATS activities.	2	*Content support: Familiarization visits to TWR, APP, ACC, AIS, RCC, air defence units.*	ALL											

TOPIC PEN 3: CUSTOMER RELATIONS

Sub-topic PEN 3.1 — Provision of services and user requirements

APS PEN 3.1.1	Identify the role of ATC as a service provider.	3	ALL	
APS PEN 3.1.2	Appreciate ATS users requirements.	3	ALL	

TOPIC PEN 4: ENVIRONMENTAL PROTECTION

Sub-topic PEN 4.1 — Environmental protection

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS PEN 4.1.1	Describe the environmental constraints on aerodrome operations.	2	*Content support: ICAO Circular 303* - Operational opportunities to minimize fuel use and reduce emissions.	TWR APP APS											
APS PEN 4.1.2	Explain the use of Collaborative Environmental Management (CEM) process at airports.	2		TWR APP APS											
APS PEN 4.1.3	Appreciate the mitigation techniques used to minimize aviation's impact on the environment.	3	*Content support: Continuous descent operations (CDO), noise abatement procedures, noise preferential routes, flight efficiency.*	APP APS											

SUBJECT 10: ABNORMAL AND EMERGENCY SITUATIONS

The subject objective is:

Learners shall develop professional attitudes to manage traffic in abnormal and emergency situations.

TOPIC ABES 1: ABNORMAL AND EMERGENCY SITUATIONS (ABES)

Sub-topic ABES 1.1 — Overview of ABES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS ABES 1.1.1	List common abnormal and emergency situations.	1	*Content support: Any unusual/emergency situations, ambulance flights, ground based safety nets alerts, airframe failure, unreliable instruments, runway incursion.*	ALL											x
APS ABES 1.1.2	Identify potential or actual abnormal and emergency situations.	3		ALL	x					x					
APS ABES 1.1.3	Take into account the procedures for given abnormal and emergency situations.	2	*Content support: ICAO Doc 4444.*	APP ACP APS ACS						x					
APS ABES 1.1.4	Take into account that procedures don't exist for all abnormal and emergency situations.	2	*Content support: Real life examples.*	ALL						x					
APS ABES 1.1.5	Consider how the evolution of a situation may have an impact on safety.	2	*Content support: Separation, information, coordination.*	ALL						x					

TOPIC ABES 2: SKILLS IMPROVEMENT

Sub-topic ABES 2.1 — Communication effectiveness

APS ABES 2.1.1	Ensure effective communication in all circumstances including the case where standard phraseology is not applicable.	4	Phraseology, vocabulary, readback, silence instruction.	ALL				x		x					
APS ABES 2.1.2	Apply change of radiotelephony call sign.	3	ICAO Doc 4444	ALL				x		x					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 2.2 — Avoidance of mental overload															
APS ABES 2.2.1	Describe actions to keep the control of the situation.	2	*Content support: Sector splitting, holding, flow management, task delegation*	ALL											x
APS ABES 2.2.2	Organize priority of actions.	4		ALL									x		
APS ABES 2.2.3	Ensure an effective circulation of information.	4	*Content support: Between executive and planner/-coordinator, with the supervisor, between sectors, between ACC, APP and TWR, with ground staff.*	ALL					x						
APS ABES 2.2.4	Consider asking for help.	2		ALL										x	
Sub-topic ABES 2.3 — Air / ground cooperation															
APS ABES 2.3.1	Collect appropriate information relevant for the situation.	3		ALL						x					
APS ABES 2.3.2	Assist the pilot.	3	Pilot workload. *Content support: Instructions, information, support, Human Factors.*	ALL						x					

TOPIC ABES 3: PROCEDURES FOR ABNORMAL AND EMERGENCY SITUATIONS

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 3.1 — Application of procedures for ABES															
APS ABES 3.1.1	Apply the procedures for given abnormal and emergency situations.	3		ALL						x					
Sub-topic ABES 3.2 — Radio failure															
APS ABES 3.2.1	Describe the procedures followed by a pilot when he/she experiences complete or partial radio failure.	2	ICAO Doc 7030 *Content support: Military procedures.*	ALL											x
APS ABES 3.2.2	Apply the procedures to be followed when a pilot experiences complete or partial radio failure.	3	*Content support: Prolonged loss of communication.*	ALL						x					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 3.3 — Unlawful interference and aircraft bomb threat															
APS ABES 3.3.1	Apply ATC procedures associated with unlawful interference and aircraft bomb threat.	3	ICAO Doc 4444	ALL						x					
Sub-topic ABES 3.4 — Strayed or unidentified aircraft															
APS ABES 3.4.1	Apply the procedures in the case of strayed aircraft.	3	ICAO Doc 4444 *Content support: Inside controlled airspace, outside controlled airspace.*	ALL						x					
APS ABES 3.4.2	Apply the procedures in the case of unidentified aircraft.	3	ICAO Doc 4444	ALL						x					
Sub-topic ABES 3.5 — Diversions															
APS ABES 3.5.1	Provide navigational assistance to diverting emergency aircraft.	4	Track/heading, distance, other navigational assistance. *Content support: Nearest most suitable aerodrome.*	APP ACP APS ACS						x					
Sub-topic ABES 3.6 — Transponder failure															
APS ABES 3.6.1	Apply procedures in the event of an SSR transponder failure.	3	ICAO Doc 4444, ICAO Doc 7030. *Content support: Total/partial failure, impact on ADS-B/Mode S capability.*	APS ACS						x					

SUBJECT 11: AERODROMES

The subject objective is:

Learners shall recognize and understand the design and layout of aerodromes.

TOPIC 1: Definitions

Sub-topic 1.1 — Define aerodrome data

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS AGA 1.1.1	Define aerodrome data.														x
APS AGA 1.1.2	Identify the information that has to be passed between Air Traffic Services (ATS) and the airport authority.	3	Airport conditions, fire/rescue category, condition of ground equipment and NAVAIDs, AIRAC, ICAO Annex 14.	TWR APP APS											x

TOPIC AGA 2: MOVEMENT AREA

Sub-topic AGA 2.1 — Movement area

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS AGA 2.1.1	Describe movement area.	2	ICAO Annex 14	TWR APP APS											x
APS AGA 2.1.2	Describe the marking of obstacles and unusable or unserviceable areas.	2	Flags, signs on pavement, lights.	TWR APP APS											x
APS AGA 2.1.3	Identify the information on conditions of the movement area that have to be passed to aircraft.	3	Essential information on aerodrome conditions.	TWR APP APS											x

Sub-topic AGA 2.2 — Manoeuvring area

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS AGA 2.2.1	Describe manoeuvring area.	2	ICAO Annex 14	TWR APP APS											x
APS AGA 2.2.2	Describe taxiway.	2		TWR APP APS											x
APS AGA 2.2.3	Describe the daylight marking on taxiways.	2		TWR APP APS											x
APS AGA 2.2.4	Describe taxiway lighting.	2		TWR APP APS											x

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic AGA 2.3 — Runways															
APS AGA 2.3.1	Describe runway.	2	Runway, runway surface, runway strip, shoulder, runway end safety areas, clearways, stopways.	TWR APP APS											x
APS AGA 2.3.2	Describe instrument runway.	2	ICAO Annex 14	TWR APP APS											x
APS AGA 2.3.3	Describe non-instrument runway.	2	ICAO Annex 14	TWR APP APS											x
APS AGA 2.3.4	Explain declared distances.	2	TORA, TODA, ASDA, LDA	TWR APP APS											x
APS AGA 2.3.5	Explain the differences between ACN and PCN.	2	Strength of pavements	TWR APP APS											x
APS AGA 2.3.6	Describe the daylight markings on runways.	2	*Content support: Runway designator, centre line, threshold, aiming point, fixed distance, touchdown zone, side strip, colour.*	TWR APP APS											x
APS AGA 2.3.7	Describe runway lights.	2	*Content support: Colour, centre line, intensity, edge, touchdown zone, threshold barettes.*	TWR APP APS											x
APS AGA 2.3.8	Explain the functions of visual landing aids.	2	*Content support: AVASI, VASI, PAPI.*	TWR APP APS											x
APS AGA 2.3.9	Describe the approach lighting systems.	2	*Centre line, cross bars, stroboscopic lights, colours, intensity and brightness.*	TWR APP APS											x
APS AGA 2.3.10	Characterize the effect of water/ice on runways.	2		TWR APP APS											x
APS AGA 2.3.11	Explain braking action.	2	*Braking action coefficient.*	TWR APP APS											x
APS AGA 2.3.12	Explain the effect of runway visual range on aerodrome operation	2		TWR APP APS											x

TOPIC AGA 3: OBSTACLES

Sub-topic AGA 3.1 — Obstacle-free airspace around aerodromes

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS AGA 3.1.1	Explain the necessity for establishing and maintaining an obstacle-free airspace around aerodromes.	2		TWR APP APS											x

TOPIC AGA 4: MISCELLANEOUS EQUIPMENT

Sub-topic AGA 4.1 — Location

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
APS AGA 4.1.1	Explain the location of different aerodrome ground equipment.	2	*Content support: LLZ, GP, VDF, radio communication or ATS surveillance systems sensors, stopbars, AVASI, VASI, PAPI.*	TWR APP APS											x

CHAPTER 4 - Appendix 1e – Example Area Control Procedural Rating syllabus

SUBJECT 1: INTRODUCTION TO THE COURSE

The subject objective is:

Learners shall know and understand the training programme that they will follow and learn how to obtain the appropriate information.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC INTR 1: COURSE MANAGEMENT															
Sub-topic INTR 1.1 — Course introduction															
ACP INTR 1.1.1	Explain the aims and main objectives of the course.	2		ALL											
Sub-topic INTR 1.2 — Course administration															
ACP INTR 1.2.1	State course administration.	1		ALL											
Sub-topic INTR 1.3 — Study material and training documentation															
ACP INTR 1.3.1	Use appropriate documentation and their sources for course studies.	3	*Content support: Training documentation, library, CBT library, web, learning management server.*	ALL											
ACP INTR 1.3.2	Integrate appropriate information into course studies.	4	Training documentation *Content support: Supplementary information, library.*	ALL											
TOPIC INTR 2: INTRODUCTION TO THE ATC TRAINING COURSE															
Sub-topic INTR 2.1 — Course content and organization															
ACP INTR 2.1.1	State the different training methods applied in the course.	1	Theoretical training, practical training, self-study, types of training events.	ALL											
ACP INTR 2.1.2	State the subjects of the course and their purpose.	1		ALL											
ACP INTR 2.1.3	Describe the organization of theoretical training.	2	*Content support: Course programme.*	ALL											

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP INTR 2.1.4	Describe the organization of practical training.	2	*Content support: PTP, simulation, briefing, debriefing, course programme.*	ALL											
Sub-topic INTR 2.2 — Training ethos															
ACP INTR 2.2.1	Recognize the feedback mechanisms available.	1	Training progress, assessment, briefing, debriefing, learner/instructor feedback, Instructor/instructor feedback.	ALL											
Sub-topic INTR 2.3 — Assessment process															
ACP INTR 2.3.1	Describe the assessment process.	2		ALL											

SUBJECT 2: AVIATION LAW

The subject objective is:

Learners shall know, understand and apply the rules of the air and the regulations regarding reporting, airspace and appreciate the Licensing and Competence principles.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW

TOPIC LAW 1: ATCO LICENSING/CERTIFICATE OF COMPETENCE

Sub-topic LAW 1.1 — Privileges and conditions

ACP LAW 1.1.1	Appreciate the conditions which shall be met to issue an area control procedural rating.	3	*Content support: National documents.*	ACP											X
ACP LAW 1.1.2	Explain how to maintain and update professional knowledge and skills to retain competence in the operational environment.	2		ALL											X
ACP LAW 1.1.3	Explain the conditions for suspension/revocation of ATCO licence.	2		ALL											X

TOPIC LAW 2: RULES AND REGULATIONS

Sub-topic LAW 2.1 — Reports

ACP LAW 2.1.1	List the standard forms for reports.	1	Air traffic incident report. *Content support: Routine air reports, breach of regulations, watch/log book, records.*	ALL											X
ACP LAW 2.1.2	Describe the functions of, and processes for, reporting.	2	Reporting culture, air traffic incident report. *Content support: Breach of regulations, watch/log book, records, voluntary reporting.*	ALL											X
ACP LAW 2.1.3	Use forms for reporting.	3	Air traffic incident reporting form(s). *Content support: ICAO Doc 4444 Appendix 4, routine air reports, breach of regulations, watch/log book, records .*	ALL						X					

Sub-topic LAW 2.2 — Airspace

ACP LAW 2.2.1	Appreciate classes and structure of airspace and their relevance to area control procedural rating operations.	3	ACP											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP LAW 2.2.2	Provide planning, coordination and control actions appropriate to the airspace classification and structure.	4	*Content support: ICAO Annex 2, ICAO Annex 11, international requirements, civil requirements, military requirements, areas of responsibility, sectorization, national requirements.*	ALL	X	X	X		X		X				
ACP LAW 2.2.3	Appreciate responsibility for terrain clearance.	3		ALL	X	X					X				

TOPIC LAW 3: ATC SAFETY MANAGEMENT

Sub-topic LAW 3.1 — Feedback process															
ACP LAW 3.1.1	State the importance of controller contribution to the feedback process.	1	*Content support: Voluntary reporting.*	ALL											X
ACP LAW 3.1.2	Describe how reported occurrences are analysed.	2	*Content support: Local procedures.*	ALL											X
ACP LAW 3.1.3	Name the means used to disseminate recommendations.	1	*Content support: Safety letters, safety boards web pages.*	ALL											X
ACP LAW 3.1.4	Appreciate the 'Just Culture' concept.	3	Benefits, prerequisites, constraints.	ALL											X
Sub-topic LAW 3.2 — Safety Investigation															
ACP LAW 3.2.1	Describe role and mission of Safety Investigation in the improvement of safety.	2		ALL											X
ACP LAW 3.2.2	Define working methods of safety investigation.	1		ALL											X

SUBJECT 3: AIR TRAFFIC MANAGEMENT

The subject objective is:

Learners shall manage air traffic to ensure safe, orderly and expeditious services.

TOPIC ATM 1: PROVISION OF SERVICES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 1.1 — Air traffic control (ATC) service															
ACP ATM 1.1.1	Appreciate own area of responsibility.	3		APP ACP APS ACS	X	X									X
ACP ATM 1.1.2	Provide area control service.	4	ICAO Annex 11, ICAO Doc 7030, ICAO Doc 4444, Operation manuals.	ACP ACS	X	X	X	X	X		X	X	X	X	
Sub-topic ATM 1.2 — Flight information service (FIS)															
ACP ATM 1.2.1	Provide FIS.	4	ICAO Doc 4444. *Content support: National documents.*	ALL	X	X		X	X	X	X	X	X	X	
ACP ATM 1.2.2	Issue appropriate information concerning the location of conflicting traffic.	3	ICAO Doc 4444, traffic information, essential traffic information.	APP ACP APS ACS		X									
Sub-topic ATM 1.3 — Alerting service (ALRS)															
ACP ATM 1.3.1	Provide ALRS.	4	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X		X	X	X				X	
ACP ATM 1.3.2	Respond to distress and urgency messages and signals.	3	ICAO Annex 10, ICAO Doc 4444 *Content support: EUROCONTROL Guidelines for Controller Training in the Handling of Unusual/Emergency Situations.*	ALL						X					

Sub-topic ATM 1.4 — ATS system capacity and air traffic flow management

ACP ATM 1.4.1	Appreciate principles of ATS system capacity and air traffic flow management.	3	*Content support: Flexible use of airspace, free flight.*	APP ACP APS ACS		X							X		X
ACP ATM 1.4.2	Apply flow management procedures in the provision of ATC.	3		APP ACP APS ACS	X	X							X		

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 1.4.3	Organize traffic flows and patterns to take account of airspace boundaries.	4	*Content support: Civil and military, controlled, uncontrolled, advisory, restricted, danger, prohibited, special rules, sector boundaries, national boundaries, FIR boundaries, delegated airspace, transfer of control, transfer of communications, en-route, off route.*	APP ACP APS ACS	X	X					X				
ACP ATM 1.4.4	Organize traffic flows and patterns to take account of areas of responsibility.	4		APP ACP APS ACS	X	X					X				
ACP ATM 1.4.5	Inform supervisor of situation.	3	*Content support: Abnormal situations, decrease in sector capacity, limitations on systems and equipment, changes in workload/-capacity, unusual meteorological conditions, relevant information like: reported ground-based incidents, forest fires, smoke, oil pollution.*	APP ACP APS ACS	X	X		X	X						
Sub-topic ATM 1.5 — Airspace management (ASM)															
ACP ATM 1.5.1	Appreciate the principles and means of ASM.	3	*Content support: ICAO Doc 4444.*	APP ACP APS ACS											X
Sub-topic ATM 1.5 — Airspace management (ASM)															
ACP ATM 1.5.2	Organize traffic to take account of ASM.	4	*Content support: Real-time activation, deactivation or reallocation of airspace.*	APP ACP	X	X					X				

TOPIC ATM 2: COMMUNICATION

Sub-topic ATM 2.1 — Effective communication

ACP ATM 2.1.1	Use approved phraseology.	3	ICAO Doc 4444 *Content support: ICAO Doc 9432 RTF manual, Standard words and phrases as contained in ICAO Annex 10, Volume II.*	ALL				X							
ACP ATM 2.1.2	Ensure effective communication.	4	Communication techniques, readback/verification of readback.	ALL				X							

TOPIC ATM 3: ATC CLEARANCES AND ATC INSTRUCTIONS

Sub-topic ATM 3.1 — ATC clearances

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 3.1.1	Issue appropriate ATC clearances.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X	X								
ACP ATM 3.1.2	Integrate appropriate ATC clearances in control service.	4		ALL		X	X								
ACP ATM 3.1.3	Ensure the agreed course of action is carried out.	4		ALL	X										

Sub-topic ATM 3.2 — ATC instructions

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 3.2.1	Issue appropriate ATC instructions.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X									
ACP ATM 3.2.2	Integrate appropriate ATC instructions in control service.	4		ALL		X									
ACP ATM 3.2.3	Ensure the agreed course of action is carried out.	4		ALL		X									

TOPIC ATM 4: COORDINATION

Sub-topic ATM 4.1 — Necessity for coordination

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 4.1.1	Identify the need for coordination.	3		ALL	X	X			X						

Sub-topic ATM 4.2 — Tools and methods for coordination

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 4.2.1	Use the available tools for coordination.	3	*Content support: Electronic transfer of flight data, telephone, interphone, intercom, direct speech, radiotelephone (RTF), local agreements, automated system coordination.*	ALL					X						

Sub-topic ATM 4.3 — Coordination procedures

ACP ATM 4.3.1	Initiate appropriate coordination.	3	Delegation/transfer of responsibility for air-ground communications and separation, transfer of control, ICAO Doc 4444. *Content support: Release point*	ALL					X						

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 4.3.2	Analyse effect of coordination requested by an adjacent position/unit.	4	*Content support: Delegation/transfer of responsibility for air-ground communications and separation, release point, transfer of control.*	ALL	X				X						
ACP ATM 4.3.3	Select, after negotiation, an appropriate course of action.	5		ALL	X	X			X						
ACP ATM 4.3.4	Ensure the agreed course of action is carried out.	4		ALL	X	X									
ACP ATM 4.3.5	Coordinate in the provision of FIS.	4	ICAO Doc 4444	ALL					X						
ACP ATM 4.3.6	Coordinate in the provision of ALRS.	4	ICAO Doc 4444	ALL					X	X					

TOPIC ATM 5: ALTIMETRY AND LEVEL ALLOCATION

Sub-topic ATM 5.1 — Altimetry

ACP ATM 5.1.1	Allocate levels according to altimetry data.	4	ICAO Doc 8168, ICAO Doc 4444	ALL		X									
ACP ATM 5.1.2	Ensure separation according to altimetry data.	4	*Content support: Transition level, transition altitude, transition layer, height, flight level, altitude, vertical distance to airspace boundaries.*	ALL			X								

Sub-topic ATM 5.2 — Terrain clearance

ACP ATM 5.2.1	Provide planning, coordination and control actions appropriate to the rules for minimum safe levels and terrain clearance.	4	*Content support: Terrain clearance dimensions, minimum safe altitudes, transition level, minimum flight level, minimum sector altitude.*	APP ACP	X	X	X		X						

TOPIC ATM 6: SEPARATIONS

Sub-topic ATM 6.1 — Vertical separation

ACP ATM 6.1.1	Provide standard vertical separation.	4	ICAO Doc 4444, ICAO Doc 7030, level allocation, during climb/descent, rate of climb/descent, RVSM, non-RVSM aircraft, holding pattern.	ACP ACS	X	X	X								

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 6.1.2	Provide increased vertical separation.	4	ICAO Doc 4444, ICAO Doc 7030 *Content support: Level allocation, during climb/descent, rate of climb/descent.*	APP ACP APS ACS	X	X	X								
ACP ATM 6.1.3	Appreciate the application of vertical emergency separation.	3	ICAO Doc 4444, ICAO Doc 7030	APP ACP APS ACS		X	X			X					
Sub-topic ATM 6.2 — Horizontal separation															
ACP ATM 6.2.1	Provide longitudinal separation.	4	Based on time, based on distance (DME and/or GNSS, RNAV). *Content support: Based on time with Mach number technique.*	ACP	X	X	X								
ACP ATM 6.2.2	Provide lateral separation.	4	ICAO Doc 4444, ICAO Doc 7030, holding.	APP ACP	X	X	X								
ACP ATM 6.2.3	Provide track separation.	4		ACP APP	X	X	X								
ACP ATM 6.2.4	Provide geographical separation.	4	Visual, using navigation aids, area navigation.	ACP APP	X	X	X								
TOPIC ATM 7: AIRBORNE COLLISION AVOIDANCE SYSTEMS AND GROUND-BASED SAFETY NETS															
Sub-topic ATM 7.1 — Airborne collision avoidance systems															
ACP ATM 7.1.1	Differentiate between ACAS advisory thresholds and separation standards applicable in the area control environment.	2	ICAO Doc 9863	ACP ACS											X

ACP ATM 7.1.2	Describe the controller responsibility during and following an ACAS RA reported by pilot.	2	ICAO Doc 4444	ALL											X
ACP ATM 7.1.3	Respond to pilot notification of actions based on airborne systems warnings.	3	ACAS, TAWS	ALL	X	X				X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW

TOPIC ATM 8: DATA DISPLAY

Sub-topic ATM 8.1 — Data management

ACP ATM 8.1.1	Update the data display to accurately reflect the traffic situation.	3	Content *support: Information displayed, strip marking procedures, electronic information data displays, actions based on traffic display information, calculation of EET.*	ALL	X	X									
ACP ATM 8.1.2	Analyse pertinent data on data displays.	4		ALL	X										
ACP ATM 8.1.3	Organize pertinent data on data displays.	4		ALL	X	X									
ACP ATM 8.1.4	Obtain flight plan information.	3	CPL, FPL, supplementary information. *Content support: RPL, AFIL.*	ALL		X									
ACP ATM 8.1.5	Use flight plan information.	3		ALL		X									

TOPIC ATM 9: OPERATIONAL ENVIRONMENT (SIMULATED)

Sub-topic ATM 9.1 — Integrity of the operational environment

ACP ATM 9.1.1	Obtain information concerning the operational environment.	3	*Content support: Briefing, notices, local orders, verification of information.*	ALL	X										
ACP ATM 9.1.2	Ensure the integrity of the operational environment.	4	*Content support: Integrity of displays, verification of the information provided by displays.*	APP ACP APS ACS	X	X									

Sub-topic ATM 9.2 — Verification of the currency of operational procedures

ACP ATM 9.2.1	Check all relevant documentation before managing traffic.	3	*Content support: Briefing, LOAs, NOTAM, AICs.*	ALL	X										
ACP ATM 9.2.2	Manage traffic in accordance with procedural changes.	4		APP ACP APS ACS		X	X								

Sub-topic ATM 9.3 — Handover-takeover

ACP ATM 9.3.1	Transfer information to the relieving controller.	3	ALL	X		X	X							

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 9.3.2	Obtain information from the controller handing over.	3		ALL	X		X	X							

TOPIC ATM 10: PROVISION OF CONTROL SERVICE

Sub-topic ATM 10.1 — Responsibility and processing of information

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 10.1.1	Describe the division of responsibility between air traffic control units.	2	ICAO Doc 4444	ALL											X
ACP ATM 10.1.2	Describe the responsibility in regard to military traffic.	2	ICAO Doc 4444. *Content support: ICAO Doc 9554.*	ALL											X
ACP ATM 10.1.3	Describe the responsibility in regard to unmanned free balloons.	2	ICAO Doc 4444	APP ACP APS ACS											X
ACP ATM 10.1.4	Obtain operational information.	3	ICAO Doc 4444, Local operation manuals.	APP ACP APS ACS	X	X									
ACP ATM 10.1.5	Interpret operational information.	5		APP ACP APS ACS	X	X									
ACP ATM 10.1.6	Organize forwarding of operational information.	4	Content *support: Including the use of backup procedures.*	APP ACP APS ACS		X		X							
ACP ATM 10.1.7	Integrate operational information into control decisions.	4		APP ACP APS ACS		X					X				
ACP ATM 10.1.8	Appreciate the influence of operational requirements.	3	*Content support: Military flying, calibration flights, aerial photography.*	ALL	X	X									

Sub-topic ATM 10.2 — Area control

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 10.2.1	Explain the responsibility for the provision of an area procedural control service.	2	ICAO Doc 4444, ICAO Annex 11, Local operation manuals.	ACP											X
ACP ATM 10.2.2	Provide planning, coordination and control actions appropriate to the VFR and IFR in VMC and IMC.	4	ICAO Annex 2, ICAO Annex 11, ICAO Doc 4444	ACP	X	X	X		X						

Sub-topic ATM 10.3 — Traffic management process

ACP ATM 10.3.1	Ensure that situational awareness is maintained.	4	Information gathering, traffic projection.	APP ACP	X										

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ATM 10.3.2	Detect conflicts in time for appropriate resolution.	4		ALL	X	X	X								
ACP ATM 10.3.3	Identify potential solutions to achieve a safe and effective traffic flow.	3		APP ACP APS ACS			X				X				
ACP ATM 10.3.4	Evaluate possible outcomes of different planning and control actions.	5		APP ACP APS ACS	X										
ACP ATM 10.3.5	Select an appropriate plan in time to achieve safe and effective traffic flow.	5		APP ACP APS ACS		X	X								
ACP ATM 10.3.6	Ensure an adequate priority of actions.	4		ALL	X	X	X				X		X		
Sub-topic ATM 10.3 — Traffic management process															
ACP ATM 10.3.7	Execute selected plan in a timely manner.	3		APP ACP APS ACS			X				X		X		
ACP ATM 10.3.8	Ensure a safe and efficient outcome is achieved.	4	Traffic monitoring, adaptability and follow up.	ALL		X							X		
Sub-topic ATM 10.4 — Handling traffic															
ACP ATM 10.4.1	Manage arrivals, departures and overflights.	4		APP ACP APS ACS		X	X								
ACP ATM 10.4.2	Balance the workload against personal capacity.	5	*Content support:* *Re-routing, re-planning, prioritising solutions, denying requests, delegating responsibility for separation.*	APP ACP APS ACS									X		

TOPIC ATM 11: HOLDING

Sub-topic ATM 11.1 — General holding procedures

ACP ATM 11.1.1	Apply holding procedures.	3	ICAO Doc 4444, holding instructions, allocation of holding levels, onward clearance times.	APP ACP APS ACS		X	X								
ACP ATM 11.1.2	Appreciate the factors affecting holding patterns.	3	Effect of speed, effect of level used, effect of navigation aid in use, turbulence, aircraft type.	APP ACP APS ACS											X

				SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 11.2 — Holding aircraft														
ACP ATM 11.2.1	Calculate expected onward clearance times.	3	ACP ACS		X									

SUBJECT 4: METEOROLOGY

The subject objective is:

Learners shall acquire, decode and make proper use of meteorological information relevant to the provision of ATS.

TOPIC MET 1: METEOROLOGICAL PHENOMENA

Sub-topic MET 1.1 — Meteorological phenomena

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP MET 1.1.1	Appreciate the impact of adverse weather.	3	Thunderstorms, icing, jet streams, Clear Air Turbulence (CAT), turbulence, microburst, severe mountain waves, line squalls, volcanic ash. *Content support: Solar radiation.*	ACP ACS	X					X					
ACP MET 1.1.2	Integrate data about meteorological phenomena into provision of ATS.	4	Clearances, instructions and transmitted information. *Content support: Relevant meteorological phenomena.*	ALL		X									
ACP MET 1.1.3	Use techniques to avoid adverse weather when necessary/possible.	3	Rerouting, level change.	APP ACP APS ACS						X					

TOPIC MET 2: SOURCES OF METEOROLOGICAL DATA

Sub-topic MET 2.1 — Sources of meteorological information

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP MET 2.1.1	Obtain meteorological information	3	METAR, TAF, SIGMET, AIRMET. *Content support: AIREP/AIREP Special.*	APP ACP APS ACS		X			X						
ACP MET 2.1.2	Relay meteorological information.	3	ICAO Doc 4444 *Content support: Flight information centre, adjacent ATS unit.*	APP ACP APS ACS		X									

SUBJECT 5: NAVIGATION

The subject objective is:

Learners shall analyse all navigational aspects in order to organize the traffic.

TOPIC NAV 1: MAPS AND AERONAUTICAL CHARTS

Sub-topic NAV 1.1 — Maps and charts

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP NAV 1.1.1	Use relevant maps and charts.	3		APP ACP APS ACS	X	X									

TOPIC NAV 2: INSTRUMENT NAVIGATION

Sub-topic NAV 2.1 — Navigational systems

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP NAV 2.1.1	Manage traffic in case of change in the operational status of navigational systems.	4	*Content support: Limitations, status of ground-based and satellite-based systems.*	APP ACP APS ACS		X				X			X		
ACP NAV 2.1.2	Appreciate the effect of precision, limitations and change of the operational status of navigational systems.	3	*Content support: Limitations, status, degraded procedures.*	ALL		X				X			X		

Sub-topic NAV 2.2 — Navigational assistance

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP NAV 2.2.1	Evaluate the necessary information to be provided to pilots in need of navigational assistance.	5	*Content support: Nearest most suitable aerodrome, track, heading, distance, aerodrome information, any other navigational assistance relevant at the time.*	APP ACP APS ACS		X				X					

Sub-topic NAV 2.3 — PBN applications															
ACP NAV 2.3.1	State the navigation applications used in terminal and en-route environments.	1	Terminal-RNAV-1 (≈P-RNAV); En-route-RNAV-5 (B-RNAV). *Content support: Doc 9613.*	ACP ACS											X
Sub-topic NAV 2.3 — PBN applications															
ACP NAV 2.3.2	Explain the principles and designation of navigation specifications in use.	2	*Content support: Performance, functionality, sensors, aircrew and controller requirements.*	APP ACP APS ACS											X
ACP NAV 2.3.3	State future PBN developments.	1	A-RNP, APV. *Content support: RNP 3D, RNP 4D.*	TWR APP ACP APS ACS											X

SUBJECT 6: AIRCRAFT

The subject objective is: Learners shall assess and integrate aircraft performance in the provision of ATS.

TOPIC ACFT 1: AIRCRAFT INSTRUMENTS

Sub-topic ACFT 1.1 — Aircraft instruments

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ACFT 1.1.1	Integrate information from aircraft instruments provided by the pilot in the provision of ATS.	4		ALL	X										
ACP ACFT 1.1.2	Explain the operation of aircraft radio equipment.	2	*Content support: Radios (number of), emergency radios.*	ALL											X

TOPIC ACFT 2: AIRCRAFT CATEGORIES

Sub-topic ACFT 2.1 — Wake turbulence

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ACFT 2.1.1	Explain the wake turbulence effect and associated hazards to the succeeding aircraft.	2		ALL											X
ACP ACFT 2.1.2	Appreciate the techniques used to prevent hazards associated with wake turbulence on succeeding aircraft.	3		ALL	X	X									

TOPIC ACFT 3: FACTORS AFFECTING AIRCRAFT PERFORMANCE

Sub-topic ACFT 3.1 — Climb factors

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ACFT 3.1.1	Integrate the influence of factors affecting aircraft during climb.	4	*Content support: Speed, mass, air density, cabin pressurization, wind and temperature.*	APP ACP APS ACS	X	X									

Sub-topic ACFT 3.2 — Cruise factors															
ACP ACFT 3.2.1	Integrate the influence of factors affecting aircraft during cruise.	4	Level, cruising speed, wind, mass, cabin pressurization.	APP ACP APS ACS	X	X									
Sub-topic ACFT 3.3 — Descent factors															
ACP ACFT 3.3.1	Integrate the influence of factors affecting aircraft during descent.	4	*Content support: Wind, speed, rate of descent, cabin pressurization.*	ACP ACS	X	X									

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ACFT 3.4 — Economic factors															
ACP ACFT 3.4.1	Integrate consideration of economic factors affecting aircraft.	4	*Content support: Routing, level, speed, rate of climb and rate of descent, approach profile, top of descent.*	ACP ACS	X	X									
ACP ACFT 3.4.2	Use continuous climb techniques where applicable.	3		APP ACP APS ACS		X									
ACP ACFT 3.4.3	Use direct routing where applicable.	3		APP ACP APS ACS		X	X								
Sub-topic ACFT 3.5 — Environmental factors															
ACP ACFT 3.5.1	Appreciate the performance restrictions due to environmental constraints.	3	*Content support: Fuel dumping, minimum flight levels, continuous descent operations.*	ACP ACS		X	X								

TOPIC ACFT 4: AIRCRAFT DATA

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ACFT 4.1 — Performance data															
ACP ACFT 4.1.1	Integrate the average performance data of a representative sample of aircraft which will be encountered in the operational/working environment into the provision of a control service.	4	Performance data under a representative variety of circumstances.	APP ACP APS ACS		X	X								

SUBJECT 7: HUMAN FACTORS

The subject objective is:

Learners shall recognize the necessity to constantly extend their knowledge and analyse factors which affect personal and team performance.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC HUM 1: PSYCHOLOGICAL FACTORS															
Sub-topic HUM 1.1 — Cognitive															
ACP HUM 1.1.1	Describe the human information processing model.	2	Attention, perception, memory, situational awareness, decision making, response.	ALL	X										X
ACP HUM 1.1.2	Describe the factors which influence human information processing.	2	Confidence, stress, learning, knowledge, experience, fatigue, alcohol/drugs, distraction, interpersonal relations.	ALL	X										X
ACP HUM 1.1.3	Monitor the effect of human information processing factors on decision making.	3	*Content support: Workload, stress, interpersonal relations, distraction, confidence.*	ALL	X						X				
TOPIC HUM 2: MEDICAL AND PHYSIOLOGICAL FACTORS															
Sub-topic HUM 2.1 — Fatigue															
ACP HUM 2.1.1	State factors that cause fatigue.	1	Shift work. *Content support: Night shifts and rosters.*	ALL											X
Sub-topic HUM 2.1 — Fatigue															
ACP HUM 2.1.2	Describe the onset of fatigue.	2	*Content support: Lack of concentration, listlessness, irritability, frustration, ICAO Circular 241 – AN/145* Human Factors in ATC.	ALL											X
ACP HUM 2.1.3	Recognize the onset of fatigue in self.	1	*Content support: ICAO Circular 241 – AN/145* Human Factors in ATC.	ALL								X	X		
ACP HUM 2.1.4	Recognize the onset of fatigue in others.	1		ALL										X	

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP HUM 2.1.5	Describe appropriate action when recognizing fatigue.	2		ALL											X
Sub-topic HUM 2.2 — Fitness															
ACP HUM 2.2.1	Recognize signs of lack of personal fitness.	1		ALL								X		X	
ACP HUM 2.2.2	Describe actions when aware of a lack of personal fitness.	2		ALL											X

TOPIC HUM 3: SOCIAL AND ORGANIZATIONAL FACTORS

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 3.1 — Team resource management (TRM)															
ACP HUM 3.1.1	State the relevance of TRM.	1		ALL											X
Sub-topic HUM 3.1 — Team resource management (TRM)															
ACP HUM 3.1.2	State the content of the TRM concept.	1	*Content support: Team work, human error, team roles, stress, decision making, communication, situational awareness.*	ALL											X
Sub-topic HUM 3.2 — Teamwork and team roles															
ACP HUM 3.2.1	Identify reasons for conflict.	3		ALL											X
ACP HUM 3.2.2	Describe actions to prevent human conflicts.	2	*Content support: TRM team roles.*	ALL											X
ACP HUM 3.2.3	Describe strategies to cope with human conflicts.	2	*Content support: In your team, in the simulator*	ALL											X

Sub-topic HUM 3.3 — Responsible behaviour

ACP HUM 3.3.1	Consider the factors which influence responsible behaviour.	2	*Content support: Situation, team, personal situation and judgement, instance of justification, moral motivation, personality.*	ALL								X			
ACP HUM 3.3.2	Apply responsible judgement.	3	Case study and discussion about a dilemma situation.	ALL								X			

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW

TOPIC HUM 4: STRESS

Sub-topic HUM 4.1 — Stress

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP HUM 4.1.1	Recognize the effects of stress on performance.	1	Stress and its symptoms in self and in others.	ALL								X	X	X	

Sub-topic HUM 4.2 — Stress management

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP HUM 4.2.1	Act to reduce stress.	3	The effect of personality in coping with stress, The benefits of active stress management.	ALL								X		X	
ACP HUM 4.2.2	Respond to stressful situation by offering, asking or accepting assistance.	3	*Content support: The benefits of offering, accepting and asking for help in stressful situations.*	ALL								X		X	
ACP HUM 4.2.3	Recognize the effect of shocking and stressful events.	1	Self and others, abnormal situations, CISM.	ALL								X		X	
ACP HUM 4.2.4	Consider the benefits of Critical Incident Stress Management (CISM).	2		ALL											X
ACP HUM 4.2.5	Explain procedures used following an incident/accident.	2	*Content support: CISM, counselling, human element.*	ALL											X

TOPIC HUM 5: HUMAN ERROR

Sub-topic HUM 5.1 — Human error

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP HUM 5.1.1	Explain the relationship between error and safety.	2	Number and combination of errors, proactive versus reactive approach to discovery of error. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X
ACP HUM 5.1.2	Differentiate between the types of error.	2	Slips, lapses, mistakes *Content support: Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X

ACP HUM 5.1.3	Describe error-prone conditions.	2	*Content support: Increase in traffic, changes in procedures, complexities of systems or traffic, weather, unusual occurrences.*	ALL											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP HUM 5.1.4	Collect examples of different error types, their causes and consequences in ATC.	3	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X
ACP HUM 5.1.5	Explain how to detect errors to compensate for them.	2	STCA, MSAW, individual and collective strategy. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X
Sub-topic HUM 5.1 — Human error															
ACP HUM 5.1.6	Execute corrective actions.	3	Error compensation. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL	X	X	X						X		
ACP HUM 5.1.7	Explain the importance of error management.	2	*Content support: Prevention of incidents, safety improvement, revision of procedures and/or working practises.*	ALL											X
ACP HUM 5.1.8	Describe the impact on an ATCO following an occurrence/incident.	2	*Content support: Reporting, SMS, investigation, CISM.*	ALL											X
Sub-topic HUM 5.2 — Violation of rules															
ACP HUM 5.2.1	Explain the causes and dangers of violation of rules becoming accepted as a practice.	2	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X

TOPIC HUM 6: COLLABORATIVE WORK

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 6.1 — Communication															
ACP HUM 6.1.1	Use communication effectively in ATC.	3		ALL				X							
ACP HUM 6.1.2	Analyse examples of pilot and controller communication for effectiveness.	4		ALL											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 6.2 — Collaborative work within the same area of responsibility															
ACP HUM 6.2.1	List communication means between controllers in charge of the same area of responsibility (sector or tower).	1	*Content support: Electronic, written, verbal and non-verbal communication.*	ALL											X
ACP HUM 6.2.2	Explain consequences of the use of communication means on effectiveness.	2	*Content support: Strips legibility and encoding, labels designation, feedback.*	ALL											X
ACP HUM 6.2.3	List possible actions to provide a safe position handover.	1	*Content support: Rigour, preparation, overlap time.*	ALL											X
ACP HUM 6.2.4	Explain consequences of a missed position handover process.	2		ALL											X
Sub-topic HUM 6.3 — Collaborative work between different areas of responsibility															
ACP HUM 6.3.1	List factors and means for an effective coordination between sectors and/or tower positions.	1	*Content support: Other sectors constraints, electronic coordination tools.*	ALL											X
Sub-topic HUM 6.4 — Controller/pilot cooperation															
ACP HUM 6.4.1	Describe parameters affecting controller/pilot cooperation.	2	*Content support: Workload, mutual knowledge, controller vs pilot mental picture.*	ALL											X

SUBJECT 8: EQUIPMENT AND SYSTEMS

The subject objective is:

Learners shall integrate knowledge and understanding of the basic working principles of equipment and systems and comply with the equipment and system degradation procedures in the provision of ATS.

TOPIC EQPS 1: VOICE COMMUNICATIONS

Sub-topic EQPS 1.1 — Radio communications

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP EQPS 1.1.1	Operate two-way communication equipment.	3	Transmit/receive switches, procedures. *Content support: Frequency selection, standby equipment.*	ALL				X							
ACP EQPS 1.1.2	Identify indications of operational status of radio equipment.	3	*Content support: Indicator lights, serviceability displays, selector/-frequency displays.*	ALL				X							
ACP EQPS 1.1.3	Consider radio range.	2	*Content support: Transfer to another frequency, apparent radio failure, failure to establish radio contact, frequency protection range.*	APP ACP APS ACS				X							

Sub-topic EQPS 1.2 — Other voice communications

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP EQPS 1.2.1	Operate landline communications.	3	*Content support: Telephone, interphone and intercom equipment.*	ALL				X							

TOPIC EQPS 2: AUTOMATION IN ATS

Sub-topic EQPS 2.1 — Aeronautical fixed telecommunication network (AFTN)

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP EQPS 2.1.1	Decode AFTN messages.	3	*Content support: Movement and control messages, NOTAM, SNOWTAM, BIRDTAM.*	ALL				X							

Sub-topic EQPS 2.2 — Automatic data interchange

ACP EQPS 2.2.1	Use automatic data transfer equipment where available.	3	*Content support:* *Automated information and coordination, OLDI.*	APP ACP				X							

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC EQPS 3: CONTROLLER WORKING POSITION															
Sub-topic EQPS 3.1 — Operation and monitoring of equipment															
ACP EQPS 3.1.1	Monitor the technical integrity of the controller working position.	3	Notification procedures, responsibilities.	ALL				X							
ACP EQPS 3.1.2	Operate the equipment of the controller working position.	3	*Content support: Situation displays, flight progress board, flight data display, radio, telephone, maps and charts, strip-printer, clock, information systems, UDF/VDF.*	ALL				X							
ACP EQPS 3.1.3	Operate available equipment in abnormal and emergency situations.	3		ALL						X					
Sub-topic EQPS 3.2 — Situation displays and information systems															
ACP EQPS 3.2.1	Use situation displays.	3		ALL	X	X									
ACP EQPS 3.2.2	Check availability of information material.	3		ALL	X										
ACP EQPS 3.2.3	Obtain information from equipment.	3		APP ACP APS ACS	X										
Sub-topic EQPS 3.3 — Flight data systems															
ACP EQPS 3.3.1	Use the flight data information at controller working position.	3		ALL	X										
TOPIC EQPS 4: FUTURE EQUIPMENT															
Sub-topic EQPS 4.1 — New developments															
ACP EQPS 4.1.1	Recognize future developments.	1	New advanced systems.	ALL											X

TOPIC EQPS 5: EQUIPMENT AND SYSTEMS LIMITATIONS AND DEGRADATION

Sub-topic EQPS 5.1 — Reaction to limitations

ACP EQPS 5.1.1	Take account of the limitations of equipment and systems.	2		ALL	X					X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP EQPS 5.1.2	Respond to technical deficiencies of the operational position.	3	Notification procedures, responsibilities.	ALL	X					X					
Sub-topic EQPS 5.2 — Communication equipment degradation															
ACP EQPS 5.2.1	Identify that communication equipment has degraded.	3	*Content support: Ground-air and landline communications .*	APP ACP APS ACS						X					
ACP EQPS 5.2.2	Apply contingency procedures in the event of communication equipment degradation.	3	Procedures for total or partial degradation of ground-air and landline communications, alternative methods of transferring data.	APP ACP APS ACS						X					
Sub-topic EQPS 5.3 — Navigational equipment degradation															
ACP EQPS 5.3.1	Identify when a navigational equipment failure will affect operational ability.	3	*Content support: VOR, navigational aids.*	ALL						X					
ACP EQPS 5.3.2	Apply contingency procedures in the event of a navigational equipment degradation.	3	*Content support: Vertical separation, information to aircraft, navigational assistance, seeking assistance from adjacent units.*	ALL						X					

SUBJECT 9: PROFESSIONAL ENVIRONMENT

The subject objective is:

Learners shall identify the need for close cooperation with other parties concerning ATM operations and appreciate aspects of environmental protection.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC PEN 1: FAMILIARIZATION															
Sub-topic PEN 1.1 — Study visit to area control centre															
ACP PEN 1.1.1	Appreciate the functions and provision of an operational area control service.	3	Study visit to area control centre.	ACP ACS											
TOPIC PEN 2: AIRSPACE USERS															
Sub-topic PEN 2.1 — Contributors to civil ATS operations															
ACP PEN 2.1.1	Characterize civil ATS activities in area control centre.	2	Study visit to an area control centre. *Content support: Familiarization visits to TWR, APP, AIS, RCC.*	ACP ACS											
ACP PEN 2.1.2	Characterize other parties interfacing with ATS operations.	2	*Content support: Familiarization visits to engineering services, fire and emergency services, airline operations offices.*	ALL											
Sub-topic PEN 2.2 — Contributors to military ATS operations															
ACP PEN 2.2.1	Characterize military ATS activities.	2	*Content support: Familiarization visits to TWR, APP, ACC, AIS, RCC, air defence units.*	ALL											

TOPIC PEN 3: CUSTOMER RELATIONS

Sub-topic PEN 3.1 — Provision of services and user requirements

ACP PEN 3.1.1	Identify the role of ATC as a service provider.	3	ALL	

Sub-topic PEN 3.1 — Provision of services and user requirements

ACP PEN 3.1.2	Appreciate ATS users requirements.	3	ALL	

TOPIC PEN 4: ENVIRONMENTAL PROTECTION

Sub-topic PEN 4.1 — Environmental protection

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP PEN 4.1.1	Appreciate the mitigation techniques used en-route to minimize the aviation's impact on the environment.	3	*Content support: FRA, night/weekend routes, ICAO Circular 303* - Operational opportunities to minimize fuel use and reduce emissions.	ACP ACS											

SUBJECT 10: ABNORMAL AND EMERGENCY SITUATIONS

The subject objective is:

Learners shall develop professional attitudes to manage traffic in abnormal and emergency situations.

TOPIC ABES 1: ABNORMAL AND EMERGENCY SITUATIONS (ABES)

Sub-topic ABES 1.1 — Overview of ABES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ABES 1.1.1	List common abnormal and emergency situations.	1	*Content support: Any unusual/emergency situations, ambulance flights, ground based safety nets alerts, airframe failure, unreliable instruments, runway incursion.*	ALL											X
ACP ABES 1.1.2	Identify potential or actual abnormal and emergency situations.	3		ALL	X					X					
ACP ABES 1.1.3	Take into account the procedures for given abnormal and emergency situations.	2	*Content support: ICAO Doc 4444.*	APP ACP APS ACS						X					
ACP ABES 1.1.4	Take into account that procedures don't exist for all abnormal and emergency situations.	2	*Content support: Real life examples/*	ALL						X					
ACP ABES 1.1.5	Consider how the evolution of a situation may have an impact on safety.	2	*Content support: Separation, information, coordination.*	ALL						X					

TOPIC ABES 2: SKILLS IMPROVEMENT

Sub-topic ABES 2.1 — Communication effectiveness

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACP ABES 2.1.1	Ensure effective communication in all circumstances including the case where standard phraseology is not applicable.	4	Phraseology, vocabulary, readback, silence instruction.	ALL				X		X					
ACP ABES 2.1.2	Apply change of radiotelephony call sign.	3	ICAO Doc 4444	ALL				X		X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 2.2 — Avoidance of mental overload															
ACP ABES 2.2.1	Describe actions to keep the control of the situation.	2	*Content support: Sector splitting, holding, flow management, task delegation.*	ALL						X			X		
ACP ABES 2.2.2	Organize priority of actions.	4		ALL						X			X		
ACP ABES 2.2.3	Ensure an effective circulation of information.	4	*Content support: Between executive and planner/-coordinator, with the supervisor, between sectors, between ACC, APP and TWR , with ground staff.*	ALL					X	X				X	
ACP ABES 2.2.4	Consider asking for help.	2		ALL						X			X	X	
Sub-topic ABES 2.3 — Air / ground cooperation															
ACP ABES 2.3.1	Collect appropriate information relevant for the situation.	3		ALL					X	X					
ACP ABES 2.3.2	Assist the pilot.	3	Pilot workload. *Content support: Instructions, information, support, Human Factors.*	ALL						X					

TOPIC ABES 3: PROCEDURES FOR ABNORMAL AND EMERGENCY SITUATIONS

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 3.1 — Application of procedures for ABES															
ACP ABES 3.1.1	Apply the procedures for given abnormal and emergency situations.	3		ALL						X					

Sub-topic ABES 3.2 — Radio failure

ACP ABES 3.2.1	Describe the procedures followed by a pilot when he/she experiences complete or partial radio failure.	2	ICAO Doc 7030 *Content support: Military procedures.*	ALL											X
ACP ABES 3.2.2	Apply the procedures to be followed when a pilot experiences complete or partial radio failure.	3	*Content support: Prolonged loss of communication.*	ALL						X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 3.3 — Unlawful interference and aircraft bomb threat															
ACP ABES 3.3.1	Apply ATC procedures associated with unlawful interference and aircraft bomb threat.	3	ICAO Doc 4444	ALL						X					
Sub-topic ABES 3.4 — Strayed or unidentified aircraft															
ACP ABES 3.4.1	Apply the procedures in the case of strayed aircraft.	3	ICAO Doc 4444 *Content support: Inside controlled airspace, outside controlled airspace.*	ALL						X					
ACP ABES 3.4.2	Apply the procedures in the case of unidentified aircraft.	3	ICAO Doc 4444	ALL						X					
ACP ABES 3.4.3	Provide navigational assistance to diverting emergency aircraft.	4	Track/heading, distance, other navigational assistance. *Content support: Nearest most suitable aerodrome.*	APP ACP APS ACS						X					

CHAPTER 4 - Appendix 1f – Example Area Control Surveillance Rating syllabus

SUBJECT 1: INTRODUCTION TO THE COURSE

The subject objective is:

Learners shall know and understand the training programme that they will follow and learn how to obtain the appropriate information.

TOPIC INTR 1: COURSE MANAGEMENT

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic INTR 1.1 — Course introduction															
ACS INTR 1.1.1	Explain the aims and main objectives of the course.	2		ALL											
Sub-topic INTR 1.2 — Course administration															
ACS INTR 1.2.1	State course administration.	1		ALL											
Sub-topic INTR 1.3 — Study material and training documentation															
ACS INTR 1.3.1	Use appropriate documentation and their sources for course studies.	3	*Content support: Training documentation, library, CBT library, web, learning management server.*	ALL											
ACS INTR 1.3.2	Integrate appropriate information into course studies.	4	Training documentation. *Content support: Supplementary information, library.*	ALL											

TOPIC INTR 2: INTRODUCTION TO THE ATC TRAINING COURSE

Sub-topic INTR 2.1 — Course content and organization

ACS INTR 2.1.1	State the different training methods applied in the course.	1	Theoretical training, practical training, self-study, types of training events.	ALL
ACS INTR 2.1.2	State the subjects of the course and their purpose.	1		ALL
ACS INTR 2.1.3	Describe the organization of theoretical training.	2	*Content support: Course programme.*	ALL
ACS INTR 2.1.4	Describe the organization of practical training.	2	*Content support: PTP, simulation, briefing, debriefing, course programme.*	ALL

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic INTR 2.2 — Training ethos															
ACS INTR 2.2.1	Recognize the feedback mechanisms available.	1	Training progress, assessment, briefing, debriefing, learner/instructor feedback, Instructor/instructor feedback.	ALL											
Sub-topic INTR 2.3 — Assessment process															
ACS INTR 2.3.1	Describe the assessment process.	2		ALL											

SUBJECT 2: AVIATION LAW

The subject objective is:

Learners shall know, understand and apply the rules of the air and the regulations regarding reporting, airspace and appreciate the Licensing and Competence principles.

TOPIC LAW 1: ATCO LICENSING/CERTIFICATE OF COMPETENCE

Sub-topic LAW 1.1 — Privileges and conditions

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS LAW 1.1.1	Appreciate the conditions which shall be met to issue an area control surveillance rating.	3	*Content support: National documents.*	ACS											X
ACS LAW 1.1.2	Explain how to maintain and update professional knowledge and skills to retain competence in the operational environment.	2		ALL											X
ACS LAW 1.1.3	Explain the conditions for suspension/revocation of ATCO licence.	2		ALL											X

TOPIC LAW 2: RULES AND REGULATIONS

Sub-topic LAW 2.1 — Reports

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS LAW 2.1.1	List the standard forms for reports.	1	Air traffic incident report. *Content support: Routine air reports, breach of regulations, watch/log book, records.*	ALL											X
ACS LAW 2.1.2	Describe the functions of, and processes for, reporting.	2	Reporting culture, air traffic incident report. *Content support: Breach of regulations, watch/log book, records, voluntary reporting.*	ALL											X
ACS LAW 2.1.3	Use forms for reporting.	3	Air traffic incident reporting form(s). *Content support: ICAO Doc 4444 Appendix 4, routine air reports, breach of regulations, watch/log book, records.*	ALL						X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic LAW 2.2 — Airspace															
ACS LAW 2.2.1	Appreciate classes and structure of airspace and their relevance to area control surveillance rating operations.	3		ACS											X
ACS LAW 2.2.2	Provide planning, coordination and control actions appropriate to the airspace classification and structure.	4	*Content support: ICAO Annex 2, ICAO Annex 11, international requirements, civil requirements, military requirements, areas of responsibility, sectorization, national requirements.*	ALL	X	X	X		X		X				X
ACS LAW 2.2.3	Appreciate responsibility for terrain clearance.	3		ALL	X	X					X				X

TOPIC LAW 3: ATC SAFETY MANAGEMENT

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic LAW 3.1 — Feedback process															
ACS LAW 3.1.1	State the importance of controller contribution to the feedback process.	1	*Content support: Voluntary reporting.*	ALL											X
ACS LAW 3.1.2	Describe how reported occurrences are analysed.	2	*Content support: Local procedures.*	ALL											X
ACS LAW 3.1.3	Name the means used to disseminate recommendations.	1	*Content support: Safety letters, safety boards web pages.*	ALL											X
ACS LAW 3.1.4	Appreciate the ‘Just Culture’ concept.	3	Benefits, prerequisites, constraints.	ALL											X
Sub-topic LAW 3.2 — Safety Investigation															
ACS LAW 3.2.1	Describe role and mission of Safety Investigation in the improvement of safety.	2		ALL											X
ACS LAW 3.2.2	Define working methods of safety investigation.	1		ALL											X

SUBJECT 3: AIR TRAFFIC MANAGEMENT

The subject objective is:

Learners shall manage air traffic to ensure safe, orderly and expeditious services.

TOPIC ATM 1: PROVISION OF SERVICES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 1.1 — Air traffic control (ATC) service															
ACS ATM 1.1.1	Appreciate own area of responsibility.	3		APP ACP APS ACS	X	X									X
ACS ATM 1.1.2	Provide area control service.	4	ICAO Annex 11, ICAO Doc 7030, ICAO Doc 4444, Operation manuals.	ACP ACS	X	X	X	X	X		X	X	X	X	X
Sub-topic ATM 1.2 — Flight information service (FIS)															
ACS ATM 1.2.1	Provide FIS.	4	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X		X	X	X	X	X	X	X	X
ACS ATM 1.2.2	Use ATS surveillance system for the provision of FIS.	3	ICAO Doc 4444, Information to identified aircraft concerning: traffic, navigation. *Content support: Weather.*	APS ACS	X	X									X
ACS ATM 1.2.3	Issue appropriate information concerning the location of conflicting traffic.	3	ICAO Doc 4444, traffic information, essential traffic information.	APS ACS APP ACP		X									
Sub-topic ATM 1.3 — Alerting service (ALRS)															
ACS ATM 1.3.1	Provide ALRS.	4	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X		X	X	X				X	X

Sub-topic ATM 1.3 — Alerting service (ALRS)

ACS ATM 1.3.2	Respond to distress and urgency messages and signals.	3	ICAO Annex 10, ICAO Doc 4444. *Content support: EUROCONTROL Guidelines for Controller Training in the Handling of Unusual/Emergency Situations.*	ALL						X					
ACS ATM 1.3.3	Use ATS surveillance system for the provision of ALRS.	3		APS ACS						X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 1.4 — ATS system capacity and air traffic flow management															
ACS ATM 1.4.1	Appreciate principles of ATS system capacity and air traffic flow management.	3	*Content support: Flexible use of airspace, free flight.*	APP ACP APS ACS		X							X		
ACS ATM 1.4.2	Apply flow management procedures in the provision of ATC.	3		APP ACP APS ACS	X	X							X		X
ACS ATM 1.4.3	Organize traffic flows and patterns to take account of airspace boundaries.	4	*Content support: Civil and military, controlled, uncontrolled, advisory, restricted, danger, prohibited, special rules, sector boundaries, national boundaries, FIR boundaries, delegated airspace, transfer of control, transfer of communications, en-route, off route.*	APP ACP APS ACS	X	X					X				X
ACS ATM 1.4.4	Organize traffic flows and patterns to take account of areas of responsibility.	4		APP ACP APS ACS	X	X					X				X
ACS ATM 1.4.5	Inform supervisor of situation.	3	*Content support: Abnormal situations, decrease in sector capacity, limitations on systems and equipment, changes in workload/-capacity, unusual meteorological conditions, relevant information like: reported ground-based incidents, forest, smoke, oil pollution.*	APP ACP APS ACS	X	X		X	X						X
ACS ATM 1.4.6	Organize traffic flows and patterns to take account of ATS surveillance system capability.	4		APS ACS	X	X									X

Sub-topic ATM 1.5 — Airspace management (ASM)

ACS ATM 1.5.1	Appreciate the principles and means of ASM.	3	*Content support: ICAO Doc 4444.*	APP ACP APS ACS											X
ACS ATM 1.5.2	Organize traffic to take account of ASM.	4	Real-time activation, deactivation or reallocation of airspace.	APS ACS	X	X					X				X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC ATM 2: COMMUNICATION															
Sub-topic ATM 2.1 — Effective communication															
ACS ATM 2.1.1	Use approved phraseology.	3	ICAO Doc 4444. *Content support: ICAO Doc 9432 RTF manual, Standard words and phrases as contained in ICAO Annex 10, Volume II.*	ALL				X							
ACS ATM 2.1.2	Ensure effective communication.	4	Communication techniques, readback/verification of readback.	ALL				X							
TOPIC ATM 3: ATC CLEARANCES AND ATC INSTRUCTIONS															
Sub-topic ATM 3.1 — ATC clearances															
ACS ATM 3.1.1	Issue appropriate ATC clearances.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X	X								X
ACS ATM 3.1.2	Integrate appropriate ATC clearances in control service.	4		ALL		X	X								
ACS ATM 3.1.3	Ensure the agreed course of action is carried out.	4		ALL		X									
Sub-topic ATM 3.2 — ATC instructions															
ACS ATM 3.2.1	Issue appropriate ATC instructions.	3	ICAO Doc 4444 *Content support: National documents.*	ALL	X	X									X
ACS ATM 3.2.2	Integrate appropriate ATC instructions in control service.	4		ALL		X									
ACS ATM 3.2.3	Ensure the agreed course of action is carried out.	4		ALL		X									

TOPIC ATM 4: COORDINATION

Sub-topic ATM 4.1 — Necessity for coordination

ACS ATM 4.1.1	Identify the need for coordination.	3	ALL	X	X			X						X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 4.2 — Tools and methods for coordination															
ACS ATM 4.2.1	Use the available tools for coordination.	3	*Content support: Electronic transfer of flight data, telephone, interphone, intercom, direct speech, radiotelephone (RTF), local agreements, automated system coordination.*	ALL					X						
Sub-topic ATM 4.3 — Coordination procedures															
ACS ATM 4.3.1	Initiate appropriate coordination.	3	Delegation/transfer of responsibility for air-ground communications and separation, transfer of control, ICAO Doc 4444. *Content support: Release point.*	ALL					X						
ACS ATM 4.3.2	Analyse effect of coordination requested by an adjacent position/unit.	4	*Content support: Delegation/transfer of responsibility for air-ground communications and separation, release point, transfer of control.*	ALL	X				X						X
ACS ATM 4.3.3	Select, after negotiation, an appropriate course of action.	5		ALL	X	X			X						X
ACS ATM 4.3.4	Ensure the agreed course of action is carried out.	4		ALL		X									
ACS ATM 4.3.5	Coordinate in the provision of FIS.	4	ICAO Doc 4444	ALL					X						
ACS ATM 4.3.6	Coordinate in the provision of ALRS.	4	ICAO Doc 4444	ALL					X	X					

TOPIC ATM 5: ALTIMETRY AND LEVEL ALLOCATION

Sub-topic ATM 5.1 — Altimetry

ACS ATM 5.1.1	Allocate levels according to altimetry data.	4	ICAO Doc 8168, ICAO Doc 4444	ALL		X									
ACS ATM 5.1.2	Ensure separation according to altimetry data.	4	*Content support: Transition level, transition altitude, transition layer, height, flight level, altitude, vertical distance to airspace boundaries.*	ALL			X								

Sub-topic ATM 5.2 — Terrain clearance

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ATM 5.2.1	Provide planning, coordination and control actions appropriate to the rules for minimum safe levels and terrain clearance.	4	*Content support: Minimum vectoring altitude, terrain clearance dimensions, minimum safe altitudes, transition level, minimum flight level, minimum sector altitude.*	APS ACS	X	X	X		X						X

TOPIC ATM 6: SEPARATIONS

Sub-topic ATM 6.1 — Vertical separation

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ATM 6.1.1	Provide standard vertical separation.	4	ICAO Doc 4444, ICAO Doc 7030, level allocation, during climb/descent, rate of climb/descent, RVSM, non-RVSM aircraft, holding pattern.	ACP ACS	X	X	X								X
ACS ATM 6.1.2	Provide increased vertical separation.	4	ICAO Doc 4444, ICAO Doc 7030 *Content support: Level allocation, during climb/descent, rate of climb/descent.*	APP ACP APS ACS	X	X	X								X
ACS ATM 6.1.3	Appreciate the application of vertical emergency separation.	3	ICAO Doc 4444, ICAO Doc 7030.	APP ACP APS ACS		X	X			X					
ACS ATM 6.1.4	Provide vertical separation in a surveillance environment.	4	Pressure altitude-derived information, pilot level reports. *Content support: Into/out of ATS surveillance system coverage.*	APS ACS	X	X	X								X

Sub-topic ATM 6.2 — Longitudinal separation in a surveillance environment

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ATM 6.2.1	Provide longitudinal separation in a surveillance environment.	4	Successive departures, successive arrivals, overflights, speed control, Mach number techniques, silent transfer, ICAO Doc 4444.	ACS	X	X	X								X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 6.3 — Wake turbulence distance-based separation															
ACS ATM 6.3.1	Provide distance-based wake turbulence separation.	4	ICAO Doc 4444 *Content support: National documents.*	APS ACS	X	X	X								X
Sub-topic ATM 6.4 — Separation based on ATS surveillance systems															
ACS ATM 6.4.1	Describe how separation based on ATS surveillance systems is applied.	2	ICAO Doc 4444	APS ACS		X									
ACS ATM 6.4.2	Provide horizontal separation.	4	ICAO Doc 4444, ICAO Doc 7030 Local operation manuals, holding.	APS ACS	X	X	x								X
ACS ATM 6.4.3	Provide horizontal separation by vectoring in a variety of situations.	4	*Content support: Transit, meteorological phenomena, vectoring for approach, departure vs transit vs arrival/*	APS ACS	X	X	X				X				X
ACS ATM 6.4.4	Ensure horizontal or vertical separation from airspace boundaries.	4	Adjacent sectors, prohibited, restricted and danger areas.	APS ACS	X	X	X								X

TOPIC ATM 7: AIRBORNE COLLISION AVOIDANCE SYSTEMS AND GROUND-BASED SAFETY NETS

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 7.1 — Airborne collision avoidance systems															
ACS ATM 7.1.1	Differentiate between ACAS advisory thresholds and separation standards applicable in the area control environment.	2	ICAO Doc 9863	ACP ACS											X
ACS ATM 7.1.2	Describe the controller responsibility during and following an ACAS RA reported by pilot.	2	ICAO Doc 4444	ALL											X
ACS ATM 7.1.3	Respond to pilot notification of actions based on airborne systems warnings.	3	ACAS, TAWS	ALL	X	X				X					X
Sub-topic ATM 7.2 — Ground-based safety nets															
ACS ATM 7.2.1	Describe the controller responsibility during and following safety net warnings.	2	ICAO Doc 4444 *Content support: STCA, MSAW, APW, APM.*	APS ACS											

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ATM 7.2.2	Respond to ground-based safety nets warnings.	3	*Content support: STCA, MSAW, APW, APM.*	APS ACS	X	X				X					X

TOPIC ATM 8: DATA DISPLAY

Sub-topic ATM 8.1 — Data management

ACS ATM 8.1.1	Update the data display to accurately reflect the traffic situation.	3	*Content support: Information displayed, strip marking procedures, electronic information data displays, actions based on traffic display information, calculation of EETs.*	ALL	X	X									X
ACS ATM 8.1.2	Analyse pertinent data on data displays.	4		ALL	X										X
ACS ATM 8.1.3	Organize pertinent data on data displays.	4		ALL	X	X									X
ACS ATM 8.1.4	Obtain flight plan information.	3	CPL, FPL, supplementary information. *Content support: RPL, AFIL.*	ALL		X									
ACS ATM 8.1.5	Use flight plan information.	3		ALL		X									

TOPIC ATM 9: OPERATIONAL ENVIRONMENT (SIMULATED)

Sub-topic ATM 9.1 — Integrity of the operational environment

ACS ATM 9.1.1	Obtain information concerning the operational environment.	3	*Content support: Briefing, notices, local orders, verification of information.*	ALL	X										X
ACS ATM 9.1.2	Ensure the integrity of the operational environment.	4	*Content support: Integrity of displays, verification of the information provided by displays.*	APP ACP APS ACS	X	X									X

Sub-topic ATM 9.2 — Verification of the currency of operational procedures

ACS ATM 9.2.1	Check all relevant documentation before managing traffic.	3	*Content support: Briefing, LOAs, NOTAM, AICs.*	ALL	X										X
ACS ATM 9.2.2	Manage traffic in accordance with procedural changes.	4		APP ACP APS ACS		X	X								

Sub-topic ATM 9.3 — Handover-takeover

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ATM 9.3.1	Transfer information to the relieving controller.	3		ALL	X			X	X						X
ACS ATM 9.3.2	Obtain information from the controller handing over.	3		ALL	X			X	X						X

TOPIC ATM 10: PROVISION OF CONTROL SERVICE

Sub-topic ATM 10.1 — Responsibility and processing of information

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ATM 10.1.1	Describe the division of responsibility between air traffic control units.	2	ICAO Doc 4444	ALL											X
ACS ATM 10.1.2	Describe the responsibility in regard to military traffic.	2	ICAO Doc 4444 *Content support: ICAO Doc 9554*	ALL											X
ACS ATM 10.1.3	Describe the responsibility in regard to unmanned free balloons.	2	ICAO Doc 4444	APP ACP APS ACS											X
ACS ATM 10.1.4	Obtain operational information.	3	ICAO Doc 4444, Local operation manuals.	APP ACP APS ACS	X	X									X
ACS ATM 10.1.5	Interpret operational information.	5		APP ACP APS ACS	X	X									X
ACS ATM 10.1.6	Organize forwarding of operational information.	4	Content *support: Including the use of backup procedures.*	APP ACP APS ACS		X		X							
ACS ATM 10.1.7	Integrate operational information into control decisions.	4		APP ACP APS ACS		X					X				
ACS ATM 10.1.8	Appreciate the influence of operational requirements.	3	*Content support: Military flying, calibration flights, aerial photography.*	ALL	X	X									X

Sub-topic ATM 10.2 — ATS surveillance service

ACS ATM 10.2.1	Explain the responsibility for the provision of ATS surveillance service appropriate to ACS rating.	2	ICAO Doc 4444, ICAO Annex 11, Local operation manuals.	ACS											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ATM 10.2.2	Explain the functions that may be performed with the use of ATS surveillance systems derived information presented on a situation display.	2	ICAO Doc 4444	APS ACS											X
ACS ATM 10.2.3	Provide planning, coordination and control actions appropriate to the VFR and IFR in VMC and IMC.	4	ICAO Annex 2, ICAO Annex 11, ICAO Doc 4444.	ACS	X	X	X		X						X
ACS ATM 10.2.4	Apply the procedures for termination of ATS surveillance service.	3	ICAO Doc 4444. *Content support: Transfer of control, termination or interruption of ATS surveillance service.*	APS ACS	X	X	X								X
Sub-topic ATM 10.3 — Traffic management process															
ACS ATM 10.3.1	Ensure that situational awareness is maintained.	4	Information gathering, scanning, traffic projection.	APS ACS	X										X
ACS ATM 10.3.2	Detect conflicts in time for appropriate resolution.	4		ALL	X	X	X								X
ACS ATM 10.3.3	Identify potential solutions to achieve a safe and effective traffic flow.	3		APP ACP APS ACS			X				X				
ACS ATM 10.3.4	Evaluate possible outcomes of different planning and control actions.	5		APP ACP APS ACS	X										X
ACS ATM 10.3.5	Select an appropriate plan in time to achieve safe and effective traffic flow.	5		APP ACP APS ACS		X	X								
ACS ATM 10.3.6	Ensure an adequate priority of actions.	4		ALL	X	X	X				X		X		X
ACS ATM 10.3.7	Execute selected plan in a timely manner.	3		APP ACP APS ACS			X				X		X		
ACS ATM 10.3.8	Ensure a safe and efficient outcome is achieved.	4	*Traffic monitoring, adaptability and follow up.*	ALL		X							X		

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 10.4 — Handling traffic															
ACS ATM 10.4.1	Manage arrivals, departures and overflights.	4		APP ACP APS ACS		X	X								
ACS ATM 10.4.2	Balance the workload against personal capacity.	5	*Content support:* *Re-routing, re-planning, prioritising solutions, denying requests, delegating responsibility for separation.*	APP ACP APS ACS									X		
ACS ATM 10.4.3	Define flight path monitoring and vectoring.	1	ICAO Doc 4444	APS ACS		X	X								
Sub-topic ATM 10.4 — Handling traffic															
ACS ATM 10.4.4	Explain the requirements for vectoring and termination of vectoring.	2	ICAO Doc 4444	APS ACS		X	X								
ACS ATM 10.4.5	Provide vectoring.	4	ICAO Doc 4444 *Content support:* *Separation, expediting arrivals, departures and/or climb to cruising levels, aircraft leaving the hold, navigation assistance, uncontrolled airspace.*	APS ACS		X	X								
ACS ATM 10.4.6	Apply the procedures for termination of vectoring.	3	ICAO Doc 4444	APS ACS		X	X								
Sub-topic ATM 10.5 — Control service with advanced system support															
ACS ATM 10.5.1	Appreciate the impact of advanced systems on the provision of area control service.	3	*Content support:* *Sequencing systems, automated holding lists, vertical traffic displays, conflict detection and decision making tools, automated information and coordination tools.*	ACS											X

TOPIC ATM 11: HOLDING

Sub-topic ATM 11.1 — General holding procedures

ACS ATM 11.1.1	Apply holding procedures.	3	ICAO Doc 4444, holding instructions, allocation of holding levels, onward clearance times.	APP ACP APS ACS		X	X								

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ATM 11.1.2	Appreciate the factors affecting holding patterns.	3	Effect of speed, effect of level used, effect of navigation aid in use, turbulence, aircraft type.	APP ACP APS ACS											X
Sub-topic ATM 11.2 — Holding aircraft															
ACS ATM 11.2.1	Calculate expected onward clearance times.	3		ACP ACS		X									
Sub-topic ATM 11.3 — Holding in a surveillance environment															
ACS ATM 11.3.1	Organize traffic to separate other aircraft from holding aircraft.	4		APS ACS		X	X								
ACS ATM 11.3.2	Integrate system support, when available.	4	*Content support: Arrival management system, automated holding lists, vertical traffic displays.*	APS ACS	X										X

TOPIC ATM 12: IDENTIFICATION

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ATM 12.1 — Establishment of identification															
ACS ATM 12.1.1	Appreciate the precautions when establishing identification.	3		APS ACS	X										X
ACS ATM 12.1.2	Identify aircraft.	3	*Content support: PSR, SSR or ADS identification method.*	APS ACS	X	X									X
ACS ATM 12.1.3	Apply procedures in the case of misidentification.	3		APS ACS	X	X				X					X
Sub-topic ATM 12.2 — Maintenance of identification															
ACS ATM 12.2.1	Appreciate the necessity to maintain identification.	3		APS ACS	X										X
Sub-topic ATM 12.3 — Loss of identity															
ACS ATM 12.3.1	Appreciate when an aircraft identification is lost or in doubt.	3	*Content support: Out of ATS surveillance system coverage, failure of ATS surveillance system, weather clutter, other clutter, garbling, holding.*	APS ACS						X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ATM 12.3.2	Apply methods to re-establish identification.	3		APS ACS		X				X					
ACS ATM 12.3.3	Respond to loss/doubt concerning identification.	3	*Content support: Procedural separation.*	APS ACS		X				X					
Sub-topic ATM 12.4 — Position Information															
ACS ATM 12.4.1	Appreciate the circumstances when position information should be passed to the aircraft.	3		APS ACS		X									
ACS ATM 12.4.2	State the format in which position information can be passed to aircraft.	1	ICAO Doc 4444	APS ACS		X									
Sub-topic ATM 12.5 — Transfer of identity															
ACS ATM 12.5.1	Apply the methods of transfer of identification.	3		APS ACS		X			X						
ACS ATM 12.5.2	Appreciate the precautions when transferring identification.	3		APS ACS					X						

SUBJECT 4: METEOROLOGY

The subject objective is:

Learners shall acquire, decode and make proper use of meteorological information relevant to the provision of ATS.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC MET 1: METEOROLOGICAL PHENOMENA															
Sub-topic MET 1.1 — Meteorological phenomena															
ACS MET 1.1.1	Appreciate the impact of adverse weather.	3	Thunderstorms, icing, jet streams, Clear Air Turbulence (CAT), turbulence, microburst, severe mountain waves, line squalls, volcanic ash. *Content support: Solar radiation.*	ACP ACS	X					X					X
ACS MET 1.1.2	Integrate data about meteorological phenomena into provision of ATS.	4	Clearances, instructions and transmitted information. *Content support: Relevant meteorological phenomena.*	ALL		X									
ACS MET 1.1.3	Use techniques to avoid adverse weather when necessary/possible.	3	Rerouting, level change.	APP ACP APS ACS						X					
TOPIC MET 2: SOURCES OF METEOROLOGICAL DATA															
Sub-topic MET 2.1 — Sources of meteorological information															
ACS MET 2.1.1	Obtain meteorological information	3	METAR, TAF, SIGMET, AIRMET. *Content support: AIREP/AIREP Special.*	APP ACP APS ACS		X			X						
ACS MET 2.1.2	Relay meteorological information.	3	ICAO Doc 4444 *Content support: Flight information centre, adjacent ATS unit.*	APP ACP APS ACS		X									

SUBJECT 5: NAVIGATION

The subject objective is:

Learners shall analyse all navigational aspects in order to organize the traffic.

TOPIC NAV 1: MAPS AND AERONAUTICAL CHARTS

Sub-topic NAV 1.1 — Maps and charts

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS NAV 1.1.1	Use relevant maps and charts.	3		APP ACP APS ACS	X	X									X

TOPIC NAV 2: INSTRUMENT NAVIGATION

Sub-topic NAV 2.1 — Navigational systems

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS NAV 2.1.1	Manage traffic in case of change in the operational status of navigational systems.	4	*Content support: Limitations, status of ground-based and satellite-based systems.*	APP ACP APS ACS		X				X			X		
ACS NAV 2.1.2	Appreciate the effect of precision, limitations and change of the operational status of navigational systems.	3	*Content support: Limitations, status, degraded procedures.*	ALL		X				X			X		

Sub-topic NAV 2.2 — Navigational assistance

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS NAV 2.2.1	Evaluate the necessary information to be provided to pilots in need of navigational assistance.	5	*Content support: Nearest most suitable aerodrome, track, heading, distance, aerodrome information, any other navigational assistance relevant at the time.*	APP ACP APS ACS		X				X					
ACS NAV 2.2.2	Assist aircraft in navigation when required.	3	Aircraft observed to be deviating from its known intended route, on request.	APS ACS						X					

Sub-topic NAV 2.3 — PBN applications

ACS NAV 2.3.1	State the navigation applications used in terminal and en-route environments.	1	Terminal-RNAV-1 (≈P-RNAV); En-route-RNAV-5 (B-RNAV). *Content support: Doc 9613*	ACP ACS											X
ACS NAV 2.3.2	Explain the principles and designation of navigation specifications in use.	2	*Content support: Performance, functionality, sensors, aircrew and controller requirements.*	APP ACP APS ACS											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS NAV 2.3.3	State future PBN developments.	1	A-RNP, APV. *Content support: RNP 3D, RNP 4D.*	TWR APP ACP APS ACS											X

SUBJECT 6: AIRCRAFT

The subject objective is:

Learners shall assess and integrate aircraft performance in the provision of ATS.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC ACFT 1: AIRCRAFT INSTRUMENTS															
Sub-topic ACFT 1.1 — Aircraft instruments															
ACS ACFT 1.1.1	Integrate information from aircraft instruments provided by the pilot in the provision of ATS.	4		ALL	X										X
ACS ACFT 1.1.2	Explain the operation of aircraft radio equipment.	2	*Content support: Radios (number of), emergency radios.*	ALL											X
ACS ACFT 1.1.3	Explain the operation of on-board surveillance equipment.	2	Transponders: equipment Mode A, Mode C, Mode S, ADS capability.	TWR APS ACS											X
TOPIC ACFT 2: AIRCRAFT CATEGORIES															
Sub-topic ACFT 2.1 — Wake turbulence															
ACS ACFT 2.1.1	Explain the wake turbulence effect and associated hazards to the succeeding aircraft.	2		ALL											X
ACS ACFT 2.1.2	Appreciate the techniques used to prevent hazards associated with wake turbulence on succeeding aircraft.	3		ALL	X	X									X
TOPIC ACFT 3: FACTORS AFFECTING AIRCRAFT PERFORMANCE															
Sub-topic ACFT 3.1 — Climb factors															
ACS ACFT 3.1.1	Integrate the influence of factors affecting aircraft during climb.	4	*Content support: Speed, mass, air density, cabin pressurization, wind and temperature.*	APP ACP APS ACS	X	X									X

Sub-topic ACFT 3.2 — Cruise factors

ACS ACFT 3.2.1	Integrate the influence of factors affecting aircraft during cruise.	4	Level, cruising speed, wind, mass, cabin pressurization.	APP ACP APS ACS	X	X									X

Sub-topic ACFT 3.3 — Descent factors

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ACFT 3.3.1	Integrate the influence of factors affecting aircraft during descent.	4	*Content support: Wind, speed, rate of descent, cabin pressurization.*	ACP ACS	X	X									X

Sub-topic ACFT 3.4 — Economic factors

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ACFT 3.4.1	Integrate consideration of economic factors affecting aircraft.	4	*Content support: Routing, level, speed, rate of climb and rate of descent, approach profile, top of descent.*	ACP ACS	X	X									X
ACS ACFT 3.4.2	Use continuous climb techniques where applicable.	3		APP ACP APS ACS		X									
ACS ACFT 3.4.3	Use direct routing where applicable.	3		APP ACP APS ACS		X	X								

Sub-topic ACFT 3.5 — Environmental factors

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ACFT 3.5.1	Appreciate the performance restrictions due to environmental constraints.	3	*Content support: Fuel dumping, minimum flight levels, continuous descent operations.*	ACP ACS		X	X								

TOPIC ACFT 4: AIRCRAFT DATA

Sub-topic ACFT 4.1 — Performance data

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ACFT 4.1.1	Integrate the average performance data of a representative sample of aircraft which will be encountered in the operational/working environment into the provision of a control service.	4	Performance data under a representative variety of circumstances.	APP ACP APS ACS		X	X								

SUBJECT 7: HUMAN FACTORS

The subject objective is:

Learners shall recognize the necessity to constantly extend their knowledge and analyse factors which affect personal and team performance.

TOPIC HUM 1: PSYCHOLOGICAL FACTORS

Sub-topic HUM 1.1 — Cognitive

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS HUM 1.1.1	Describe the human information processing model.	2	Attention, perception, memory, situational awareness, decision making, response.	ALL											X
ACS HUM 1.1.2	Describe the factors which influence human information processing.	2	Confidence, stress, learning, knowledge, experience, fatigue, alcohol/drugs, distraction, interpersonal relations.	ALL											X
ACS HUM 1.1.3	Monitor the effect of human information processing factors on decision making.	3	*Content support: Workload, stress, interpersonal relations, distraction, confidence.*	ALL							X				

TOPIC HUM 2: MEDICAL AND PHYSIOLOGICAL FACTORS

Sub-topic HUM 2.1 — Fatigue

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS HUM 2.1.1	State factors that cause fatigue.	1	Shift work. *Content support: Night shifts and rosters.*	ALL											X
ACS HUM 2.1.2	Describe the onset of fatigue.	2	*Content support: Lack of concentration, listlessness, irritability, frustration, ICAO Circular 241 – AN/145* Human Factors in ATC.	ALL											X
ACS HUM 2.1.3	Recognize the onset of fatigue in self.	1	*Content support: ICAO Circular 241 – AN/145* Human Factors in ATC.	ALL								X	X		
ACS HUM 2.1.4	Recognize the onset of fatigue in others.	1		ALL										X	
ACS HUM 2.1.5	Describe appropriate action when recognizing fatigue.	2		ALL											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic HUM 2.2 — Fitness															
ACS HUM 2.2.1	Recognize signs of lack of personal fitness.	1		ALL								X		X	
ACS HUM 2.2.2	Describe actions when aware of a lack of personal fitness.	2		ALL											X

TOPIC HUM 3: SOCIAL AND ORGANIZATIONAL FACTORS

Sub-topic HUM 3.1 — Team resource management (TRM)															
ACS HUM 3.1.1	State the relevance of TRM.	1		ALL											X
ACS HUM 3.1.2	State the content of the TRM concept.	1	*Content support: Team work, human error, team roles, stress, decision making, communication, situational awareness.*	ALL											X
Sub-topic HUM 3.2 — Teamwork and team roles															
ACS HUM 3.2.1	Identify reasons for conflict.	3		ALL										X	X
ACS HUM 3.2.2	Describe actions to prevent human conflicts.	2	*Content support: TRM team roles.*	ALL											X
ACS HUM 3.2.3	Describe strategies to cope with human conflicts.	2	*Content support: In your team, in the simulator.*	ALL											X
Sub-topic HUM 3.3 — Responsible behaviour															
ACS HUM 3.3.1	Consider the factors which influence responsible behaviour.	2	*Content support: Situation, team, personal situation and judgement, instance of justification, moral motivation, personality.*	ALL								X			
ACS HUM 3.3.2	Apply responsible judgement.	3	Case study and discussion about a dilemma situation.	ALL								X			

TOPIC HUM 4: STRESS

Sub-topic HUM 4.1 — Stress

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS HUM 4.1.1	Recognize the effects of stress on performance.	1	Stress and its symptoms in self and in others.	ALL								X	X	X	

Sub-topic HUM 4.2 — Stress management

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS HUM 4.2.1	Act to reduce stress.	3	The effect of personality in coping with stress, The benefits of active stress management.	ALL								X		X	
ACS HUM 4.2.2	Respond to stressful situation by offering, asking or accepting assistance.	3	*Content support: The benefits of offering, accepting and asking for help in stressful situations.*	ALL								X		X	
ACS HUM 4.2.3	Recognize the effect of shocking and stressful events.	1	Self and others, abnormal situations, CISM.	ALL								X		X	
ACS HUM 4.2.4	Consider the benefits of Critical Incident Stress Management (CISM).	2		ALL											X
ACS HUM 4.2.5	Explain procedures used following an incident/accident.	2	*Content support: CISM, counselling, human element.*	ALL											X

TOPIC HUM 5: HUMAN ERROR

Sub-topic HUM 5.1 — Human error

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS HUM 5.1.1	Explain the relationship between error and safety.	2	Number and combination of errors, proactive versus reactive approach to discovery of error. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X
ACS HUM 5.1.2	Differentiate between the types of error.	2	Slips, lapses, mistakes. *Content support: Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS HUM 5.1.3	Describe error-prone conditions.	2	*Content support: Increase in traffic, changes in procedures, complexities of systems or traffic, weather, unusual occurrences.*	ALL											X
ACS HUM 5.1.4	Collect examples of different error types, their causes and consequences in ATC.	3	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X
ACS HUM 5.1.5	Explain how to detect errors to compensate for them.	2	STCA, MSAW, individual and collective strategy. *Content support: ICAO* Circular 314 – AN/178 Threat and Error Management (TEM) in ATC.	ALL											X
ACS HUM 5.1.6	Execute corrective actions.	3	Error compensation. *Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL	X	X	X						X		X
ACS HUM 5.1.7	Explain the importance of error management.	2	*Content support: Prevention of incidents, safety improvement, revision of procedures and/or working practises.*	ALL											X
ACS HUM 5.1.8	Describe the impact on an ATCO following an occurrence/incident.	2	*Content support: Reporting, SMS, investigation, CISM.*	ALL											X
Sub-topic HUM 5.2 — Violation of rules															
ACS HUM 5.2.1	Explain the causes and dangers of violation of rules becoming accepted as a practice.	2	*Content support: ICAO Circular 314 – AN/178* Threat and Error Management (TEM) in ATC.	ALL											X

TOPIC HUM 6: COLLABORATIVE WORK

Sub-topic HUM 6.1 — Communication															
ACS HUM 6.1.1	Use communication effectively in ATC.	3		ALL				X							

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS HUM 6.1.2	Analyse examples of pilot and controller communication for effectiveness.	4		ALL				X							
Sub-topic HUM 6.2 — Collaborative work within the same area of responsibility															
ACS HUM 6.2.1	List communication means between controllers in charge of the same area of responsibility (sector or tower).	1	*Content support: Electronic, written, verbal and non-verbal communication.*	ALL											X
ACS HUM 6.2.2	Explain consequences of the use of communication means on effectiveness.	2	*Content support: Strips legibility and encoding, labels designation, feedback.*	ALL											X
ACS HUM 6.2.3	List possible actions to provide a safe position handover.	1	*Content support: Rigour, preparation, overlap time.*	ALL											X
ACS HUM 6.2.4	Explain consequences of a missed position handover process.	2		ALL											X
Sub-topic HUM 6.3 — Collaborative work between different areas of responsibility															
ACS HUM 6.3.1	List factors and means for an effective coordination between sectors and/or tower positions.	1	*Content support: Other sectors constraints, electronic coordination tools.*	ALL											X
Sub-topic HUM 6.4 — Controller/pilot cooperation															
ACS HUM 6.4.1	Describe parameters affecting controller/pilot cooperation.	2	*Content support: Workload, mutual knowledge, controller vs pilot mental picture .*	ALL											X

SUBJECT 8: EQUIPMENT AND SYSTEMS

The subject objective is:

Learners shall integrate knowledge and understanding of the basic working principles of equipment and systems and comply with the equipment and system degradation procedures in the provision of ATS.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC EQPS 1: VOICE COMMUNICATIONS															
Sub-topic EQPS 1.1 — Radio communications															
ACS EQPS 1.1.1	Operate two-way communication equipment.	3	Transmit/receive switches, procedures. *Content support: Frequency selection, standby equipment.*	ALL				X							
ACS EQPS 1.1.2	Identify indications of operational status of radio equipment.	3	*Content support: Indicator lights, serviceability displays, selector/-frequency displays.*	ALL				X							
ACS EQPS 1.1.3	Consider radio range.	2	*Content support: Transfer to another frequency, apparent radio failure, failure to establish radio contact, frequency protection range.*	APP ACP APS ACS				X							
Sub-topic EQPS 1.2 — Other voice communication															
ACS EQPS 1.2.1	Operate landline communications.	3	*Content support: Telephone, interphone and intercom equipment.*	ALL				X							
TOPIC EQPS 2: AUTOMATION IN ATS															
Sub-topic EQPS 2.1 — Aeronautical fixed telecommunication network (AFTN)															
ACS EQPS 2.1.1	Decode AFTN messages.	3	*Content support: Movement and control messages, NOTAM, SNOWTAM, BIRDTAM.*	ALL				X							
Sub-topic EQPS 2.2 — Automatic data interchange															
ACS EQPS 2.2.1	Use automatic data transfer equipment where available.	3	*Content support: Sequencing systems, Automated information and coordination, OLDI.*	TWR APS ACS				X							

TOPIC EQPS 3: CONTROLLER WORKING POSITION

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic EQPS 3.1 — Operation and monitoring of equipment															
ACS EQPS 3.1.1	Monitor the technical integrity of the controller working position.	3	Notification procedures, responsibilities.	ALL				X							
ACS EQPS 3.1.2	Operate the equipment of the controller working position.	3	*Content support: Situation displays, flight progress board, flight data display, radio, telephone, maps and charts, strip-printer, clock, information systems, UDF/VDF.*	ALL				X							
ACS EQPS 3.1.3	Operate available equipment in abnormal and emergency situations.	3		ALL						X					
Sub-topic EQPS 3.2 — Situation displays and information systems															
ACS EQPS 3.2.1	Use situation displays.	3		ALL	X	X									X
ACS EQPS 3.2.2	Check availability of information material.	3		ALL	X										X
ACS EQPS 3.2.3	Obtain information from equipment.	3		APP ACP APS ACS	X										X
Sub-topic EQPS 3.3 — Flight data systems															
ACS EQPS 3.3.1	Use the flight data information at controller working position.	3		ALL	X										X
Sub-topic EQPS 3.4 — Use of ATS surveillance system															
ACS EQPS 3.4.1	Use the ATS surveillance system functions.	3		APS ACS	X										X
ACS EQPS 3.4.2	Analyse the information provided by the ATS surveillance system.	4		APS ACS	X										X

ACS EQPS 3.4.3	Assign codes.	4		APS ACS	X	X									X
ACS EQPS 3.4.4	Appreciate the use of advanced surveillance technology.	3	*Content support: Mode S, ADS-B, MLAT.*	APS ACS											X

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic EQPS 3.5 — Advanced systems															
ACS EQPS 3.5.1	Appreciate the use of controller pilot datalink communications when available.	3		APS ACS	X										X
ACS EQPS 3.5.2	Appreciate the use of information provided by advanced systems.	3	*Content support: Trajectory-based information, MTCD, MONA.*	APS ACS	X										X
TOPIC EQPS 4: FUTURE EQUIPMENT															
Sub-topic EQPS 4.1 — New developments															
ACS EQPS 4.1.1	Recognize future developments.	1	New advanced systems.	ALL											X
TOPIC EQPS 5: EQUIPMENT AND SYSTEMS LIMITATIONS AND DEGRADATION															
Sub-topic EQPS 5.1 — Reaction to limitations															
ACS EQPS 5.1.1	Take account of the limitations of equipment and systems.	2		ALL	X					X					X
ACS EQPS 5.1.2	Respond to technical deficiencies of the operational position.	3	Notification procedures, responsibilities	ALL	X					X					X
Sub-topic EQPS 5.2 — Communication equipment degradation															
ACS EQPS 5.2.1	Identify that communication equipment has degraded.	3	*Content support: Ground-air and landline communications.*	APP ACP APS ACS						X					
ACS EQPS 5.2.2	Apply contingency procedures in the event of communication equipment degradation.	3	Procedures for total or partial degradation of ground-air and landline communications, alternative methods of transferring data.	APP ACP APS ACS						X					
Sub-topic EQPS 5.3 — Navigational equipment degradation															
ACS EQPS 5.3.1	Identify when a navigational equipment failure will affect operational ability.	3	*Content support: VOR, navigational aids.*	ALL						X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS EQPS 5.3.2	Apply contingency procedures in the event of navigational equipment degradation.	3	*Content support: Vertical separation, information to aircraft, navigational assistance, seeking assistance from adjacent units.*	TWR ACP APS ACS						X					
Sub-topic EQPS 5.4 — Surveillance equipment degradation															
ACS EQPS 5.4.1	Identify that surveillance equipment has degraded.	3	Partial power failure, loss of certain facilities, total failure.	APS ACS						X					
ACS EQPS 5.4.2	Apply contingency procedures in the event of surveillance equipment degradation.	3	*Content support: Inform adjacent sectors, Inform aircraft, apply vertical separation (emergency), increased horizontal separation, reduce the number of aircraft entering area of responsibility, transfer aircraft to another unit.*	APS ACS						X					
Sub-topic EQPS 5.5 — ATC processing system degradation															
ACS EQPS 5.5.1	Identify a processing system degradation.	3	*Content support: FDPS, SDPS, software processing of situation display.*	APS ACS						X					
ACS EQPS 5.5.2	Apply contingency procedures in the event of a processing system degradation.	3		APS ACS						X					

SUBJECT 9: PROFESSIONAL ENVIRONMENT

The subject objective is:

Learners shall identify the need for close cooperation with other parties concerning ATM operations and appreciate aspects of environmental protection.

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
TOPIC PEN 1: FAMILIARIZATION															
Sub-topic PEN 1.1 — Study visit to area control centre															
ACS PEN 1.1.1	Appreciate the functions and provision of an operational area control service.	3	Study visit to area control centre.	ACP ACS											
TOPIC PEN 2: AIRSPACE USERS															
Sub-topic PEN 2.1 — Contributors to civil ATS operations															
ACS PEN 2.1.1	Characterize civil ATS activities in area control centre.	2	Study visit to an area control centre. *Content support: Familiarization visits to TWR, APP, AIS, RCC.*	ACP ACS											
ACS PEN 2.1.2	Characterize other parties interfacing with ATS operations.	2	*Content support: Familiarization visits to engineering services, fire and emergency services, airline operations offices.*	ALL											
Sub-topic PEN 2.2 — Contributors to military ATS operations															
ACS PEN 2.2.1	Characterize military ATS activities.	2	*Content support: Familiarization visits to TWR, APP, ACC, AIS, RCC, air defence units.*	ALL											

TOPIC PEN 3: CUSTOMER RELATIONS

Sub-topic PEN 3.1 — Provision of services and user requirements				
ACS PEN 3.1.1	Identify the role of ATC as a service provider.	3	ALL	
Sub-topic PEN 3.1 — Provision of services and user requirements				
ACS PEN 3.1.2	Appreciate ATS users requirements.	3	ALL	

TOPIC PEN 4: ENVIRONMENTAL PROTECTION

Sub-topic PEN 4.1 — Environmental protection

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS PEN 4.1.1	Appreciate the mitigation techniques used en-route to minimize the aviation's impact on the environment.	3	*Content support: FRA, night/weekend routes, ICAO Circular 303* - Operational opportunities to minimize fuel use and reduce emissions.	ACP ACS											

SUBJECT 10: ABNORMAL AND EMERGENCY SITUATIONS

The subject objective is:

Learners shall develop professional attitudes to manage traffic in abnormal and emergency situations.

TOPIC ABES 1: ABNORMAL AND EMERGENCY SITUATIONS (ABES)

Sub-topic ABES 1.1 — Overview of ABES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ABES 1.1.1	List common abnormal and emergency situations.	1	*Content support: Any unusual/emergency situations, ambulance flights, ground based safety nets alerts, airframe failure, unreliable instruments, runway incursion.*	ALL											X
ACS ABES 1.1.2	Identify potential or actual abnormal and emergency situations.	3		ALL	X					X					X
ACS ABES 1.1.3	Take into account the procedures for given abnormal and emergency situations.	2	*Content support: ICAO Doc 4444.*	APP ACP APS ACS						X					
ACS ABES 1.1.4	Take into account that procedures don’t exist for all abnormal and emergency situations.	2	*Content support: Real life examples.*	ALL						X					
ACS ABES 1.1.5	Consider how the evolution of a situation may have an impact on safety.	2	*Content support: Separation, information, coordination.*	ALL						X					

TOPIC ABES 2: SKILLS IMPROVEMENT

Sub-topic ABES 2.1 — Communication effectiveness

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ABES 2.1.1	Ensure effective communication in all circumstances including the case where standard phraseology is not applicable.	4	Phraseology, vocabulary, readback, silence instruction.	ALL				X		X					
ACS ABES 2.1.2	Apply change of radiotelephony call sign.	3	ICAO Doc 4444	ALL				X		X					

Sub-topic ABES 2.2 — Avoidance of mental overload

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ABES 2.2.1	Describe actions to keep the control of the situation.	2	*Content support: Sector splitting, holding, flow management, task delegation.*	ALL						X			X		
ACS ABES 2.2.2	Organize priority of actions.	4		ALL						X			X		
ACS ABES 2.2.3	Ensure an effective circulation of information.	4	*Content support: Between executive and planner/-coordinator, with the supervisor, between sectors, between ACC, APP and TWR , with ground staff.*	ALL					X	X				X	
ACS ABES 2.2.4	Consider asking for help.	2		ALL						X			X	X	

Sub-topic ABES 2.3 — Air / ground cooperation

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ABES 2.3.1	Collect appropriate information relevant for the situation.	3		ALL					X	X					
ACS ABES 2.3.2	Assist the pilot.	3	Pilot workload. *Content support: Instructions, information, support, Human Factors.*	ALL						X					

TOPIC ABES 3: PROCEDURES FOR ABNORMAL AND EMERGENCY SITUATIONS

Sub-topic ABES 3.1 — Application of procedures for ABES

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
ACS ABES 3.1.1	Apply the procedures for given abnormal and emergency situations.	3		ALL						X					

Sub-topic ABES 3.2 — Radio failure

ACS ABES 3.2.1	Describe the procedures followed by a pilot when he/she experiences complete or partial radio failure.	2	ICAO Doc 7030 *Content support: Military procedures.*	ALL											X
ACS ABES 3.2.2	Apply the procedures to be followed when a pilot experiences complete or partial radio failure.	3	*Content support: Prolonged loss of communication.*	ALL						X					

					SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM	KNOW
Sub-topic ABES 3.3 — Unlawful interference and aircraft bomb threat															
ACS ABES 3.3.1	Apply ATC procedures associated with unlawful interference and aircraft bomb threat.	3	ICAO Doc 4444	ALL						X					
Sub-topic ABES 3.4 — Strayed or unidentified aircraft															
ACS ABES 3.4.1	Apply the procedures in the case of strayed aircraft.	3	ICAO Doc 4444 *Content support: Inside controlled airspace, outside controlled airspace.*	ALL						X					
ACS ABES 3.4.2	Apply the procedures in the case of unidentified aircraft.	3	ICAO Doc 4444	ALL						X					
Sub-topic ABES 3.5 — Diversions															
ACS ABES 3.5.1	Provide navigational assistance to diverting emergency aircraft.	4	Track/heading, distance, other navigational assistance. *Content support: Nearest most suitable aerodrome.*	APP ACP APS ACS						X					
Sub-topic ABES 3.6 — Transponder failure															
ACS ABES 3.6.1	Apply procedures in the event of an SSR transponder failure.	3	ICAO Doc 4444, ICAO Doc 7030. *Content support: Total/partial failure, impact on ADS-B/Mode S capability.*	APS ACS						X					

CHAPTER 4 - Appendix 2 – Example Training Events

Example 1:

The first example of a training event comes from a basic training course. The main training event is a ‘lesson’ that takes place in a classroom but also makes use of computers for some parts of the delivery. This lesson is mostly about delivery of underpinning knowledge. The topic and sub-topic numbers relate to the syllabus.

Training event title and #:	**METB 1** Meteorology Introduction		
No of periods:	3		
Training event type:	Lesson		
Training methods:	Classroom lesson	Computer-based exercises	
Training media:	Visual aids	Multi-media computers	Text
Training mode:	Delivered to group		
Learning rate:	Time restricted		

TOPIC		**SUB-TOPIC**	
1	Introduction	1.1	Units of measurement
		1.2	Aviation and meteorology
		1.3	Organization of the meteorological service
4	Meteorological phenomena	4.4	Meteorological hazards

Objectives covered (from syllabus)		**L**	**Content + *Content support***	**Training documentation**
1.1.1	Apply the units of measurement appropriate to meteorology.	3		Annex 5, aeronautical information publication, ATCO basic e-learning module
1.2.1	Explain the relevance of meteorology in aviation.	2		

1.2.2	Explain the requirements for the provision of meteorological information available to operators, flight crew members and air traffic services.	2	Annex 3, Annex 11	Doc 9377, Doc 8896, WMO: 732 *Guide to Practices for Meteorological Offices serving Aviation*
1.3.1	Name the basic duties, organization and working methods of meteorological services.	1		Doc 9377, Doc 8896, WMO: 732 *Guide to Practices for Meteorological Offices serving Aviation*
1.3.2	State the international and national standards for coordination between ATS and MET services.	1		Doc 9377, Doc 8896,
1.4.1	State the meteorological hazards to aviation.	1	Turbulence, thunderstorms, icing, microbursts, squall, macro-burst, wind-shear	ATCO basic e-learning course

Topic/Sub-topic #	**Prerequisite topics and/or sub-topics and/or objectives**	**Training event #**
LAWB 1.1.1	Name the key national and international aviation organizations.	LAWB 1
LAWB 2.1.1	Explain the purpose and function of ICAO.	LAWB 2
LAWB 2.1.2	Describe the methods by which ICAO notifies and implements international Standards.	LAWB 2
LAWB 4.7.1	Describe the units of measurement used in aviation.	LAWB 9

Example 2:

The second example also comes from a basic training course. In this case, the main training event is ‘skills practice’ in a simulator. Group briefings and debriefings are delivered to all trainees together, whereas the simulations are individually conducted.

Training event title and #:	**ATMB 25** Practical training		
No of periods:	30		
Training event type:	Skill practice		
Training methods:	Structured briefing	Individual simulation	Debriefing
Training media:	Simulator	Visual aids	Text

Training mode:	Group/individual

Learning rate:	Time restricted

TOPIC		**SUB-TOPIC**	
1	Air traffic management	1.3	Flight information service
2	Radiotelephony	2.1	Radiotelephony general operating procedures
3	ATC clearances & instructions	3.1	Type and content of ATC clearances
		3.2	ATC instructions
4	Coordination	4.3	Means
6	Separations	6.7	Applied separation
8	Data display	8.2	Data management

Objectives covered (from syllabus)		**L**	**Content + *Content support***	**Training documentation**
1.3.5	Issue information to aircraft.	3	*SIGMET, serviceability of navaids, weather, flight safety information, essential traffic, essential local traffic, information related to aerodrome conditions*	Local operating manual (for the simulation)
2.1.2	Use approved phraseology.	3	*Content: Relevant parts of Doc 4444, Doc 9432 Manual of Radiotelephony – standard words and phrases, Annex 10, Volume II.*	
2.1.3	Perform communication effectively.	3	*Communication techniques. readback/verification of readback*	
3.1.3	Issue appropriate ATC clearances.	3		
3.2.3	Issue appropriate ATC instructions.	3		
4.3.2	Use the available means for coordination.	3		
6.7.1	Apply separation.	3	*Vertical, longitudinal, lateral, aerodrome, based on ATS surveillance systems, distances from airspace boundaries*	

8.2.1	Update the data display to accurately reflect the traffic situation.	3	*Strip marking symbols, strip movement procedures, electronic data, radar label*

Topic/Sub-topic #	Prerequisite topics and/or sub-topics and/or objectives	Training event #
ATMB 1.2	Air traffic control service	ATMB 1
ATMB 1.3	Flight information service	ATMB 2
ATMB 1.7	Air traffic advisory service	
ATMB 2.1	Radiotelephony – General operating procedures	ATMB 4
ATMB 3.1	ATC clearances and instructions	ATMB 9
ATMB 4.1	Coordination	ATMB 10
ATMB 8.1	Data extraction	ATMB11
ATMB 6.1	Vertical and horizontal separations	ATMB 14
ATMB 6.6.1	Explain the use of ATS surveillance systems in ATS	ATMB18
ATMB 6.6.2	Explain the ATS surveillance systems separation standards and procedures	ATMB19
LAWB 4.3	Rules of the air	LAWB 11
LAWB 4.2	Airspace and ATS routes	LAWB 12
LAWB 4.3	Flight plan	LAWB 15
NAVB 4.1.1	Appreciate the influence of wind on the flight path	NAVB 7
NAVB 4.2	Speed	NAVB 8
HUMB 1.2	Professional conduct	HUMB 2
HUMB 4.3	Communication	HUMB 7
EQPSB 4.2.1	Explain the working principles of primary surveillance radar	EQPSB 7
EQPSB 4.3.1	Explain the working principles of secondary surveillance radar	EQPSB 8
EQPSB 4.4	Use of radars	EQPSB 9

CHAPTER 6 - Appendix 1 – Training Benefits Analysis

(Chapter 6 – 6.2.1.2 refers)

Once the operational data has been collected and analysed, the training designer, in cooperation with the unit safety section, should be in a position to identify the operational safety issues for that unit.

In the first step, the training designer uses the list of issues to identify the training topics and scenarios that will form the basis of the course development.

Each scenario is then considered in terms of its likelihood, severity and the benefit of training[9].

a) **Likelihood**. Likelihood describes the probability that over the course of a defined period of time an air traffic controller will experience the scenario described and be required to take action or manage the situation. Five levels of likelihood are used:

1 – Unlikely – once to never in a career

2 – Moderately likely – a few times in a career

3 – Likely – probably once every one to three years

4 – Highly Likely – at least once per month

5 – Certainly – typically every shift

b) **Severity**. Severity describes the most likely outcome based on the assumption that the air traffic controller has not received training to manage the described scenario. Five levels of severity are used:

1 – Negligible – insignificant effect not compromising safety

2 – Minor – reduction in safety (but not considered a significant reduction)

3 – Moderate – safety compromised

4 – Major – aircraft damage and/or injured persons

5 – Catastrophic – significant damage or fatalities

6 – Severity unrelated – controller actions are not a determining factor in the severity outcome

Note 1.— The most likely outcome, not the worst possible outcome, is considered.

Note 2.— "Severity unrelated" has been included to cater for those situations where the severity of the outcome cannot be affected by the actions of the controller.

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[9] This process is adapted from the training criticality survey contained in the *Manual of Evidence-based Training* (Doc 9995).

c) **Training benefit**. The training benefit is considered from one of two perspectives; either a direct or an indirect benefit.

Training benefit – direct. Used when any levels from 1 to 5 was selected in b). The effect of training to reduce the severity of the outcome, where controller performance is likely to have an influence on the severity. Four levels are used:

1 – Unimportant – training does not reduce severity

2 – Minor – training may slightly reduce the severity

3 – Moderate – having no training is likely to compromise safety

4 – Significant – safe outcome is unlikely without effective training

Training benefit – indirect. Used only when level 6 – Severity unrelated – was selected in b). The effect of training to manage scenarios for which the severity of the outcome is not primarily determined by the controller; however, for which the controller's actions can mitigate any secondary and indirect consequences and provide assistance to flight crews, such as is possible. Again, four levels are used:

1 – Unimportant – training does not enhance the controller's ability to manage the scenario

2 – Minor – training may slightly enhance the controller's ability to manage the scenario

3 – Moderate – training is very likely to improve the controller's ability to manage the scenario

4 – Significant – training is essential to enable the controller to manage the scenario

A scenario could be included in the refresher training if it scores a total of 7 or higher across all three elements (i.e. add the level numbers for the likelihood, severity and training benefit to determine the total). A scenario should not be included if the training benefit is considered 'unimportant'.

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CHAPTER 6 - Appendix 2 – Example Refresher Training Syllabus

							Relevant competencies from ACM									
Topic	**Types of refresher training**	**Description of the topic**	**Scenarios (sub-topics)**	**Training objectives**	**Relevant ATC Licence Ratings**	**Observable behaviours that supplement the Evidence Guide and assessment**	**SITU**	**TRAF**	**SEPC**	**COMM**	**CORD**	**NONR**	**PROB**	**SELF**	**WORK**	**TEAM**
Stabilized Approaches	SPP	This is a general focus area for approach surveillance that is concerned with any situation where the controller has an impact on a flight crew's ability to achieve a stabilized approach.	**Speed instructions** - any approach traffic situation where ATC speed control could have an impact on a flight crew's ability to achieve a stabilized approach.	Ensure that own actions do not contribute to a destabilized approach	APS	Issues speed instructions that are appropriate for the aircraft type and its position in relation to the final approach track	x	x	x	x			x		x	
				Ensure effective and appropriate use of speed control techniques for approach sequencing purposes		Avoids issuing instructions that include both a descent clearance and a speed reduction	x	x					x			
						Recognizes traffic situations where speed restrictions are having an impact on the flight crew ability to stabilize their approach	x						x			
						Cancel speed restrictions at a time that will enable the flight crew to stabilize their approach	x	x	x	x			x			
			Distance to touchdown - any approach traffic situation where ATC information concerning distance to touchdown can have an impact on a flight crew's ability to achieve a stabilized approach.	Ensure that own actions do not contribute to a destabilized approach	APS	Avoids routine vectoring for the sole purposes of shortening the flight path		x								
				Ensure effective and appropriate use of vectoring for approach sequencing purposes		Always passes accurate distance to touchdown information when aircraft are being vectored to final approach				x						
						Vectors aircraft so that they intercept the glide slope from below	x	x								
				Provide distance to touchdown information appropriately		Recognizes when an aircraft are unlikely to stabilize their approach due to excessive height relative to their distance to touchdown	x						x			
						Avoids close-in turns onto final approach	x	x		x						

Topic	Types of refresher training	Description of the topic	Scenarios (sub-topics)	Training objectives	Relevant ATC Licence Ratings	Observable behaviours that supplement the Evidence Guide and assessment	Relevant competencies from ACM									
							SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM
			Late changes of runway - any approach traffic situation where a change of runway, given at short notice could have an impact on flight crews' ability to achieve a stabilised approach.	Ensure that own actions do not contribute to a destabilized approach Manage late changes of runway effectively	APS	Recognizes situations where a late change of runway will result in a significantly increased workload for the flight crew	x	x								
						Issues instructions that take into consideration the flight crews requirement to achieve a stabilized approach, during a necessary late change of runway	x	x	x	x			x			
						Monitors the forecast and actual trend in wind velocity regularly	x									
						Avoids offering a change of runway (including a parallel runway) to aircraft below FL100 simply to achieve a reduction in ground delay		x								
Communication issues	SPP and NRS	This is a general focus area that is concerned with any situations where correct and clear communication is required to ensure safe operations. This includes air-ground and ground-ground communication.	**Communications Failure** - one or more aircraft experience a partial or complete loss of communications.	Manage a complete loss of radio communication with an aircraft effectively Manage a partial loss of radio communication with an aircraft effectively	All	Identifies that a loss, or partial loss of communications has occurred	x			x	x	x	x			
						Identifies the reason for the loss of communications				x	x		x			
						Executes appropriate procedure	x	x	x	x	x	x			x	x
						Anticipates possible outcomes and likely consequences	x						x			
						Manages consequences		x	x	x	x	x				
			Misunderstandings - one or more persons in a communication, misunderstanding the message. This may be between the controller and air crews or ground actors (e.g. other controllers, supervisors etc.).	Manage communication misunderstandings effectively	All	Recognize that a misunderstanding may have occurred	x			x			x	x		
						Takes action to clarify if a misunderstanding has occurred				x	x			x		
						Corrects misunderstandings, when applicable				x	x					
						Manages any consequences of the misunderstanding	x	x	x	x	x		x			

							Relevant competencies from ACM									
Topic	Types of refresher training	Description of the topic	Scenarios (sub-topics)	Training objectives	Relevant ATC Licence Ratings	Observable behaviours that supplement the Evidence Guide and assessment	SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM
						Takes extra care when language difficulties are apparent				x						
			Radio Discipline - any situation where communication is required.	Use appropriate radio telephony phraseology	All	Uses clear and unambiguous phraseology at all times				x	x					
						Use standard RT phraseology, when prescribed				x	x					
						Insists on complete readbacks of clearances and instructions from pilots at all times				x						
				Apply correct radio communication techniques		Corrects any error in read-back and insist on further read-back until certain that the clearance has been correctly copied				x						
						Issues conditional clearances that are correct and complete				x						
						Avoids distractions when listening to readbacks				x						
						Avoids issuing more than two instructions in the same transmission				x						
						Uses standard coordination phraseology, when prescribed				x	x					
						Does not pass RTF frequency changes as part of a multi-part clearance				x						
			Call sign confusion - two or more aircraft on the same frequency, in the same airspace with similar call signs that are likely to cause confusion.	Manage call sign confusion issues	All	Identifies call signs that could potentially lead to confusion	x						x			
						Monitors flight crew compliance with RTF call sign use				x						
						Warns the pilots of aircraft on the same RT frequency having similar call signs that call sign confusion may occur				x			x			
						Pronounces call signs at a lower speed and more clearly				x						

							Relevant competencies from ACM									
Topic	Types of refresher training	Description of the topic	Scenarios (sub-topics)	Training objectives	Relevant ATC Licence Ratings	Observable behaviours that supplement the Evidence Guide and assessment	SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM
						Instructs one or both aircraft to use alternative call signs while they are on the frequency, if call sign confusion is problematic				x			x			
Adverse Weather	NRS	This topic is concerned with threats that arise from adverse weather conditions that are either impacting the management of air traffic or affecting the flight capabilities of aircraft.	**Severe weather avoidance** - any situation where adverse weather is affecting the standard flow of traffic, reducing the available airspace, creating new conflict points, increasing frequency occupation time, increasing coordination, creating a rapidly changing situation, degrading RVSM capability, increasing the risk of non-notified airspace penetration and limiting the ability to use radar vectoring.	Manage traffic during adverse weather conditions	ALL	Maintains awareness of the adverse weather location using which ever sources are available	x				x					x
						Requests details from flight crew on their planned avoiding actions	x	x	x	x	x	x	x		x	x
						Implements strategies for crosschecking the current, planned and intended actions of flight crew with regard to weather avoidance actions				x	x	x	x			x
						Coordinates timely information to adjacent sectors when aircraft deviations may penetrate their airspace	x	x	x		x	x				x
						Actively seeks information about aircraft that appear likely to enter own sector	x	x	x		x	x	x			x
						Requests assistance, when necessary	x	x			x			x		x
						Builds in extra safety margins including increased lateral and vertical separation, when considered necessary	x	x	x	x	x					
						Informs flight crew if their weather avoidance will take aircraft outside of controlled airspace	x									
			Icing - any situation where one or more flight crew report in-flight icing, or meteorological reports indicate areas of possible icing.	Manage traffic taking into account the icing conditions in area of responsibility Assist aircraft experiencing in-flight icing	APP APS ACP ACS	Informs aircraft of icing conditions	x			x	x	x				
						Expedites traffic through or away from icing area	x	x				x				
						Anticipates effects of in-flight icing on aircraft performance	x	x				x				
						Responds to promptly to flight crew requests for change of level or heading	x			x		x				

							Relevant competencies from ACM									
Topic	**Types of refresher training**	**Description of the topic**	**Scenarios (sub-topics)**	**Training objectives**	**Relevant ATC Licence Ratings**	**Observable behaviours that supplement the Evidence Guide and assessment**	**SITU**	**TRAF**	**SEPC**	**COMM**	**CORD**	**NONR**	**PROB**	**SELF**	**WORK**	**TEAM**
			Strong low level/surface winds - any situation where aircraft at low altitude (usually approach, landing and climbing phases of flight) are affected by strong, low level winds that can be particularly dangerous as any loss of control that may occur is so close to terrain that recovery may be difficult or impossible. Includes, but not limited to windshear related to thunderstorms, microbursts and severe cross-winds.	Manage traffic taking into account the effects of strong low level wind	TWR APP APS	Manages traffic taking into account the possible actions of aircraft encountering windshear and microbursts	x			x		x			x	
						Provides traffic information and instructions, as appropriate, when an aircraft announces a go-around due windshear	x	x		x		x				
						Informs aircraft of relevant strong low level wind conditions	x	x								
In-flight emergencies	NRS	This topic covers a wide variety of in-flight emergencies. These types of emergencies are often characterized by rapidly changing circumstances and require the controller to evaluate the situation, often with limited or incomplete	**Smoke or fire in the cockpit** - during any phase of flight, the crew reports either smoke or fire in the cockpit and requests to divert to the nearest suitable airfield or priority landing if already approaching the destination aerodrome. At a certain point during the diversion, the pilot reports very poor visibility in the cockpit due to smoke. The scenario may include an emergency	Manage the traffic situation whilst dealing with an aircraft with fire or smoke in the cockpit	All	Offers any appropriate assistance	x		x			x	x			
						Coordinates with appropriate ATC units and other services, as required					x					
						Prioritizes actions depending on the evolution of the situation						x			x	
						Uses appropriate elements of the unit emergency checklist						x				
						Evaluates overall workload and requests support, when necessary									x	

							Relevant competencies from ACM									
Topic	Types of refresher training	Description of the topic	Scenarios (sub-topics)	Training objectives	Relevant ATC Licence Ratings	Observable behaviours that supplement the Evidence Guide and assessment	SITU	TRAF	SEPC	COMM	CORD	NONR	PROB	SELF	WORK	TEAM
		information, and then decide on the effective way to offer assistance. For many of these in-flight emergencies there are prescribed actions and procedures, however, circumstances may dictate that the controller creates solutions because there is no defined procedure.	descent.			Provides information to flight crew regarding closest and/or most suitable aerodromes when appropriate		x				x				
			Electrical problems - during any phase of flight, the crew experiences either partial or complete electrical failure. The effects of the electrical failure can vary from affecting the navigational systems, to anti-cing, transponders, controls and indicators, lighting.	Manage the traffic situation whilst dealing with an aircraft with electrical problems	All	Offers any appropriate assistance	x			x		x	x			
						Coordinates with appropriate ATC units and other services, as required					x					
						Prioritizes actions depending on the evolution of the situation						x			x	
						Uses appropriate elements of unit emergency checklist						x				
						Evaluates overall workload and requests support, when necessary									x	
						Provides information to flight crew regarding closest and/or most suitable aerodromes when appropriate		x				x				
			Hydraulics problems - during any phase of flight, the crew reports a problem with hydraulics. This might range from partial/total loss of control whilst flying, difficulties extending/retracting landing gear, lack of auto-pilot or reduced braking upon landing, high approach speed.	Manage the traffic situation whilst dealing with an aircraft with hydraulics problems	All	Provides increased separation between affected aircraft and other aircraft	x		x							
						Offers any appropriate assistance	x			x		x	x			
						Coordinates with appropriate ATC units and other services, as required					x					
						Prioritizes actions depending on the evolution of the situation						x			x	
						Uses appropriate elements of unit emergency checklist						x				
						Evaluates overall workload and requests support, when necessary									x	

							Relevant competencies from ACM									
Topic	**Types of refresher training**	**Description of the topic**	**Scenarios (sub-topics)**	**Training objectives**	**Relevant ATC Licence Ratings**	**Observable behaviours that supplement the Evidence Guide and assessment**	**SITU**	**TRAF**	**SEPC**	**COMM**	**CORD**	**NONR**	**PROB**	**SELF**	**WORK**	**TEAM**
						Provides information to flight crew regarding closest and/or most suitable aerodromes when appropriate		x				x				
			Fuel problems - during any phase of flight, the crew reports a fuel problem that may range from being below the legal minimum to fuel exhausted.	Manage the traffic situation whilst dealing with an aircraft with fuel problems	All	Identifies accurately the fuel status of the affected aircraft						x				
						Provides control actions that ensure efficient use of remaining fuel	x					x				
						Coordinates with appropriate ATC units and other services, as required					x					
						Uses appropriate elements of the unit emergency checklist						x				
						Provides aerodrome and weather information		x								
						Prioritizes actions depending on the evolution of the situation	x	x							x	
						Evaluates overall workload and requests support, when necessary									x	
			Bird strike - a bird or birds hit an aircraft shortly after take-off or before landing and either the windshield, engine, fuselage, landing gear or hydraulics or a combination are damaged.	Manage the traffic situation whilst dealing with an aircraft that has experienced a birdstrike	TWR	Prioritizes actions based on the seriousness of the situation	x					x			x	
						Offers any appropriate assistance	x			x		x	x			
						Uses appropriate elements of the unit emergency checklist						x				
						Coordinates with appropriate ATC units and other services, as required					x					
						Evaluates overall workload and requests support, when necessary									x	

							Relevant competencies from ACM									
Topic	**Types of refresher training**	**Description of the topic**	**Scenarios (sub-topics)**	**Training objectives**	**Relevant ATC Licence Ratings**	**Observable behaviours that supplement the Evidence Guide and assessment**	**SITU**	**TRAF**	**SEPC**	**COMM**	**CORD**	**NONR**	**PROB**	**SELF**	**WORK**	**TEAM**
			Pressurization problems - aircraft performs an emergency descent, with or without warning, due to pressurization problems. On reaching FL100, aircraft requests priority landing at nearest suitable aerodrome.	Manage the traffic situation whilst dealing with an aircraft experience pressurisation problems	ACP ACS	Clears airspace immediately below and in the vicinity of emergency aircraft	x	x	x			x				
						Provides separation and/or issues essential traffic information, as required	x	x	x			x				
						Provides information to flight crew regarding closest and/or most suitable aerodromes, when appropriate		x								
						Uses appropriate elements of the unit emergency checklist						x				
						Coordinates with appropriate ATC units and other services, as required					x					
						Evaluates overall workload and requests support, when necessary									x	
Runway Management	SPP and NRS	This topic is concerned with the management of runways when aircraft, for various reasons cause the runway to be closed for a period of time or enter the runway without clearance. The controller not only has to manage the event but also the remaining traffic that will not be able to use	**Incursions** - an aircraft or vehicle attempts to enter/cross an active runway without clearance to do so. The incursion should occur at a time when safety could be compromised if not detected. Incorrect readbacks and misunderstanding could be the cause for the incursion.	Manage a runway incursion Take action to prevent a runway incursion	TWR	Detects the possibility of a runway incursion and takes action	x	x								
						Takes immediate action to resolve a runway incursion once it has occurred	x					x				
			Excursions - an aircraft overruns on take off, or undershoots the runway on landing, or deviates off the side of the runway during	Manage a runway excursion	TWR	Offers any appropriate assistance						x				
						Follows local procedures for dealing with runway excursions						x				

							Relevant competencies from ACM									
Topic	**Types of refresher training**	**Description of the topic**	**Scenarios (sub-topics)**	**Training objectives**	**Relevant ATC Licence Ratings**	**Observable behaviours that supplement the Evidence Guide and assessment**	**SITU**	**TRAF**	**SEPC**	**COMM**	**CORD**	**NONR**	**PROB**	**SELF**	**WORK**	**TEAM**
		the blocked runway.	either landing or take off			Manages traffic taking into account the closure of the affected runway	x	x				x				
			Gear problems - aircraft arriving at aerodrome reports no gear or only partial gear deployment	Manage the traffic situation whilst dealing with an aircraft with gear problems	TWR	Clears runway according to local instructions						x				
						Coordinates with emergency services, as required					x					
						Plans traffic taking into account potential go around manouevres and a blocked runway	x	x								
						Requests technical assistance, if necessary and available						x				
			Braking problems - the flight crew report brake problems. The aircraft lands and blocks the runway due to damaged to its tyres.	Manage the traffic situation whilst dealing with an aircraft with braking problems	TWR	Clears runway according to local instructions						x				
						Coordinates with emergency services, as required					x					
						Plans traffic taking into account potential go around manoeuvres and a blocked runway	x	x								
						Requests technical assistance, if necessary and available						x				
			Go-arounds - any situation, initiated by either controller or pilot, where a go-around manouevre is carried out	Manage the traffic situation whilst dealing with a go-around.	TWR, APP, APS	Issues instructions that enable the flight crew to perform the published missed approach procedure						x				
						Issues instructions to flight crew that would modify the execution of the published missed approach only when essential to maintain safety						x				
						Follows local procedures for dealing with go-arounds						x				

SSP - Standard Practices and Procedures

NRS - Non Routine Situations

CHAPTER 6 - Appendix 3 – Example of Training Event

The example below shows the training events for the refresher training topic described in Appendix 2 to Chapter 6 as “Stabilized Approaches”. There are two training events that make up this training. The first is a self-study event that covers the theoretical aspects of stabilized approaches and the second is a practical skills event that takes place in a simulator and gives the controller the opportunity to practice all competencies associated with stabilized approaches.

Training event title and #:	**STAB 1** Stabilized approaches
# of periods:	1
Training event type:	Self-study
Training methods:	Self-study
Training media:	Computer with Internet access
Training mode:	Individual learning
Learning rate:	Self-paced

TOPIC	
1	Stabilized approaches

SUB-TOPIC	
1.1	General
1.2	Speed instructions
1.4	Late runway changes

Objectives covered (from syllabus)		**L**	**Content +** ***Content support***	**Training documentation**
1.1.1	Explain what constitutes a stabilized approach	2	Criteria listed by Flight Safety Foundation	Stabilized approach refresher training e-learning module
1.1.2	Describe what actions a pilot takes when an approach is unstable	2		
1.1.3	Explain the possible consequences	2	Runway excursion	

	of attempting to land following an unstabilized approach		Damage on touchdown Controlled flight into terrain Landing short
1.1.4	Identify controller actions that influence the flight crew’s ability to stabilize their approach	2	
1.2.1	Analyse the effect of ATC speed instructions on the flight crew’s ability to stabilize an approach	4	
1.4.1	Explain the effect of a late change of runway on the flight crew	2	

Topic/ sub-topic #	**Prerequisite topics and/or sub-topics and/or objectives**	**Training event #**
	None	

Training event title and #:	**STAB 2** Stabilized approaches		
# of periods:	10		
Training event type:	Skill practice		
Training methods:	Structured briefing	Individual simulation	Debriefing
Training media:	Simulator	Visual aids	Text
Learning rate:	Self-paced		

TOPIC		**SUB-TOPIC**	
1	Stabilized approaches	1.2	Speed instructions
		1.3	Distance to touchdown
		1.4	Late runway changes

Objectives covered (from syllabus)		**L**	**Content +** ***Content support***	**Training documentation**
1.2.2	Issue effective and appropriate speed control instructions for approach sequencing purposes	3		
1.3.1	Ensure effective and appropriate use of vectoring for approach sequencing purposes	4		
1.3.2	Provide distance to touchdown information appropriately	4		Manual of Air Traffic Services
1.4.2	Manage late changes of runway effectively	4	Parallel and cross runway operations	
1.2.1	Analyse the effect of ATC speed instructions on the flight crew ability to stabilize an approach	4		

1.4.1	Explain the effect of a late change of runway on the flight crew	2	Parallel and cross runway operations

Topic/sub-topic #	Prerequisite topics and/or sub-topics and/or objectives	Training event #
1	Stabilized approaches	STAB1

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Chapter 6 Appendix 4

List of Refresher Training Topics

The following is an example listing of refresher training topics that may be included in the programme The final determination as to what should be included in the refresher training programme must take in to consideration local and national issues or requirements that are relevant to the ATS unit involved. And they should be realistic so as the ATS unit can complete the training in the time allotted.

a) unusual situations, such as adverse weather, aircraft equipment failure, hijacking, and other types of emergencies. (training on emergency situations should be based on real life incidents and aircraft accidents, stressing a lesson learnt approach.);

b) in frequently used procedures, e.g. transitioning to procedural (non-radar) separation and procedures for special flight handling, rescue coordination centre, etc;

c) safety alerts and traffic advisories; in ATS units that are required to provide these services.

d) wake turbulence information and application;

e) line up and hold procedures;

f) locally developed de-icing operational procedures and review of national de-icing programmes (if applicable);

g) bird activity information;

h) other topics identified and transmitted by ATS authority or local ATS unit;

i) strayed or unidentified aircraft orientation;

j) interception of civil aircraft;

k) all aerodrome control tower limited aviation weather observers should receive, at least annually, refresher training in the meteorology procedures;

   1) en-route and terminal controllers required to maintain radar proficiency should receive the following refresher training:

   2) demonstrate the steps for transitioning from the primary source of radar information to the backup system and vice versa; and

   3) primary backup mode: annually review control procedures associated with operation in the backup mode (e.g. letters of agreement, handoffs, unit directives, and transition checklists) or utilize the backup mode for actual separation and control of air traffic;

m) ATS contingency plan procedures. Annually ensure familiarity with procedures and airspace based on the ATS unit contingency plans (e.g., loss of radar, communications failure, etc.);

n) effects of volcanic ash to aviation;

o) coordination procedures;

p) civil/military coordination and joint use airspace procedures;

q) separation minima;

r) radar vectoring techniques;

s) speed control techniques;

t) situational awareness;

u) ATS incident reduction;

v) aircraft performance and characteristics;

w) ATC communications;

x) preventing runway incursions;

y) special VFR operations;

z) level assignment;

aa) local manual of operations;

bb) letters of agreement;

cc) arrival and departure procedures;

dd) weather;

    1) de-icing procedures;

    2) severe weather;

    3) winter operations; and

    4) wind shear;

ee) noise abatement procedures; and

ff) ATS unit fire/life safety procedures.

— END —