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Международная
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Ref.: AN 12/48-15/71

4 September 2015

Subject: Approval of Amendment 4 to the PANS-TRG

Action Required: a) Implementation of the PANS-TRG on 10 November 2016; b) Publication of any differences as of 10 November 2016

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission, acting under delegated authority, on 11 June 2015, approved Amendment 4 to the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868) for applicability on 10 November 2016. The amendment was approved on 14 August 2015 by the President of the Council on behalf of the Council in accordance with established procedure. A copy of the amendment is available as attachments to the electronic version of this State letter on the ICAO-NET (<http://portal.icao.int>) where you can access all other relevant documentation.

2. Amendment 4 stems from proposals developed by the Secretariat as a result of the work of the Next Generation of Aviation Professionals (NGAP) Air Traffic Management (ATM) Group to restructure the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868) and to include competencies for air traffic controllers (ATCOs) and air traffic safety electronics personnel (ATSEP).

3. Your Government is invited by the Council to implement the provisions of the PANS-TRG. In this connection, I draw your attention to the decision taken by the Council, on 1 October 1973, to discontinue the publication of differences in Supplements to PANS documents and, instead, to request States to publish up-to-date lists of significant differences from PANS documents in their Aeronautical Information Publications (AIPs).

4. Given that the implementation of the competency-based training provisions for the air traffic controllers and air traffic safety electronics personnel is optional, should your Government not choose to implement these provisions, there is no need to publish a difference in the AIP. However, should your Government use a competency-based training application which differs from that in Amendment 4, you are requested to publish it in the list of differences in your State's AIP.

5. May I, therefore, invite your Government to publish in your Aeronautical Information Publication a list of any significant differences which will exist on 10 November 2016 between the provisions of the PANS-TRG and your national regulations and practices.

Accept, Sir/Madam, the assurances of my highest consideration.



Fang Liu
Secretary General

Enclosure:

Foreword to the PANS-TRG (Doc 9868)

ATTACHMENT to State letter AN 12/48-15/71

**AMENDMENT TO THE FOREWORD OF THE PANS-TRG,
FIRST EDITION**

Add the following at the end of Table A:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Approved Applicable</i>
4	Secretariat; Next Generation of Aviation Professionals (NGAP) Air Traffic Management (ATM) Group	Amendment concerning restructuring and inclusion of competencies for air traffic controllers (ATCOs) and air traffic safety electronics personnel (ATSEP)	14 August 2015 10 November 2016

— END —

AMENDMENT No. 4

TO THE

**PROCEDURES
FOR
AIR NAVIGATION SERVICES**

TRAINING

(Doc 9868)

INTERIM EDITION

The text of Amendment No. 4 to the PANS-TRG (Doc 9868) was approved by the President of the Council on behalf of the Council on **14 August 2015** for applicability on **10 November 2016**. This interim edition is distributed to facilitate implementation of the amendment by States. Replacement pages incorporating Amendment No. 4 are expected to be distributed in October 2016. (State letter AN 12/48-15/71 refers.)

AUGUST 2015

INTERNATIONAL CIVIL AVIATION ORGANIZATION

NOTES ON THE EDITORIAL PRESENTATION OF THE AMENDMENT

1. The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

~~Text to be deleted is shown with a line through it.~~

text to be deleted

New text to be inserted is highlighted with grey shading.

new text to be inserted

~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.

new text to replace existing text

2. The source of the proposed amendment arises from the Secretariat concerning restructuring and inclusion of competencies for air traffic controllers (ATCOs) and air traffic safety electronics personnel (ATSEP).

**TEXT OF AMENDMENT 4 TO THE
PROCEDURES FOR AIR NAVIGATION SERVICES —
TRAINING**

Editorial note.— Due to the restructuring of the PANS-TRG, paragraph numbering and cross-references contained in existing text will be corrected accordingly in due course.

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[Reserved]

**PART VI — TRAINING AND ASSESSMENT FOR
OTHER AVIATION PERSONNEL**

[Reserved]

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FOREWORD

1. Historical background

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

1.4-1.5 Between 2006 and 2010, aeroplane accidents resulting from a loss of control in flight (LOC-I) event were the leading cause of fatalities in commercial aviation. Recognizing the need to identify and effectively implement mitigating strategies, the prevention of aeroplane upsets quickly became an ICAO priority. Following extensive studies of the LOC-I phenomena, in collaboration with civil aviation authorities (CAAs), aviation accident investigative bodies, LOC-I focus groups, industry associations, original equipment manufacturers (OEMs) and subject-matter experts from around the world, it became readily apparent that deficiencies in current training practices were contributing factors in most aeroplane upset-related accidents. Consequently, Amendment 3 to the PANS-TRG improved the existing ICAO Standards and Recommended Practices (SARPs) and supporting guidance material by introducing aeroplane upset prevention and recovery training (UPRT) requirements.

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

2. Scope and purpose

2.1 The *Procedures for Air Navigation Services — Training* (PANS-TRG) are complementary to the Standards and Recommended Practices (SARPs) ~~contained in Annex 1~~. The PANS-TRG generally addresses competency-based training and assessment programmes that stakeholders may choose to implement.

2.2 The PANS-TRG specifies, in greater detail than in the SARPs, the actual procedures to be applied by training organizations when providing training for aeronautical personnel. This edition, ~~including the third amendment to PANS-TRG~~, contains procedures for the development and implementation of various competency-based training programmes designed to meet the Annex 1 requirements for the MPL and the aircraft maintenance mechanic/technician/engineer (AMMTE) licence, as well as those flight crew training programmes developed under the evidence-based training (EBT) concept, which provides an alternative means of satisfying the recurrent training requirements of Part I of Annex 6. ~~Amendment three~~ It also details the methodologies to successfully introduce

aeroplane upset prevention and recovery training (UPRT) at the commercial pilot (aeroplane) and multi-crew pilot licensing levels, as well as provide UPRT in a flight simulation training device at the commercial air transport pilot and type rating level— to support the UPRT provisions ~~are promulgated in the amendment to Annex 1 and Annex 6, Part I that will become applicable on 13 November 2014. The information herein is further supplemented by guidance published in the *Manual on Aeroplane Upset Prevention and Recovery Training* (Doc 10011).~~ The PANS-TRG also specifies procedures for the harmonized implementation of training procedures for ATM personnel.

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4. Implementation

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

...

6. Contents of the document

Part I — GENERAL PROCEDURES

6.1 Chapter 1 — Definitions and acronyms

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

...

6.3 Chapter 3 — Qualifications of course developers and instructors

Annex 1 contains Standards for the issuance of the flight instructor rating and for granting authorizations to flight instructors and flight simulation training device (FSTD) instructors. This chapter and its attachment contain the qualifications to be held and the competencies to be demonstrated by instructors and course developers employed in a competency-based training programme. In competency-based programmes, instructor competencies are made explicit, and instructors have to demonstrate these competencies throughout the training process and in their knowledge of the subject-matter and training course content.

Part II — TRAINING AND ASSESSMENT FOR AIRCRAFT OPERATIONAL PERSONNEL

6.3-6.4 Section 1 — Flight crew training and assessment

Chapter 3-1 — *Competency-based training and licensing for the multi-crew pilot licence (MPL)*

- 6.4.1 This chapter outlines the principles and procedures that are applicable to the development and implementation of an MPL course and that shall be followed in addition to those outlined in Part I, Chapter 2. ~~Chapter 3~~ This chapter also contains the competency units, competency elements and performance criteria developed for the MPL. ~~Attachment A to Chapter 3 contains~~ The attachments to Chapter 1 contain guidance material on; the design and development of an MPL training programme; ~~Attachment B contains~~ examples of training objectives; threat and error management (TEM); and the competencies for MPL examiners and inspectors.

Chapter 5-2 — *Evidence-based training (EBT)*

- 6.4.2 This chapter is intended to provide guidance to civil aviation authorities, operators and approved training organizations in the recurrent training of pilots to develop and evaluate crew performance according to a set of competencies and the related knowledge, skills and attitudes (KSA).

Chapter 7-3 — *Upset prevention and recovery training (UPRT)*

- 6.4.3 This chapter is intended to provide procedures to civil aviation authorities, operators and approved training organizations ~~in~~ related to the delivery of upset prevention and recovery training for aeroplane pilots. This training is required for the MPL, the type-rating and the training of commercial air transport pilots and is highly recommended for the CPL(A).

Chapter 4 — *Other flight crew members*

[Reserved]

Chapter 5 — *Flight validation pilots*

[Reserved]

6.5 Section 2 — Cabin crew

[Reserved]

6.6 Section 3 — Flight dispatchers/flight operations officers

[Reserved]

Part III — TRAINING AND ASSESSMENT FOR AIRCRAFT MAINTENANCE PERSONNEL

6.4-6.7 Chapter 4-1 — Competency-based training and assessment for aircraft maintenance personnel

This chapter outlines the principles and procedures that are applicable to the development and implementation of an AMMTE course and that shall be followed in addition to those outlined in Part I, Chapter 2. ~~Chapter 4~~ This chapter contains the competency units, competency elements and performance criteria developed for the AMMTE licence. Attachment A ~~to Chapter 4~~ contains guidance material on the design and development of an AMMTE training programme; Attachment B contains examples of training objectives. Implementation of competency-based training programmes for AMMTE is optional. Paragraph 3.1 of Annex 1, Appendix 2, enables the use of such competency-based training programmes as an alternative means of compliance with the Annex 1 experience requirements.

6.5 — Chapter 5 — Evidence-based training (EBT)

~~This chapter is intended to provide guidance to Civil Aviation Authorities, operators and approved training organizations in the recurrent training of pilots to develop and evaluate crew performance according to a set of competencies and the related knowledge, skills and attitudes (KSA).~~

6.6 — Chapter 6 — Competencies for flight crew training, course developer and instructor, and MPL examiner and inspector

~~Annex 1 contains Standards for the issuance of the flight instructor rating and for granting authorizations to flight simulation training device (FSTD) instructors. Chapter 6 of this document and its Attachment contain the qualifications to be held, and the competencies to be demonstrated, by those instructors, MPL examiners and inspectors, and course developers employed in a competency based training programme. In competency based programmes, instructor competencies are made explicit, and instructors have to demonstrate their instructional skills and their knowledge of the subject matter and training course content. Instructor competencies relative to flight simulation and the delivery of FSTD based training are also essential where extensive use is made of FSTDs. MPL examiners and inspectors must demonstrate competencies in competency based assessment techniques.~~

6.7 — Chapter 7 — Upset prevention and recovery training

~~This chapter is intended to provide procedures to Civil Aviation Authorities, operators and approved training organizations in the delivery of upset prevention and recovery training for aeroplane pilots. This training is required for the MPL, the type rating and the training of commercial air transport pilots, and is highly recommended for the CPL(A).~~

Part IV — TRAINING AND ASSESSMENT FOR AIR TRAFFIC MANAGEMENT PERSONNEL

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

This chapter outlines the general principles and procedures to be followed in the design and implementation of competency-based training and assessment. It outlines key features of the competency-based approach and describes how it is to be used by course developers, instructors and examiners for ATM personnel. Implementation of competency-based training programmes for ATM personnel is optional.

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

This chapter outlines the principles and procedures that are applicable to the development and implementation of ATCO competency-based training and that shall be followed in addition to those outlined in Chapter 1 by training organizations or ANSPs opting for a competency-based approach. Chapter 2 also contains the competency units, competency elements and performance criteria developed for the ATCO. The *ATCO Training Manual* (Doc xxxx) contains guidance material on the design and development of an ATCO training programme as well as examples of training objectives.

6.10 Chapter 3 — Competency-based training and assessment for air traffic safety electronics personnel (ATSEP)

This chapter outlines the principles and procedures that are applicable to the development and implementation of ATSEP competency-based training and that shall be followed in addition to those outlined in Chapter 1 by training organizations or ANSPs opting for a competency-based approach. Chapter 3 also contains the competency units, competency elements and performance criteria developed for the ATSEP. The *ATSEP Training Manual* (Doc xxxx) contains guidance material on the design and development of an ATSEP training programme as well as examples of training objectives.

Part V — TRAINING AND ASSESSMENT FOR AERODROME PERSONNEL

[Reserved]

Part VI — TRAINING AND ASSESSMENT FOR OTHER AVIATION PERSONNEL

[Reserved]

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Part I — GENERAL PROCEDURES

This part contains three chapters:

1. Chapter 1 contains the definitions and acronyms and their technical meanings as used in this document. In some cases, the terms are defined in other ICAO documents.
2. Chapter 2 outlines the general provisions for competency-based training and outlines the general principles and procedures to be followed in the design and implementation of a competency-based approach to training and assessment. A description of the ICAO course development methodology is provided in the Attachment to this chapter.
3. Chapter 3 contains the qualifications to be held and the competencies to be demonstrated by course developers and instructors employed in a competency-based training programme.

Chapter 1. DEFINITIONS AND ACRONYMS

1.1 DEFINITIONS

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

...

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

Note.— See Attachment C to ~~Chapter 3~~ Part II, Section 1, Chapter 1, and Circular 314 — Threat and Error Management (TEM) in Air Traffic Control for a description of undesired states.

...

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

Note.— See Attachment C to ~~Chapter 3~~ Part II, Section 1, Chapter 1, and Circular 314 — Threat and Error Management (TEM) in Air Traffic Control for a description of undesired states.

...

1.2 ACRONYMS

AD	Airworthiness directives
AMM	Aircraft maintenance manual
AMMTE	Aircraft maintenance mechanic/technician/engineer
AMO	Approved maintenance organization
AMTO	Approved maintenance training organization
ANSP	Air navigation services provider
APU	Auxiliary power unit
ATA	Air Transport Association (of America)
ATCO	Air traffic controller
ATM	Air traffic management
ATO	Approved training organization
ATSEP	Air traffic safety electronics personnel
BITE	Built-in test equipment
CAA	Civil aviation authority
CE	Competency element
CMM	Component maintenance manual
CPL(A)	Commercial pilot licence (aeroplane)
CRM	Crew resource management
CRS	Certificate of return to service
DDPG	Dispatch Deviation Procedures Guide
EBT	Evidence-based training
FIM	Fault Isolation Manual
FSTD	Flight simulation training device
IOE	Initial operating experience

ISD	Instructional systems design
KSA	Knowledge, skills and attitudes
LOC-I	Loss of control in flight
LOSA	Line operations safety audit
LWTR	Licence without type rating (an aircraft maintenance technician licence)
MEL	Minimum equipment list
MM	Maintenance manual
MMEL	Master minimum equipment list
MOPM	Maintenance organization's procedures manual
MPL	Multi-crew pilot licence
MRM	Maintenance resource management
NDT	Non-destructive test(ing)
OEM	Original equipment manufacturer
OJT	On-the-job training
PC	Performance criteria
QA	Quality assurance
QAD	Quick attach/detach
QS	Quality system
SARPs	Standards and Recommended Practices
SMPM	Special maintenance procedures manual
SMS	Safety management system
SOP	Standard operating procedure
SPM	Standard practices manual
SRM	Structural repair manual
SWPM	Standard wiring practices manual

TEM	Threat and error management
TR	Type rating (on an aircraft maintenance licence)
UPRT	Upset prevention and recovery training (UPRT)

Chapter 2. GENERAL PROVISIONS FOR COMPETENCY-BASED TRAINING AND ASSESSMENT

2.1 Introduction

Chapter 2 outlines the requirements that training organizations and Licensing Authorities need to comply with in order to implement competency-based training and assessment.

2.2 Relationship between competency-related concepts

(Reserved)

2.2-2.3 Competency-based approach to training and assessment

...

2.3-2.4 The competency framework

The competency framework consists of *competency units, competency elements, performance criteria, evidence and assessment guide* and *range of variables*. Competency units, competency elements and performance criteria shall be derived from job and tasks analysis and shall describe observable outcomes.

Note.— Definitions of competency units, competency elements and performance criteria are provided in Chapter 1.

~~2.3.2—The competency framework for flight crew shall be based on the following competency units:~~

- ~~1. Apply threat and error management principles~~
- ~~2. Perform ground and pre-flight operation~~
- ~~3. Perform take-off~~
- ~~4. Perform climb~~
- ~~5. Perform cruise~~
- ~~6. Perform descent~~
- ~~7. Perform approach~~
- ~~8. Perform landing~~
- ~~9. Perform after-landing and post-flight operation~~

~~2.3.3—The competency frameworks for aircraft maintenance personnel shall be based on the following competency units:~~

<i>Aircraft systems maintenance personnel</i>	<i>Aircraft structure maintenance personnel</i>	<i>Aircraft component maintenance personnel</i>
<ol style="list-style-type: none"> 1. Perform fault isolation 2. Perform maintenance practices 3. Perform service 4. Remove component/assembly 5. Install component/assembly 6. Adjust 7. Test 8. Inspect 9. Check 10. Clean 11. Paint 12. Repair 13. Perform MEL and CDL/DDPB Procedures 	<ol style="list-style-type: none"> 1. Perform aircraft structural repair inspection 2. Perform structural damage investigation, cleanup and aerodynamic smoothness check 3. Perform special process application 4. Perform metal rework/testing 5. Perform structural repair 	<ol style="list-style-type: none"> 1. Perform testing fault isolation 2. Perform disassembly 3. Clean 4. Perform inspection/check 5. Repair 6. Perform assembly 7. Perform storage

...

Chapter 3. QUALIFICATIONS OF COURSE DEVELOPERS AND INSTRUCTORS

Editorial note.— Insert new Chapter 3, which is existing Chapter 6, paragraphs 6.1 through 6.1.2.9, renumbered and amended as shown below:

6.1.3.1 Course developer and instructor qualifications

6.1.1 Course developer qualifications

Course developers shall have demonstrated that they possess the competencies described in the Attachment to this chapter and that they have successfully achieved the ability to develop training in accordance with the features of a competency-based approach to training, as outlined in 2.2 of Part I, Chapter 2.

6.1.2.3.2 Instructor qualifications

6.1.2.1-3.2.1 Prior to the issue of a flight crew an instructor certificate, rating or authorization, all instructors shall hold or have held a licence, rating or authorization equivalent to that for which the privilege to instruct is being sought.

Note.— The above requirement does not preclude a non-licensed technical specialist from being authorized by the ~~Licensing Authority~~ appropriate authority to instruct on subject matters that deal with systems operation or procedural requirements in any training environment or media ~~a traditional classroom or FSTD~~.

~~6.1.2.2~~ 3.2.2 Qualified and authorized instructors may be assigned to carry out specific assessment, checking, testing and/or auditing duties to determine that all required performance standards have been satisfactorily achieved. These performance standards may be obligated as being a final objective or required to be met on a continuous basis. In either case, the instructor is responsible for making a determination of the actual standards attained and any recommendation for immediate remediation if necessary.

~~6.1.2.3~~ 3.2.3 ~~Instructors~~ Flight crew instructors shall meet the requirements as specified in Annex 1, 2.1.8 and 2.8, as appropriate. In addition, for the Intermediate and Advanced phases of the MPL training programme, the instructor shall have experience, acceptable to the Licensing Authority, in multi-crew operations.

~~6.1.2.4~~ 3.2.4 Prior to an organization authorizing the provision of instruction within holistic competency-based training environments, ~~such as MPL or EBT programmes,~~ instructors should undergo a selection process designed to ensure the individual's motivation and disposition are suitable for the instructor's role.

~~6.1.2.5~~ 3.2.5 In addition, selection of ~~an~~ a pilot instructor should be based on criteria intended to define a proven capability in the piloting function that he/she intends to instruct, in accordance with the competencies and the related KSA described in ~~5.3.3~~ Part II, Section 1, 2.3.3.

Note.— An example set of competencies is contained in Doc 9995.

~~6.1.2.6~~ 3.2.6 Training programmes for the instructor role should focus on development of the competencies listed in the Attachment to ~~Chapter 6, Part I, Chapter 3,~~ in the following areas:

...

~~6.1.2.7~~ 3.2.7 Additionally, flight crew instructors providing training for the multi-pilot operations should:

a) have suitable experience in multi-pilot operations; or

...

~~6.1.2.8~~ 3.2.8 Prior to the issue of an instructor ~~certificate,~~ rating or authorization, all instructors should successfully complete a formal instructor competency assessment during the conduct of practical training. The final assessment of instructor competence should be made against the competency framework contained in the Attachment to ~~Chapter 6~~ Part I, Chapter 3.

~~6.1.2.9~~ 3.2.9 All instructors should receive refresher training, and be reassessed according to ~~6.1.2.8~~ 6.3.2.8 using a documented training and assessment process acceptable to the ~~Licensing Authority~~ appropriate authority, implemented by a certificated or approved

organization, or at intervals established by the ~~Licensing Authority~~ authority. Such refresher training and reassessment intervals shall not be greater than three years.

Editorial note.— Insert new Attachment to Chapter 3 as follows. The text has been extracted from the existing Attachment to Chapter 6.

Attachment to Chapter 6-3

COMPETENCIES OF ~~INSTRUCTORS, MPL EXAMINERS AND INSPECTORS, AND~~ COURSE DEVELOPERS AND INSTRUCTORS

COURSE DEVELOPER

Develop competency-based training and assessment

1. Conduct analysis

- 1.1 Conduct preliminary analysis
- 1.2 Conduct job and task analysis
- 1.3 Conduct population analysis

...

3. Evaluate training material

- 3.1 Validate competency-based training materials
- 3.2 Evaluate whether job performance objectives are met
- 3.3 Evaluate whether organizational and operational objectives are met

THE INSTRUCTOR COMPETENCY FRAMEWORK

The competency framework consists of competency units, competency elements and performance criteria. The competency framework for instructors ~~of flight crew~~ should be based on the following competency units:

1. Unit 1 — Manage safety

The competent instructor must ensure a safe training/evaluation environment at all times. The competent instructor must ensure the safety of trainees in his/her care.

...

7. Unit 7 — Continuously improve performance

- 7.1 Evaluates effectiveness
 - a) encourages and welcomes feedback on his/her own performance as an instructor;
 - b) evaluates his/her own performance as an instructor and learns from the results; and

- c) actively seeks feedback on the training course from trainees and peers.

7.2 Sustains personal development

- a) maintains required qualifications;
- b) strives to increase and update relevant knowledge and skills; and
- c) demonstrates continuous improvement of instructor competencies.

Part II — TRAINING AND ASSESSMENT FOR AIRCRAFT OPERATIONAL PERSONNEL

This part provides guidance on the training and assessment for aircraft operational personnel, including flight crew, cabin crew and flight dispatchers/flight operations officers. Section 1 introduces the training and assessment for flight crew. Chapter 1 outlines the principles and procedures for competency-based training and licensing for the multi-crew pilot licence (MPL). Chapter 2 includes other training requirements for flight crew, such as evidence-based training (EBT), and Chapter 3 deals with upset prevention and recovery training (UPRT).

Note. — Additional chapters will be introduced to Part II as procedures become available.

Section 1. FLIGHT CREW TRAINING AND ASSESSMENT

Chapter 3-1. — COMPETENCY-BASED TRAINING AND LICENSING FOR THE MULTI-CREW PILOT LICENCE (MPL)

This chapter outlines the principles and procedures that are applicable to the development and implementation of an MPL course and that shall be followed in addition to those outlined in Part I, Chapter 2. This chapter also contains the competency units, competency elements and performance criteria developed for the MPL. The Attachments to Chapter 1 contain guidance material on: the design and development of an MPL training programme; examples of training objectives; threat and error management (TEM); and the competencies of MPL examiners and inspectors.

3.1-1.1 Introduction

This chapter provides the elements for a competency-based multi-crew pilot licence (MPL), with which approved training organizations (ATOs) and Licensing Authorities shall comply.

3.2-1.2 Assessment

~~3.2-1~~ 1.2.1 The competency framework for the MPL shall be based on the competency units of Appendix 3 to this chapter. Licensing Authorities and ATOs shall use the competency units, competency elements and performance criteria in approving and developing their own licensing and training programmes for the MPL, as contained in the competency-based framework at Appendix ~~2-3~~ 3 to this chapter. Licensing Authorities shall develop or approve the range of variables and the evidence and assessment guide and/or practical test standards required for assessing applicants for the MPL.

...

~~3.2-3~~ 1.2.3 Licensing Authorities shall ensure that TEM competency elements are assessed as an integral part of each of the other eight phase-of-flight competency units established for the MPL.

Note.— Refer to Attachment C to this chapter and Chapter 2 of the Human Factors Training Manual (Doc 9683) for guidance material on TEM.

3.3-1.3 Training

~~3.3.1-1.3.1~~ All MPL training programmes shall be developed with the use of an ISD methodology.

Note.— A detailed description of the ICAO course development methodology, a competency-based approach to training and assessment and an example of an ISD methodology, can be found in the Attachment to Part I, Chapter 2.

~~3.3.2-1.3.2~~ Each phase of the MPL ~~Training Scheme~~ training scheme (see Appendix ~~1-2~~ to this ~~chapter~~ section) shall be composed of instruction in underpinning knowledge and presented in practical training segments. Training in the underpinning knowledge requirements for the MPL shall therefore be fully integrated with the training of the skill requirements.

Note.— Refer to “Guidelines for the ~~Implementation~~ implementation of the MPL multi-crew pilot licence” in Appendix ~~3-1~~ to this chapter.

...

Editorial note.— Insert the following paragraphs, which have been extracted from Chapter 6, paragraphs 6.2 through 6.2.2, and amended and renumbered as shown below:

6.2-1.4 MPL examiner and inspector qualifications

~~6.2.1-1.4.1~~ MPL examiner qualifications

~~6.2.1.1-1.4.1.1~~ MPL examiners shall meet at least the following requirements:

- a) have demonstrated that they possess the competencies for MPL examiners described in ~~the Attachment D~~ to this chapter;

...

~~6.2.2-1.4.2~~ MPL inspector qualifications

Inspectors of MPL training programmes shall have demonstrated that they possess the competencies described in ~~the Attachment D~~ to this chapter.

Editorial note.— Insert the following new Appendices/Attachments, which are the existing Appendices/Attachments to Chapter 3, renumbered and amended shown below:

Appendix 3-1 to Chapter 3-1
GUIDELINES FOR THE IMPLEMENTATION
OF THE MULTI-CREW PILOT LICENCE

...

Appendix 1-2 to Chapter 3-1
MULTI-CREW PILOT LICENCE TRAINING SCHEME

...

Appendix 2-3 to Chapter 3-1
MULTI-CREW PILOT LICENCE COMPETENCY UNITS,
COMPETENCY ELEMENTS AND PERFORMANCE CRITERIA

	<i>Reference</i>	<i>Duty</i>	<i>Observation & assessment</i>
1. APPLY THREAT AND ERROR MANAGEMENT PRINCIPLES			
1.1	Recognize Threat		
1.2	Manage Threat		
1.3	Recognize Error		
1.4	Manage Error		
1.5	Recognize Undesired Aircraft State		
1.6	Manage Undesired Aircraft State		
<i>Note.</i> — Refer to Attachment C to this chapter and to Chapter 2 of the Human Factors Training Manual (Doc 9683) for guidance material on TEM.			
...			
3. PERFORM TAKE-OFF List of competency elements and performance criteria			
3.0 Recognize and manage potential threats and errors			
...			
3.2 Perform take-off roll			
3.2.1	applies take-off thrust	Ops. Manual	PF
3.2.2	checks engine parameters	Ops. Manual	PF/PNF
3.2.3	checks airspeed indicators	Ops. Manual	PF/PNF
3.2.4	stays on runway centre line	Ops. Manual	PF
			satisfactory/unsatisfactory

...

Attachment A to Chapter 3-1
COMPETENCY-BASED TRAINING AND LICENSING FOR
THE MULTI-CREW PILOT LICENCE —
GUIDANCE ON THE DESIGN AND DEVELOPMENT OF A
MULTI-CREW PILOT LICENCE TRAINING PROGRAMME

1. Introduction

This Attachment to Chapter 3-1 of this section provides a description of the application of the principles and procedures of the ICAO course development methodology in the development of an MPL training programme. A description of the structure of the MPL training programme, as established in Annex 1, is provided, followed by a detailed description of the application of the different phases of the ICAO course development methodology in the development of an MPL training programme.

2. Structure of the MPL training programme

- 2.1 The MPL training scheme is contained in Appendix 4-2 to Chapter 3-1 of this section. The training items listed under the *Core Flying Skills and Basic levels* of training must be completed prior to entering the Intermediate phase of training. These first two phases of training are of the utmost importance as the student starts to develop core technical, interpersonal, procedural and aircraft-handling skills that underpin the competencies of an MPL. The learning of cockpit resource management (CRM) and threat and error management (TEM) skills is also strengthened by introducing them at the very beginning of the programme.

...

- 2.5 The nine competency units for the MPL are listed in Annex 1, Appendix 3, paragraph 3.1. The competency elements into which the units have been broken down and the performance criteria, which have been established against each of the competency elements, are contained in Appendix 2-3 to Chapter 3-1 of this section. For the purpose of the Standard, TEM is established as a competency unit independent of the other eight units that each correspond to a phase of flight. For the purpose of training and testing, however, the TEM competency should be considered an integral feature of all the other phase-of-flight competencies.

3. Design and development of an MPL training programme through ICAO course development methodology

3.1 Methodological principles

There are three principal activities in the ICAO course development methodology process: analysis, design and production and evaluation; each activity is broken down into three phases (Attachment to Part I, Chapter 2, refers).

...

3.6 Developing MPL training objectives

- 3.6.1 As described in Part I, Chapter 2, a training objective states the (observable) *desired action* or *behaviours*, the (measurable) *standard* and the *conditions* relevant to what must be accomplished by the student during each phase of training prior to reaching the desired level of competency. Sample training objectives are contained in Attachment B to Chapter 3-1 of this section. Included with each sample objective is a sample assessment guide and an example of the application of threat and error management.
- 3.6.2 The action statement or the statement of behaviours, the most important part of the training objective, should always be expressed with a verb that specifies definite, observable actions. The competency elements and performance criteria found in Appendix 2-3 to Chapter 3-1 of this section provide useful sources of suitable action verbs. Action verbs have also been developed in other learning/training objective taxonomies (Bloom, B.S (1956); Harrow, A. (1972) and Simpson, E. (1972)). Since these classifications were developed for general education purposes, however, they should only be used when a more domain-specific verb, from either the MPL functional/task analysis or other similar flight training task analysis, is not available.
- 3.6.3 Action verbs can be classified according to the different tasks or skills, knowledge and attitudes they represent, which facilitates the development of an effective and efficient learning path. Training organizations should choose or develop the classification that best suits their own circumstances. As described in the Attachment to Part I, Chapter 2, the ICAO course development methodology proposes two basic categories, i.e. intellectual and physical (motor) skills; intellectual skills can be further broken down into classifying, discriminating, rule-using and problem-solving sub-skills.
- 3.6.4 Where an action verb has to be used to define a skill to infer a non-observable process, as is often the case when assessing cockpit resource management (CRM) and threat and error management (TEM), an overt or observable synonym should be used as evidence that the process has been carried out. (See also Attachment B to Chapter 3-1 of this section that describes how evidence of the application of TEM can be collected.)

...

3.8 Selection of modes of delivery and training techniques

3.8.1 The training objectives will determine the modes of delivery and training techniques that are to be used in the different phases of training. The consistent delivery of training for the MPL demands the use of a mixture of validated, approved training materials. In accordance with Annex 1, 1.2.8, and Appendix 2, all MPL training should be conducted by an approved training organization, and conditions for obtaining the authorization should include having the necessary documentation, manuals and equipment for conducting the course. The approval requirements also cover the employment and training of course developers and instructors. ~~Chapter 4~~ Part I, Chapter 3, contains the competency-based requirements for instructors, ~~examiners, inspectors~~ and course developers, while Part II, Section 1, Chapter 1, 1.4, contains the requirements for MPL examiners and inspectors.

...

3.10 Selection of training media

3.10.1 In general, the selection of media, as described in the ICAO course development methodology (the Attachment to Part I, Chapter 2, refers) depends on its instructional appropriate-ness, economy, simplicity and availability. All facilities and training media should be considered by the Licensing Authority as being acceptable and appropriate for an MPL training course as part of the process of the approval of a training organization, in accordance with Annex 1, 1.2.8, and Appendix 2.

...

3.10.3 A definition of the different types of FSTDs to be used for training for the MPL is contained in Annex 1, Appendix 3, paragraph 4. Their allocation to the different phases of training is indicated in the MPL training scheme contained in Appendix ~~4-2~~ to Chapter ~~3-1~~ of this document section.

3.11 Production, developmental testing, validation, implementation and evaluation

...

3.11.2 As outlined in the Attachment to Part I, Chapter 2, the output of Phase 6 results in all training materials being produced in such a manner as to allow any competent instructor to deliver the course. Consequently, a comprehensive, well-documented and formatted MPL training programme does not differ from any other standardized training package.

...

3.11.5 Once the course materials have been validated and revised as necessary, the MPL training programme can be implemented (Phase 8 of the ICAO course development methodology). However, successful implementation will depend on the qualifications of the instructors delivering the material. To this end, approved training organizations should ensure that instructors and examiners for the MPL training programme meet the competencies described in ~~Chapter 4~~ Part I, Chapter 3 and Part II, Section 1, Chapter 1, 1.4.

- 3.11.6 Post-training evaluation is the last phase of the ICAO course development methodology. In the Attachment to Part I, Chapter 2, four levels of evaluation are described. Trainee reactions to the MPL training programme (Level 1) and trainee mastery of objectives (Level 2) will be recorded as a matter of course, given the provisions described in the *Manual on the Approval of Flight-Crew Training Organizations* (Doc 9841) and the use of the ISD approach in training development. Evaluation at Level 3 calls for the description of the on-the-job performance of trainees and how it effectively meets the standard spelled out during task analysis. This particular level of evaluation will normally be carried out during the IOE phase that MPL holders will have to go through upon completion of the MPL training programme. The purpose of evaluation at Level 4 is to determine the effects of the training programme at an organizational level. This level of evaluation could be used to determine the extent to which the adoption of an MPL training programme has actually resolved organizational issues (shortage of pilots, economies of time, cost benefits, etc.) and to determine and review an organization's strategic planning accordingly.

Attachment B to Chapter 3-1
MULTI-CREW PILOT LICENCE
SAMPLE TRAINING OBJECTIVES

...

Attachment C to Chapter 3-1
THREAT AND ERROR MANAGEMENT (TEM)

...

7. Countermeasures

...

- 7.4 Enhanced TEM is the product of the combined use of systemic-based and individual and team countermeasures. Table 4 presents detailed examples of individual and team countermeasures. Further guidance on countermeasures can be found in the sample assessment guides for terminal training objectives (Attachment B to Chapter 3-1 of this section) as well as in the manual *Line Operations Safety Audit (LOSA)* (Doc 9803).

...

Attachment D to Chapter 6-1**COMPETENCIES OF INSTRUCTORS, MPL EXAMINERS AND INSPECTORS, AND COURSE DEVELOPERS**

Editorial note.— Insert new Attachment D to Chapter 1, which has been extracted from the existing Attachment to Chapter 6. *Delete* existing Chapter 6 and its Attachment in toto.

MPL EXAMINER**Carry out competency-based assessment****1. Gather evidence**

- 1.1 Establish a working relationship with the candidate
- 1.2 Interpret competency standards
- 1.3 Apply assessment techniques and tools

2. Evaluate evidence

- 2.1 Ensure validity of evidence gathered
- 2.2 Ensure reliability of evidence gathered
- 2.3 Establish assessment decision
- 2.4 Provide constructive feedback to the candidate

3. Report assessment decision

- 3.1 Record assessment results
- 3.2 Provide candidate with future training plan, if applicable
- 3.3 Review assessment process to improve validity and reliability
- 3.4 Process relevant documentation

MPL INSPECTOR**Inspect competency-based training programmes****1. Assess ATO's application to conduct a competency-based training programme**

- 1.1 Validate background data on Approved Training Organization
- 1.2 Review application
- 1.3 Evaluate quality assurance system implementation
- 1.4 Document findings

2. Evaluate competency-based training programme

- 2.1 Assess training needs analysis
- 2.2 Assess curriculum design
- 2.3 Assess courseware (ground, FSTD and flight)

- 2.4 Assess evaluation procedures
 - 2.5 Confirm required qualifications and competencies of instructors and designated/delegated MPL examiners
 - 2.6 Document evaluation findings
- 3. Inspect competency-based training programme**
- 3.1 Inspect ground school facilities
 - 3.2 Inspect FSTD facilities
 - 3.3 Inspect flight training facilities
 - 3.4 Inspect record-keeping system
 - 3.5 Evaluate conduct of training
 - 3.6 Document inspection findings
- 4. Conduct surveillance**
- 4.1 Carry out a risk assessment
 - 4.2 Establish initial surveillance plan
 - 4.3 Conduct operational review of training programme
 - 4.4 Instigate follow-up rectification/enforcement action
 - 4.5 Document surveillance findings
 - 4.6 Establish ongoing surveillance plan
- 5. Conduct trend analysis of approval/surveillance activity***

* Depending on the size of the CAA, individual MPL inspectors may or may not be responsible for this competency unit.

End of new Attachment

Editorial note.— Insert new Chapter 2, which is existing Chapter 5 renumbered and amended as shown below:

Chapter 5.2.— EVIDENCE-BASED TRAINING (EBT)

This chapter is intended to provide guidance to civil aviation authorities, operators and approved training organizations in the recurrent training of pilots to develop and evaluate crew performance according to a set of competencies and the related knowledge, skills and attitudes (KSA).

...

- 5.3.6-2.3.6 The defined programme includes outlined guidance for the development of training programmes and the evaluation of trainee flight crew and pilot performance, in addition to information for instructors conducting the training. This chapter does not formally consider training media but will assume that the training and evaluation described will be conducted in an FSTD qualified to an appropriate level in accordance

with Civil Aviation Authority (CAA) rules (*Manual of Criteria for the Qualification of Flight Simulation Training Devices* (Doc 9625) refers).

Editorial note.— Insert new Chapter 3, which is existing Chapter 7 renumbered as shown below:

Chapter 7.3.— UPSET PREVENTION AND RECOVERY TRAINING (UPRT)

7.1-3.1 Applicability

~~7.1.1~~ 3.1.1 This chapter, supported by the *Manual on Aeroplane Upset Prevention and Recovery Training* (Doc 10011), is intended to provide procedures to Civil Aviation Authorities, operators and approved training organizations to meet the UPRT requirements for an MPL and UPRT recommendations for a CPL(A) contained in Annex 1. Similarly, the information provided supports the UPRT requirements for type-rating in Annex 1 and for the recurrent training of pilots required by Annex 6, Part I, paragraph 9.3 – *Flight crew member training programmes*. The procedures in this chapter are applicable only to aeroplane UPRT.

...

Chapter 4.— OTHER FLIGHT CREW MEMBERS

(Reserved)

Chapter 5.— FLIGHT VALIDATION PILOTS

(Reserved)

Section 2. CABIN CREW

(Reserved)

Section 3. FLIGHT DISPATCHERS/FLIGHT OPERATIONS OFFICERS

(Reserved)

Part III — TRAINING AND ASSESSMENT FOR AIRCRAFT MAINTENANCE PERSONNEL

This part outlines the principles and procedures that are applicable to the development and implementation of an AMMTE course. It contains the competency units, competency elements and performance criteria developed for the AMMTE licence. Attachment A contains guidance material on the design and development of an AMMTE training programme; Attachment B contains examples of training objectives.

Editorial note.— Insert new Part III, which is existing Chapter 4 and its Appendices/Attachments, renumbered and amended as shown below:

Chapter 4—1 COMPETENCY-BASED TRAINING AND ASSESSMENT FOR AIRCRAFT MAINTENANCE PERSONNEL

4.1-1.1 Introduction

This chapter provides material on the implementation of an optional competency-based approach to training and assessment of personnel working in aircraft maintenance, including those with certification privileges. This material will be useful to Licensing Authorities responsible for approving training courses, to Approved Maintenance Organizations (AMOs) that should ensure that their personnel demonstrate the competencies appropriate to their individual functions, and to Approved Maintenance Training Organizations (AMTOs) that should implement training programmes complying with the requirements of the Licensing Authorities and fulfilling the needs of AMOs.

...

4.6-1.6 Training

4.6-1.6.1 Competency-based training programmes for aircraft maintenance personnel shall be based on the competency units of Appendix 2 to this Chapter, as applicable to the aircraft maintenance domain (see Appendix 2 to this Chapter, 1.2), and shall be developed with the use of an ISD methodology.

Note.— A detailed description of the ICAO course development methodology, a competency-based approach to training and assessment and an example of an ISD methodology can be found in the Attachment to Chapter 2.

...

Appendix 1 to Chapter-4 1
GUIDELINES FOR THE IMPLEMENTATION OF
COMPETENCY-BASED TRAINING AND ASSESSMENT
FOR AIRCRAFT MAINTENANCE PERSONNEL

...

Appendix 2 to Chapter-4 1
AIRCRAFT MAINTENANCE COMPETENCY UNITS —
COMPETENCY ELEMENTS AND PERFORMANCE CRITERIA

...

Attachment A to Chapter-4 1
COMPETENCY-BASED TRAINING FOR
AIRCRAFT MAINTENANCE — GUIDANCE ON
THE DESIGN AND DEVELOPMENT OF A
COMPETENCY-BASED TRAINING PROGRAMME
FOR MAINTENANCE PERSONNEL

1. Introduction

This Attachment to ~~Chapter 4~~ describes how the principles and procedures of the ICAO course development methodology can be applied in the development of an aircraft maintenance personnel training programme.

2. Design and development of an aircraft maintenance training programme through ICAO course development methodology

2.1 The ICAO course development methodology

The generic ICAO course development process is described in the Attachment to **Part I**, Chapter 2 of this document. For each phase of development, guidelines are provided for the development of aircraft maintenance training programmes.

...

2.5 Curriculum design

...

- 2.5.4 The competency frameworks found in Appendix 2 to Chapter 4-1 provide the basis from which training objectives should be derived for fundamental training and for training for specialty-rating. Curriculum design starts with the formulation of training objectives which correspond to the competency elements and performance criteria identified in the framework. (See the Attachment to Part I, Chapter 2, paragraph 5.2, and section 2.6 below).

...

2.6 Developing training objectives for aircraft maintenance training

- 2.6.1 As described in Part I, Chapter 2, a training objective states the (observable) *desired action* or *behaviours*, the (measurable) *standard* and the *conditions* relevant to what must be accomplished by the student during each phase of training prior to reaching the desired level of competency.
- 2.6.2 The *action statement* or the *statement of behaviours*, the most important part of the training objective, should always be expressed with a verb that specifies definite, observable actions. The competency elements and performance criteria found in Appendix 2 to Chapter 4-1 provide useful sources of suitable action verbs. Action verbs have also been developed in other learning/training objective taxonomies (Bloom, B.S (1956); Harrow, A. (1972) and Simpson, E. (1972)). Since these classifications were developed for general education purposes, however, they should only be used when a more domain-specific verb is not available.

...

2.8 Selection of modes of delivery, training techniques and training media

...

- 2.8.3 In general, the selection of media, as described in the ICAO course development methodology (the Attachment to Part I, Chapter 2, refers) depends on its instructional appropriateness, economy, simplicity and availability. As part of the process of the approval of a maintenance training organization and the training programme, Licensing Authorities should assess whether all facilities and training media are acceptable and appropriate for a competency-based maintenance training programme.

...

2.9 Production, developmental testing, validation, implementation and evaluation

...

- 2.9.2 As outlined in the Attachment to Part I, Chapter 2, the output of Phase 6 results in all training materials being produced in such a manner as to allow any competent and suitably trained maintenance personnel to deliver the course. Consequently, a comprehensive, well-documented and formatted training programme does not differ from any other standardized training package.

...

- 2.9.5 Post-training evaluation is the last phase of the ICAO course development methodology. In the Attachment to Part I, Chapter 2, the four levels of evaluation are described.

Attachment B to Chapter 4-1

DERIVING TRAINING OBJECTIVES FOR AIRCRAFT MAINTENANCE PERSONNEL

1. General

- 1.1 Training objectives are derived from the job and task analysis used to develop the competency frameworks for aircraft maintenance personnel contained in Appendix 2 to Chapter-4 1. The tasks to be performed during aircraft maintenance can be classified into generic tasks and specialty-rated tasks. The competency frameworks make an inventory of these generic tasks that can be performed on any kind of aeronautical equipment.

...

2. Basic/fundamental training objectives

- 2.1 A two-step approach should be used to derive training objectives for basic/fundamental training programmes. First, basic/fundamental training programmes are designed for a particular maintenance position (normally represented by a certain aircraft maintenance licence category as described in Annex 1, paragraph 4.2.2). Based on the scope of the licence to be obtained, corresponding groups of generic tasks (standard practices) are selected out of the appropriate “Standard Practices Manual”. All these groups of tasks have been documented in the competency frameworks of Appendix 2 to Chapter-4 1 as competency units. For example, the standard practice “Electrical connective devices repair” corresponds to the competency unit “12. Repair”.

...

Editorial note.— Insert new text as follows:

Part IV — TRAINING AND ASSESSMENT FOR AIR TRAFFIC MANAGEMENT (ATM) PERSONNEL

This part contains three chapters with procedures for the development and implementation of a competency-based training programme for air traffic controllers (ATCOs) and air traffic safety electronics personnel (ATSEP):

1. Chapter 1 outlines the general principles and procedures to be followed in the design and implementation of competency-based training and assessment of ATM personnel. It outlines key features of the competency-based approach and describes how it is to be used by course developers, instructors and examiners.
2. Chapters 2 and 3 outline the principles and procedures that are applicable to the development and implementation of competency-based training for ATCOs and ATSEP, respectively, and that shall be followed, in addition to those outlined in Chapter 1, by those training organizations or air navigation service providers (ANSPs) opting for a competency-based approach. Chapters 2 and 3 also contain

the competency units, competency elements and performance criteria developed for the ATCOs and ATSEP, respectively.

Chapter 1. GENERAL PROVISIONS FOR COMPETENCY-BASED TRAINING AND ASSESSMENT FOR AIR TRAFFIC MANAGEMENT (ATM) PERSONNEL

1.1 Introduction

Chapter 1 outlines the requirements to be met in order to implement competency-based training and assessment for ATM personnel. Implementation of such training is, however, optional.

1.2 Competency-based approach to training and assessment

1.2.1 The development of competency-based training and assessment shall be based on a systematic approach whereby competencies and their performance criteria are defined, training is based on the competencies identified, and assessments are developed to determine whether these competencies have been achieved. Competency-based training and assessment may be implemented by a training organization or an ANSP, or a combination of both. If implemented, competency-based training and assessment shall comply with the following characteristics.

1.2.2 Competency-based approaches to training and assessment shall include at least the following features:

- a) the justification of a training need through a systematic analysis;
- b) the identification of indicators to be used to evaluate the effect of training on the air navigation service provision's operational performance;
- c) the use of a job and task analysis to determine performance standards, the conditions under which the job is carried out, the criticality of tasks, and the inventory of skills, knowledge and attitudes;
- d) the identification of the characteristics of the trainee population;
- e) the derivation of training objectives from the task analysis and their formulation in an observable and measurable fashion;
- f) the development of criterion-referenced, valid, reliable and performance-oriented tests;
- g) the development of a curriculum based on adult learning principles¹ and with a view to achieving an optimal path to the attainment of competencies;

¹ Adults have special needs and requirements when learning, compared to children and teens.

- h) the development of material-dependent training (as opposed to instructor-dependent training);
 - i) the use of a continuous evaluation process to ensure the effectiveness of training and its relevance to real-time operations;
 - j) the selection and description of the training for competency-based assessors;
 - k) the performance criteria to be considered by the assessor when assessing each competency; and
 - l) the assessment (evidence) guide applicable to all competency-based assessments.
- 1.2.3 The training process consists of filling the gap between existing competencies and expected competencies through training and demonstrating the outcome in an assessment process.

1.3 The competency framework

- 1.3.1 The competency framework supports the establishment of a systematic approach as mentioned in 1.2.1 by providing a generic model that should be adapted to suit the variety of situations that exist worldwide in the ATM domain.
- 1.3.2 The competency framework consists of competency units, competency elements and performance criteria. The assessment (evidence) guide and range of variables are to be developed by training organizations and/or air navigation service providers as part of the local adaptation process.
- 1.3.3 Competency units, competency elements and performance criteria shall be further developed from job and tasks analysis of ATM personnel and shall describe observable outcomes.

Note. —Definitions of competency unit, competency element and performance criteria are provided in Part 1, Chapter 1.

Chapter 2. COMPETENCY-BASED TRAINING AND ASSESSMENT FOR AIR TRAFFIC CONTROLLERS (ATCOs)

2.1 Introduction

- 2.1.1 This chapter provides the procedures for establishing a competency-based training and assessment programme for ATCOs, with which approved training organizations (ATOs), air navigation service providers and Authorities shall comply when implementing a competency-based training programme.

- 2.1.2 The ATCO competency framework defined in Appendix 2 to this chapter shall be used as the basis for the development and approval of local competency-based training and assessment programmes.

2.2 Assessment

- 2.2.1 Authorities shall develop and/or approve as applicable the assessment process, which includes the assessment (evidence) guide, range of variables, and the knowledge and skills standards required for assessing applicants.
- 2.2.2 The air traffic control licence shall meet the requirements of the approved competency-based training programme and be evaluated according to the approved assessment process.

2.3 Training

- 2.3.1 All competency-based training for ATCOs shall be developed with the use of a systematic methodology such as ISD or equivalent.
- 2.3.2 The competency-based training programme for ATCOs shall be composed of integrated theoretical and practical instruction.

Note.— Refer to the guidelines for the implementation of competency-based training for ATCOs in Appendix 1 to this chapter.

- 2.3.3 The competency-based training programme for ATCOs shall include a continuous evaluation of the training programme acceptable to the Authority. The evaluation shall ensure that:
- a) the competencies and related assessments are relevant to the work of an air traffic controller in the specific context and environment to which he/she may be assigned after training;
 - b) the trainees acquire the necessary competencies in a progressive and satisfactory manner; and
 - c) remediation actions are taken if in-training or post-training evaluation indicates a need to do so.
- 2.3.4 A competency-based training programme for ATCOs shall include on-the-job training to ensure that consistent performance at the required level of competence is achieved. The performance shall be at a level that is appropriate to the exercise of duty. This on-the-job training shall be performed under the supervision of an authorized instructor in the area for which the rating shall be issued and be conducted under the SMS of the ANSP.

Appendix 1 to Chapter 2

GUIDELINES FOR THE IMPLEMENTATION OF COMPETENCY-BASED TRAINING FOR AIR TRAFFIC CONTROLLERS (ATCOs)

1. Introduction

This appendix provides guidance to Authorities, ATOs and air navigation services providers on the measures to be taken to facilitate the efficient implementation of competency-based training for ATCOs.

2. General considerations

- 2.1 The level of competence expected from an ATCO is defined in detail in this document and aims at complying with Annex 1 requirements. In broad terms, the ATCO graduate is expected to have successfully completed all phases of training within the defined time frame.
- 2.2 Local implementation of the ATCO competency framework contained in Appendix 2 to this chapter includes selecting competencies appropriate to the local context.
- 2.3 When converting to a competency-based training programme, the general approach that is suggested is to start by using the existing training programme (ab initio or equivalent) as a reference, and then to progressively implement the new competency-based training programme using the *ATCO Training Manual* (Doc xxxx) for guidance.
- 2.4 This transition from an existing ATCO training programme to a competency-based approach shall be made in a progressive manner whereby successive evolutions of the training programme introduce a higher level of competency-based training.

3. Guidelines for the Authority

- 3.1
 - a) The implementation of competency-based training requires blending of various types of training (theoretical and practical) with the media (e.g. classroom, various levels of simulation and OJT). The approved training programme shall demonstrate the capacity to achieve training objectives using the various training means.
 - b) In view of the developmental nature of a first competency-based ATCO programme in an ATO or ANSP, the approval should be provisional and should be confirmed only after obtaining a satisfactory result from the first courses and after incorporating the lessons learnt into the training programme.
 - c) All the relevant provisions related to ATCO training shall apply and associated guidance material should apply, including those dealing with approval of the curriculum and quality assurance system (*Manual on the Approval of Training Organizations* (Doc 9841)).
 - d) One of the attributes of competency-based training, as defined in this document, is the use of a continuous process for the evaluation of the training programme to

ensure the effectiveness of the training and its relevance to real-time operations. This aspect of continuous evaluation is especially important during the initial implementation of an ATCO competency-based programme.

- e) Oversight by the Authority shall be exercised during the initial implementation. The need for regular feedback from the ATO or ANSP to the Authority on the progress and problems faced during delivery of the programme is important. How this feedback is to be provided to the Authority shall therefore be clearly stated as part of the approval.
- f) The success of the implementation of the ATCO competency-based training depends to a large measure on effective coordination and cooperation between the Authority, the training ATO and the ANSPs employing the ATCOs, and controller representative bodies. Authorities should encourage and facilitate such cooperation and coordination.

Appendix 2 to Chapter 2

AIR TRAFFIC CONTROLLER COMPETENCY UNITS, COMPETENCY ELEMENTS AND PERFORMANCE CRITERIA

1. The purpose of developing an ATCO competency framework is to encourage standardized performance and to enable the use of existing best practices in ATCO training and assessment.
2. The ATCO competency framework describes the competency units, competency elements and performance criteria that shall be translated into the operating environment of the ANSP, taking into account the applicable air traffic control ratings and the required competencies for such ratings within the context and level of the training taking place.
3. The ATCO competency framework shall be used by ATOs or ANSPs as the basis for developing their own training and assessment and should be adapted to suit the operational, technical and organizational environment in which the ATCO duties will be exercised. The Authority should use the ATCO competency framework, with due consideration for the local environment, when evaluating ATCO training programmes submitted for approval.
4. The use of such a competency framework is not an obligation but is recommended in order to achieve the best performance in ATCO training.
5. It is recommended that ATOs as well as ANSPs use the ATCO competency framework as a flexible tool to help them define the ATCO competencies. The competency framework is generic and applies to all phases of training. It shall be adapted to develop curricula that are appropriate to the phase of training and the challenges of the operating environment. Establishing different levels of taxonomy in the training to describe the required performance may be an effective method for differentiating between the performance criteria for each phase of training. The application of this taxonomy is explained in the *ATCO Training Manual* (Doc xxxx).
6. The framework constitutes a high-level structure of ATCO competencies. It may be further specified under broad rating categories such as area, approach and aerodrome. The framework is independent of the type of equipment in use or of the major areas of application (en-route, approach, tower) or of

the sharing of tasks on the controller working position. Certain competencies might relate exclusively to a dedicated or separate air traffic control function — this would be determined by the local organizational context. Crisis management, collaborative decision making as well as air traffic flow management functions have been left out of the scope of the ATCO competency framework.

ATCO COMPETENCY FRAMEWORK

Note 1.— Paragraph 3 of Appendix 2 states that this framework should be adapted to the local context of the organization. The framework is generic and is intended to be adapted to the operating environment and challenges of the organization as well as to the professional experience of ATCOs. It does not address the specific definition of duties, sharing of tasks, ratings and proficiency levels existing in the organization. Local implementation of this framework includes selecting competencies appropriate to their local context. The competencies in the table are not listed according to any pre-defined priority.

Note 2.— Performance criteria defined in the following table may serve one or more of the competency units and elements. The criteria used to judge whether the required level of performance has been achieved is to be established by the ANSP and/or ATO.

Note 3.— The principles of threat and error management should be integrated in the development of competency-based training programmes.

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
SITUATIONAL AWARENESS	Comprehend the current operational situation and anticipate future events	CE1.1	<ul style="list-style-type: none"> ● Monitor the operational situation 	PC1.1	<ul style="list-style-type: none"> ● Monitors air traffic in own area of responsibility and nearby airspace
		CE1.2	<ul style="list-style-type: none"> ● Scan for specific or new information 	PC1.2	<ul style="list-style-type: none"> ● Monitors the meteorological conditions that impact on own area of responsibility and nearby airspace
		CE1.3	<ul style="list-style-type: none"> ● Comprehend the operational situation 	PC1.3	<ul style="list-style-type: none"> ● Monitors the status of the ATC systems and equipment
		CE1.4	<ul style="list-style-type: none"> ● Anticipate the future situation 	PC1.4	<ul style="list-style-type: none"> ● Monitors the operational circumstances in nearby sectors to anticipate impact on own situation
		CE1.5	<ul style="list-style-type: none"> ● Recognize indications of reduced situational awareness 	PC1.5	<ul style="list-style-type: none"> ● Acquires information from available surveillance and flight data systems, meteorological data, electronic data displays and any other means available
				PC1.6	<ul style="list-style-type: none"> ● Integrates information acquired from monitoring and scanning into the overall picture
				PC1.7	<ul style="list-style-type: none"> ● Analyses the actual situation based on information acquired from monitoring and scanning

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
				PC1.8 PC1.9 PC1.10 PC1.11 PC1.12	<ul style="list-style-type: none"> • Interprets the situation based on the analysis • Predicts the future operational situation • 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) • Verifies that information is accurate and assumptions are correct • Uses available tools to monitor, scan, comprehend and predict operational situations
TRAFFIC AND CAPACITY MANAGEMENT	Ensure a safe, orderly and efficient traffic flow and provide essential information on environment and potentially hazardous situations	CE2.1 CE2.2 CE 2.3 CE 2.4	<ul style="list-style-type: none"> • Manage the traffic situation • Achieve optimal operational performance • Disseminate flight information • Inform pilots of essential traffic and weather information 	PC2.1 PC2.2 PC2.3 PC2.4 PC2.5 PC2.6	<ul style="list-style-type: none"> • Manages arriving, departing and/or en-route traffic using prescribed procedures • Takes aircraft performance into account when issuing clearances and instructions • Uses a variety of techniques to effectively manage the traffic (e.g. speed control, vectoring, traffic sequencing, assigning climb/descent rate) • Increases safety margins when deemed necessary • Takes action when appropriate to ensure that demand does not exceed sector capacity • Maintains focus despite varying traffic levels

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
				PC2.7	<ul style="list-style-type: none"> Reacts appropriately to situations that have the potential to become unsafe
				PC2.8	<ul style="list-style-type: none"> Issues clearances and instructions to the flight crew that result in an efficient traffic flow
				PC2.9	<ul style="list-style-type: none"> Issues appropriate clearances and instructions
				PC2.10	<ul style="list-style-type: none"> Issues clearances and instructions in a timely manner
				PC2.11	<ul style="list-style-type: none"> Uses available tools to reduce delays and optimize flight profiles
				PC2.12	<ul style="list-style-type: none"> Provides flight information and status of facilities in a timely manner
				PC2.13	<ul style="list-style-type: none"> Issues hazard and safety alerts to the flight crews when necessary
				PC2.14	<ul style="list-style-type: none"> Issues traffic proximity information to flight crews in a relevant, accurate and timely manner
				PC2.15	<ul style="list-style-type: none"> Issues weather information to flight crews when necessary
SEPARATION AND CONFLICT RESOLUTION	Manage potential traffic conflicts and maintain separation	CE3.1	<ul style="list-style-type: none"> Detect potential traffic conflicts 	PC3.1	<ul style="list-style-type: none"> Identifies traffic conflicts
		CE3.2	<ul style="list-style-type: none"> Resolve traffic conflicts 	PC3.2	<ul style="list-style-type: none"> Selects the most appropriate separation method
		CE3.3	<ul style="list-style-type: none"> Maintain separation between aircraft 	PC3.3	<ul style="list-style-type: none"> Applies appropriate air traffic separation and spacing
		CE 3.4	<ul style="list-style-type: none"> Maintain separation of aircraft from terrain and known obstacles 	PC3.4	<ul style="list-style-type: none"> Issues clearances and instructions that ensure separation is maintained
				PC3.5	<ul style="list-style-type: none"> Issues clearances and instructions that take into account aircraft performance, terrain obstacles, airspace constraints and weather

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
				PC3.6 PC3.7 PC3.8 PC3.9	<ul style="list-style-type: none"> ● Issues clearance and instructions that resolve traffic conflicts ● Resolves conflicts through coordination with adjacent sectors or units ● Monitors the execution of separation actions ● Adjusts control actions, when necessary, to maintain separation

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
COMMUNICATION	Communicate effectively in all operational situations	CE4.1	<ul style="list-style-type: none"> Select appropriate mode of communication 	PC4.1	<ul style="list-style-type: none"> Selects communication mode that takes into account the requirements of the situation, including speed, accuracy and level of detail of the communication
		CE4.2	<ul style="list-style-type: none"> Demonstrate effective verbal communication 	PC4.2	<ul style="list-style-type: none"> Speaks clearly, accurately and concisely
		CE4.3	<ul style="list-style-type: none"> Demonstrate effective communication in written, automated and other non-verbal communication 	PC4.3	<ul style="list-style-type: none"> Uses appropriate vocabulary and expressions to convey clear messages
				PC4.4	<ul style="list-style-type: none"> Uses standard radiotelephony phraseology, when prescribed
				PC4.5	<ul style="list-style-type: none"> Adjusts speech techniques to suit the situation
				PC4.6	<ul style="list-style-type: none"> Demonstrates active listening by asking relevant questions and providing feedback
				PC4.7	<ul style="list-style-type: none"> Verifies accuracy of readbacks and corrects as necessary
				PC4.8	<ul style="list-style-type: none"> Uses plain language when standardized phraseology does not exist or the situation warrants it
				PC4.9	<ul style="list-style-type: none"> Where applicable, uses eye contact, body movements and gestures that are consistent with verbal messages and the environment
				PC4.10	<ul style="list-style-type: none"> Writes or inputs messages according to protocol or in a clear and concise manner where protocol does not exist
				PC4.11	<ul style="list-style-type: none"> Communicates relevant concerns and intentions

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
COORDINATION	Manage coordination between personnel in operational positions and with other affected stakeholders	CE5.1 CE5.2 CE5.3	<ul style="list-style-type: none"> Determine the need for coordination Select appropriate method of coordination Perform coordination 	PC5.1 PC5.2 PC5.3 PC5.4 PC5.5 PC5.6 PC5.7 PC5.8 PC5.9	<ul style="list-style-type: none"> Coordinates with personnel in other operational positions and other stakeholders, in a timely manner Selects coordination method based on circumstances, including urgency of coordination, status of facilities and prescribed procedures Coordinates the movement, control and transfer of control for flights using the prescribed coordination procedures Coordinates changes of status of operational facilities such as equipment, systems and functions Coordinates changes of status of airspace and aerodrome resources Uses clear and concise terminology for verbal coordination Uses standard ATS message formats and protocol for non-verbal coordination Uses clear and concise non-standard coordination methods when required Conducts effective briefings during position handover
MANAGEMENT OF NON-ROUTINE SITUATIONS	Detect and respond to emergency and unusual situations related to aircraft operations and manage degraded modes of ATS operation	CE6.1 CE6.2	<ul style="list-style-type: none"> Manage emergency and unusual situations related to aircraft operations Manage degraded modes of ATS operations 	PC6.1 PC6.2 PC6.3	<ul style="list-style-type: none"> Recognizes, from the information available, the possibility of an emergency or unusual situation developing Determines the nature of the emergency Prioritizes actions based on the urgency of the situation

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
				PC6.4	<ul style="list-style-type: none"> Decides upon the most appropriate type of assistance that can be given
				PC6.5	<ul style="list-style-type: none"> Follows prescribed procedures for communication and coordination of urgent situations
				PC6.6	<ul style="list-style-type: none"> Provides assistance and takes action, when necessary, to ensure safety of aircraft in area of responsibility
				PC6.7	<ul style="list-style-type: none"> Detects that ATS systems and/or equipment have degraded
				PC6.8	<ul style="list-style-type: none"> Assesses the impact of a degraded mode of operation
				PC6.9	<ul style="list-style-type: none"> Follows prescribed procedures for managing, coordinating and communicating a degraded mode of operation
				PC6.10	<ul style="list-style-type: none"> Creates solutions when no procedure exists for responding to non-routine situations
PROBLEM SOLVING AND DECISION MAKING	Find and implement solutions for identified hazards and associated risks	CE7.1	<ul style="list-style-type: none"> Determine possible solutions to an identified problem 	PC7.1	<ul style="list-style-type: none"> Takes into account the existing rules and operating procedures when determining possible solutions to a problem
		CE7.2	<ul style="list-style-type: none"> Prioritize effectively 	PC7.2	<ul style="list-style-type: none"> Implements an appropriate solution to a problem
		CE7.3	<ul style="list-style-type: none"> Manage risks effectively 	PC7.3	<ul style="list-style-type: none"> Determines the situations that have the highest priority
				PC7.4	<ul style="list-style-type: none"> Organizes tasks in accordance with an appropriate order of priorities
				PC7.5	<ul style="list-style-type: none"> Applies an appropriate mitigation strategy for the hazards identified
				PC7.6	<ul style="list-style-type: none"> Perseveres in working through problems without impacting safety
				PC7.7	<ul style="list-style-type: none"> Considers timeliness in decision making

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
SELF-MANAGEMENT AND CONTINUOUS DEVELOPMENT	Demonstrate personal attributes that improve performance and maintain an active involvement in self-learning and self-development	CE8.1	<ul style="list-style-type: none"> Self-evaluate to improve performance 	PC8.1	<ul style="list-style-type: none"> Takes responsibility for own performance, detecting and resolving own errors
		CE8.2	<ul style="list-style-type: none"> Use feedback to improve performance 	PC8.2	<ul style="list-style-type: none"> Improves performance through self-evaluation of the effectiveness of actions
		CE8.3	<ul style="list-style-type: none"> Adapt to the demands of a situation as needed 	PC8.3	<ul style="list-style-type: none"> Seeks and accepts feedback to improve performance
		CE8.4	<ul style="list-style-type: none"> Engage in continuous development activities 	PC8.4	<ul style="list-style-type: none"> Maintains self-control and performs adequately in adverse situations
				PC8.5	<ul style="list-style-type: none"> Changes behaviour and responds as needed to deal with the demands of the changing situation
				PC8.6	<ul style="list-style-type: none"> Maintains, through personal initiative, awareness of developments and changes in aviation
				PC8.7	<ul style="list-style-type: none"> Participates in learning activities (e.g. team meetings, briefings and training sessions)
WORKLOAD MANAGEMENT	Use available resources to prioritize and perform tasks in an efficient and timely manner	CE9.1	<ul style="list-style-type: none"> Adapt to differing workload conditions 	PC9.1	<ul style="list-style-type: none"> Manages tasks effectively in response to current and future workload
		CE9.2	<ul style="list-style-type: none"> Recognize where and when assistance is needed 	PC9.2	<ul style="list-style-type: none"> Manages interruptions and distractions effectively
		CE9.3	<ul style="list-style-type: none"> Request assistance when and where required 	PC9.3	<ul style="list-style-type: none"> Determines if and when support is necessary based on workload
		CE9.4	<ul style="list-style-type: none"> Manage time effectively 	PC9.4	<ul style="list-style-type: none"> Asks for help, when necessary
		CE9.5	<ul style="list-style-type: none"> Use ATS equipment 	PC9.5	<ul style="list-style-type: none"> Delegates tasks when necessary to reduce workload
		PC9.6	<ul style="list-style-type: none"> Accepts assistance, when necessary 		

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
			efficiently and effectively	PC9.7 PC9.8 PC9.9	<ul style="list-style-type: none"> Adjusts the pace of work according to workload Selects appropriate tools, equipment and resources to support the efficient achievement of tasks Uses the automated capabilities of ATS equipment to improve efficiency
TEAMWORK	Operate as a team member	CE10.1 CE10.2 CE10.3	<ul style="list-style-type: none"> Foster an atmosphere of open communication Encourage team participation and cooperation Use feedback to improve overall team performance 	PC10.1 PC10.2 PC10.3 PC10.4 PC10.5 PC10.6 PC10.7 PC10.8 PC10.9	<ul style="list-style-type: none"> Provides both positive and negative feedback constructively Accepts both positive and negative feedback objectively Shows respect and tolerance for other people Carries out actions and duties in a manner that fosters a team environment Manages interpersonal conflicts to maintain an effective team environment Uses negotiating and problem-solving techniques to help resolve unavoidable conflict when encountered Raises relevant concerns in an appropriate manner Anticipates and responds appropriately to the needs of others Shares experiences with the aim of continuous improvement

Chapter 3. COMPETENCY-BASED TRAINING AND ASSESSMENT FOR AIR TRAFFIC SAFETY ELECTRONICS PERSONNEL (ATSEP)

1. Introduction

- 1.1 Air traffic safety electronics personnel (ATSEP) is the recognized ICAO terminology for personnel proven to be competent in the installation, operation and/or maintenance of a CNS/ATM system.
- 1.2 It is the responsibility of the air navigation services provider to define the scope of ATSEP activities. The appropriate Authority should approve this definition.
- 1.3 This chapter provides the procedures for establishing a competency-based training and assessment programme for ATSEP, which is recommended for ATSEP training organizations, air navigation services providers or Authorities.
- 1.4 The ATSEP competency framework defined in Appendix 1 to this chapter should be used as a basis for the development and approval of local competency-based training and assessment programmes.

2. Assessment

- 2.1 Authorities may choose to validate the training and assessment process for ATSEP, including the assessment (evidence) guide, range of variables and the knowledge and skills required for assessing applicants.
- 2.2 In the case of a State validated assessment process for ATSEP, the ATSEP shall comply with all the requirements of the competency-based training programme and be evaluated according to the validated assessment process.

3. Training

- 3.1 All ATSEP competency-based training programmes shall be developed with the use of a systematic methodology, such as ISD or equivalent
- 3.2 The competency-based training programme for ATSEP should be composed of integrated theoretical and practical instruction.

Note.— Refer to the guidelines for the implementation of competency-based training for ATSEP in Appendix 1 to this chapter.

- 3.3 The competency-based training programme for ATSEP shall include continuous evaluation of the effectiveness of the training programme that is acceptable to the Authority or the employing ANSP. The evaluation shall ensure that:
 - a) the competencies and related assessment are relevant to the work of air traffic safety electronics personnel in the specific context and environment to which they may be assigned after training;

- b) the trainees acquire the necessary competencies in a progressive and satisfactory manner; and
 - c) remediation actions are taken if in-training or post-training evaluation indicates a need to do so.
- 3.4 A competency-based training programme for ATSEP shall include sufficient practical training to ensure competency is achieved. The performance shall be at a level that is appropriate to the exercise of duty. This practical training should be performed under the supervision of an instructor qualified and competent in the technical domain for which the certificate of competency shall be issued. In instances where practical training is provided through on-the-job training, the instructor shall be qualified and competent in the technical domain, and the training shall be conducted under the SMS of the ANSP.

Appendix 1 to Chapter 3 GUIDELINES FOR THE IMPLEMENTATION OF COMPETENCY-BASED TRAINING FOR AIR TRAFFIC SAFETY ELECTRONICS PERSONNEL (ATSEP)

1. Introduction

This appendix provides guidance to Authorities, training organizations and air navigation services providers on the measures to be taken to facilitate efficient implementation of competency-based training for ATSEP.

2. General considerations

- 2.1 The level of competence expected from an ATSEP should be defined, approved and agreed between the training organization and the employing ANSP, and Authorities in the case of a State-approved programme. In broad terms, the ATSEP graduate is expected to have successfully completed all phases of training within the defined time frame.
- 2.2 Local implementation of the ATSEP competency framework of Appendix 2 to this chapter includes selecting competencies appropriate to the local context.
- 2.3 When transitioning to a competency-based training programme, the general approach that is suggested is to start using the existing training programme (ab initio or equivalent) as a reference and then to progressively implement the new competency-based training programme for ATSEP, using the *ATSEP Training Manual* (Doc xxxx).
- 2.4 This transition from an existing ATSEP training programme to a competency-based approach shall be made in a progressive manner whereby successive evolutions of the training programme introduce a higher level of competency-based training.

3. Guidelines for the Authority

These guidelines are useful to Authorities choosing to validate ATSEP training programmes.

- 3.1 a) The implementation of competency-based training requires blending of various types of training (theoretical and practical) with media (e.g. classroom, various levels of

simulation and OJT). The training programme shall demonstrate the capacity to achieve training objectives using the various training means.

- b) In view of the developmental nature of a first competency-based ATSEP programme in a training organization or ANSP, the validation should be provisional and should be confirmed only after obtaining a satisfactory result from the first courses and after incorporating the lessons learnt into the training programme.
- c) All the provisions related to ATSEP training should apply as well as the principles contained in relevant guidance material, such as the *Manual on the Approval of Training Organizations* (Doc 9841).
- d) One of the attributes of competency-based training, as defined in this document, is the use of a process for the continuous evaluation of the training programme to ensure the effectiveness of the training and its relevance to real-time operations. This aspect of continuous evaluation is especially important during the initial implementation of an ATSEP competency-based programme.
- e) Oversight by the Authority, as applicable, shall be exercised during the initial implementation. The training organizations or ANSP should provide regular feedback as applicable to the Authority on the progress and problems faced during delivery of the programme. How this feedback is to be provided to the Authority shall therefore be clearly stated as part of the validation process.
- f) The success of the implementation of ATSEP competency-based training programmes depends to a large measure on the effective coordination and cooperation between the Authority if applicable, the training organizations and the ANSPs employing the ATSEP, and ATSEP representative bodies. Such cooperation and coordination should be encouraged and facilitated by stakeholders.

Appendix 2 to Chapter 3
AIR TRAFFIC SAFETY ELECTRONIC PERSONNEL
COMPETENCY UNITS, COMPETENCY ELEMENTS
AND PERFORMANCE CRITERIA

1. The purpose of developing an ATSEP competency framework is to encourage standardized performance and to enable the use of existing best practices in ATSEP training and assessment.
2. The ATSEP competency framework describes the competency units, competency elements and performance criteria that shall be translated into the operating environment of the ANSP, taking into account the system and equipment qualifications.
3. The ATSEP competency framework should be used by training organizations or ANSPs as the basis for developing their own training and assessment process and should be adapted to the operational, technical and organizational environment in which the ATSEP duties will be exercised. The ANSPs or, if applicable, the authority should use the ATSEP competency framework, with due consideration for the local environment, when evaluating ATSEP training programmes submitted for validation.
4. The use of a competency framework is not an obligation but is recommended in order to achieve best performance in ATSEP training.
5. It is recommended that training organizations as well as ANSPs use the ATSEP competency framework as a flexible tool to help them define the ATSEP competencies. The competency framework is generic and applies to all phases of training and assessment of ATSEP. It should be adapted to develop curricula and assessment guides that are appropriate to the phases of training and the challenges of the operating environment. Establishing different levels of taxonomy in the training to describe the required performance may be an effective method for differentiating between the performance criteria for each phase of training. The application of this taxonomy is explained in the *ATSEP Training Manual* (Doc xxxx).
6. The framework constitutes a high-level structure of ATSEP competencies. It may be reorganized and specified under broad categories such as: communication systems, radio navigation aids, surveillance, data processing, system monitoring and control. The proposed framework is generic and does not address the specific type of technology in use, organizational schemes or the type of maintenance conducted (corrective or preventive).
7. Certain competencies might relate exclusively to some dedicated or separate ATSEP function. This would be determined by the local organizational context.

ATSEP COMPETENCY FRAMEWORK

Note 1.— Paragraph 3 of Appendix 2 states that this framework should be adapted to the local context of the organization. The framework is generic and is intended to be adapted to the operating environment and challenges of the organization as well as to the professional experience of ATSEP. It does not address the specific definition of duties, sharing of tasks, qualifications and proficiency levels existing in the organization. Local implementation of this framework includes selecting competencies appropriate to their local context. The competencies in the table are not listed according to any predefined priority.

Note 2.— Performance criteria defined in the following table may serve one or more of the competency units and elements. The criteria used to judge whether the required level of performance has been achieved is to be established by the ANSP and/or ATO.

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
ENGINEERING	Collaborate in developing, modifying and integrating systems, networks and equipment	CE1.1	<ul style="list-style-type: none"> Develop specifications 	PC1.1	<ul style="list-style-type: none"> Demonstrates technical knowledge and reasoning
		CE1.2	<ul style="list-style-type: none"> Design the technical system 	PC1.2	<ul style="list-style-type: none"> Demonstrates ability of engineering reasoning and problem solving
		CE1.3	<ul style="list-style-type: none"> Support the technical system 	PC1.3	<ul style="list-style-type: none"> Demonstrate the knowledge and reasoning of interoperability in terms of global systems and environments
		CE1.4	<ul style="list-style-type: none"> Install CNS/ATM systems into an operational context 	PC1.4	<ul style="list-style-type: none"> Demonstrates ability to set system requirements
		CE1.5	<ul style="list-style-type: none"> Evaluate new technologies 	PC1.5	<ul style="list-style-type: none"> Develops modelling of system and ensures requirements can be met
		CE1.6	<ul style="list-style-type: none"> Manage system operational life cycle 	PC1.6	<ul style="list-style-type: none"> Manages development projects effectively
		CE1.7	<ul style="list-style-type: none"> Assess system performance in the performance-based operational context 	PC1.7	<ul style="list-style-type: none"> Designs implementation process effectively
		CE1.8	<ul style="list-style-type: none"> Manage resources required for CNS/ATM systems and capabilities 	PC1.8	<ul style="list-style-type: none"> Tests, verifies, validates and certifies new systems, equipment or installations

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
				PC1.9 PC1.10 PC1.11 PC1.12 PC1.13 PC1.14 PC1.15	<ul style="list-style-type: none"> • Supports system and equipment implementation • Optimizes systems and network elements • Supports system life cycle • Anticipates and organizes system and equipment decommissioning • Contributes to risk management processes • Determines, prescribes and ensures compliance of systems and network elements with the performance-based operational context • Manages system resources and safeguards them (e.g. frequency spectrum)
SITUATIONAL AWARENESS	Comprehend the current status of the ATM system and anticipate future events	CE2.1 CE2.2 CE2.3 CE2.4 CE2.5	<ul style="list-style-type: none"> • Maintain awareness of the system status • Maintain awareness of the global system environment • Maintain awareness of the operational situation • Maintain awareness of hazard situations • Anticipate the future situation 	PC2.1 PC2.2 PC2.3 PC2.4 PC2.5 PC2.6 PC2.7 PC2.8 PC2.9	<ul style="list-style-type: none"> • Monitors the CNS/ATM systems in own area of responsibility and contributing areas as well • Monitors the environmental conditions that have an impact on own and adjacent areas of responsibility and understands the impact on systems and services • Monitors the relevant elements of the ATC operational situation • Maintains awareness of the people involved in or affected by the operation • Obtains information from all available monitoring sources • Analyses information from all available monitoring sources • Predicts future system load (e.g. network, computing capacity and other parameters) • Identifies potentially hazardous situations • Checks for data integrity

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
SERVICE PROVISION	Ensure availability and reliability of CNS/ATM systems and capabilities	CE3.1 CE3.2 CE3.3	<ul style="list-style-type: none"> • Monitor the system • Analyze anomalies in CNS/ATM systems • Implement solutions to ensure continuity of services 	PC3.1 PC3.2 PC3.3 PC3.4 PC3.5 PC3.6 PC3.7 PC3.8	<ul style="list-style-type: none"> • Uses systems monitoring and diagnostic capabilities effectively • Evaluates the operational consequences of CNS/ATM system anomalies or failures • Switches from monitoring to intervention in a timely manner • Uses prescribed operation procedures properly • Ensures that technical interventions take into account the ATC operational situation • Coordinates technical interventions with other technical units, the different stakeholders and ATC • Monitors the execution of technical interventions • Uses a variety of methods to effectively manage system anomalies and degraded situations
COORDINATION	Manage coordination with operational stakeholders and with other affected stakeholders	CE4.1 CE4.2 CE4.3 CE4.4	<ul style="list-style-type: none"> • Coordinate overall system status and associated resources • Coordinate actions with different stakeholders • Report safety-critical information • Coordinate handover activities 	PC4.1 PC4.2 PC4.3 PC4.4 PC4.5	<ul style="list-style-type: none"> • Coordinates effectively with internal stakeholders • Coordinates effectively with external stakeholders • Selects the coordination method based on circumstances and in a timely manner • Uses common coordination terminology as required by the prescribed operational procedures • Adjusts timing of coordination, taking into account current factors affecting the technical team

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				PC4.6	<ul style="list-style-type: none"> Conducts effective briefings during position handovers and transfer of maintenance tasks
MANAGEMENT OF NON-ROUTINE SITUATIONS	Detect and respond to emergency and unusual situations related to the ATC operation and/or CNS/ATM systems and capabilities	CE5.1 CE5.2 CE5.3 CE5.4	<ul style="list-style-type: none"> Manage emergency and unusual situations Manage degraded modes of CNS/ATM systems and capabilities Provide assistance during degraded phases Inform stakeholders of potentially hazardous events 	PC5.1 PC5.2 PC5.3 PC5.4 PC5.5 PC5.6 PC5.7	<ul style="list-style-type: none"> Recognizes, from the information available, the possibility of an emergency, urgent or degraded situation developing Determines the nature of the emergency Prioritizes actions based on the urgency of the situation Follows prescribed procedures for responding to non-routine situations Follows prescribed procedures for communication and coordination of urgent situations Creates solutions when no procedure exists for responding to non-routine situations Identifies potentially hazardous events requiring coordination with stakeholders
PROBLEM SOLVING AND DECISION MAKING	Find and implement solutions for identified hazards and associated risks	CE6.1 CE6.2 CE6.3	<ul style="list-style-type: none"> Determine possible solutions to an identified problem Prioritize effectively Manage risks effectively 	PC6.1 PC6.2 PC6.3 PC6.4 PC6.5 PC6.6	<ul style="list-style-type: none"> Takes into account the existing rules and operating procedures when determining possible solutions to a problem Implements a chosen solution to a problem Organizes tasks in accordance with determined priorities Applies appropriate mitigation strategies for the identified hazards Works through problems without reducing safety Considers expediency and efficiency in decision making

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
SELF MANAGEMENT AND CONTINUOUS LEARNING	Demonstrate personal attributes that improve performance and maintain an active involvement in self-learning and self-development	CE7.1	<ul style="list-style-type: none"> • Manage stress in an appropriate manner 	PC7.1	<ul style="list-style-type: none"> • Takes responsibility for own performance, detecting and resolving own errors
		CE7.2	<ul style="list-style-type: none"> • Self-evaluate to improve performance 	PC7.2	<ul style="list-style-type: none"> • Improves performance through self-evaluation of the effectiveness of actions
		CE7.3	<ul style="list-style-type: none"> • Use feedback to improve performance 	PC7.3	<ul style="list-style-type: none"> • Seeks and accepts feedback to improve performance
		CE7.4	<ul style="list-style-type: none"> • Adapt to the demands of a situation as needed 	PC7.4	<ul style="list-style-type: none"> • Maintains self-control and performs adequately in adverse situations
		CE7.5	<ul style="list-style-type: none"> • Engage in continuous development activities 	PC7.5	<ul style="list-style-type: none"> • Changes behaviour and responds as needed to deal with the demands of the changing situation
		PC7.6	<ul style="list-style-type: none"> • Maintains awareness of developments in aviation and technological evolution 	PC7.7	<ul style="list-style-type: none"> • Participates in learning activities
		PC7.7			

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
WORKLOAD MANAGEMENT	Use available resources to prioritize and perform tasks in an efficient and timely manner	CE8.1 CE8.2 CE8.3 CE8.4 CE8.5	<ul style="list-style-type: none"> Adapt to differing workload conditions Identify where and when assistance is needed Request assistance when and where required Manage time effectively Use available tools efficiently and effectively 	PC8.1 PC8.2 PC8.3 PC8.4 PC8.5	<ul style="list-style-type: none"> Manages tasks effectively in response to current and future workload Determines if and when support is necessary based on workload Delegates tasks when necessary to reduce workload Selects appropriate tools, equipment and resources to support the efficient achievement of tasks Contributes to balancing team workload in normal and non-routine situations
TEAMWORK	Operate as a team member	CE9.1 CE9.2 CE9.3	<ul style="list-style-type: none"> Foster an atmosphere of open communication Encourage team participation and cooperation Use feedback to improve overall team performance 	PC9.1 PC9.2 PC9.3 PC9.4 PC9.5 PC9.6 PC9.7	<ul style="list-style-type: none"> Provides feedback constructively Shows respect and tolerance for other people Carries out actions and duties in a manner that supports a team environment Uses negotiating and problem-solving techniques to manage unavoidable conflict when encountered Raises relevant concerns in an appropriate manner Accepts feedback constructively Shares experiences with the aim of continuous improvement
COMMUNICATION	Communicate effectively in all situations	CE10.1 CE10.2	<ul style="list-style-type: none"> Select appropriate methods of communication Use effective verbal communication 	PC10.1 PC10.2	<ul style="list-style-type: none"> Selects communication methods that take into account the requirements of the situation Speaks clearly, accurately and concisely

COMPETENCY UNIT	DEFINITION	CE No.	COMPETENCY ELEMENT	PC No.	PERFORMANCE CRITERIA OBSERVABLE BEHAVIOUR
		CE10.3	<ul style="list-style-type: none"> Use effective written and other non-verbal communication 	PC10.3 PC10.4 PC10.5 PC10.6 PC10.7	<ul style="list-style-type: none"> Uses appropriate vocabulary and expressions for communications with stakeholders Demonstrates active listening by asking relevant questions and providing feedback Verifies comprehension of counterparts and corrects as necessary Where applicable, uses eye contact, body movements and gestures that are consistent with verbal messages Interprets non-verbal communication correctly

**Part 5 — TRAINING AND ASSESSMENT FOR
AERODROME PERSONNEL**

(reserved)

**Part 6 — TRAINING AND ASSESSMENT FOR OTHER AVIATION
PERSONNEL**

(reserved)

End of new text

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