SOUTH AFRICAN CIVIL AVIATION AUTHORITY

CIVIL AVIATION ACT, 2009 (ACT NO. 13 OF 2009)

AMENDMENT SA CATS 2/2021

The Director of Civil Aviation has, in terms of section 163 (1) of the Civil Aviation Act, 2009 (Act No. 13 of 2009) read with Part 11 of the Civil Aviation Regulations, 2011 amended South African-Civil Aviation Technical Standards as reflected in the Schedules hereto. The Amendments as contained in the Schedule shall come into operation simultaneously on the date of coming into operation of the 21st Amendment of the Civil Aviation Regulations.

Poppy Khoza
Director of Civil Aviation
Date: 05 NOV 2021

GENERAL EXPLANATORY NOTE:

[ ] Words in bold type in square brackets indicate omissions from existing technical standards.

_____ Words underlined with a solid line indicate insertions in existing technical standards.

SCHEDULE

Table of contents

8. Amendment of SA CATS 91

(a) 91.03.5

(b) 91.04.10

(c) 91.04.11

(d) 91.05.5

(e) 91.07.30

(f) 91.07.34

(g) 91.07.38

9. Amendment of Document SA CATS 93

(a) 93.06.5

(b) 93.07.30

10. Deletion of Subpart 3 of Document SA CATS 101

11. Amendment of Document SA CATS 121

(a) 121.05.17

(b) 121.06.5

(c) 121.07.29

(d) 121.07.32

(e) 121.07.33

12. Amendment of Document SA CATS 127

(a) 127.06.5

(b) 127.07.19

13. Amendment of Document SA CATS 135

(a) 135.05.9

(b) 135.05.10

(c) 135.06.5

(d) 135.07.13

(e) 135.07.30

(f) 135.07.38

14. Amendment of Document SA CATS 139
    (a) 139.02.10
    (b) 139.02.23

15. Substitution of Document SA CATS 141

16. Amendment of Document SA CATS 147
    (a) 1471.01.4
17. Amendment of Document SA CATS 148
    (a) 148.01.5

18. Amendment of Document SA CATS 172
    (a) 172.03.21

19. Amendment of Document SA CATS 175

AMENDMENT OF DOCUMENT SA CATS 21

1. Document SA CATS 21 is hereby amended by insertion after Technical Standard 21.11.2 of the following of technical standard:

21.12.1 ZA-TSO Authorisation

1. ZA-TSO Performance Standards

Compliance with South African Technical Standard Order (ZA-TSO) for specified articles used in a Civil Aviation aircraft shall be shown to meet the minimum performance standard specified below and as amended on the date of application for issue of ZA-TSO authorisation.

1.1 ZA-TSO or FAA Technical Standard Order (FAA TSO) or European Technical Standard Order (ETSO)". "

INSERTION OF DOCUMENT SA-CATS 60

2. The insertion after Document SA-CATS 48 of the following Document SA-CATS:

"SA CATS 60

LIST OF TECHNICAL STANDARDS: FLIGHT SIMULATOR TRAINING DEVICES

60.01.8 FSTD user certificate approvals

1. The purpose of the approval credit table is to provide training, testing, and checking credits to each FSTD type qualified in terms of SACAA Documents FSTD (A) and FSTD (H) which are named as Appendix A and B respectively.

2. The content of the credit table derives from the FSTD qualification concept provided in ICAO Document 9625 and the EASA Part-FCL "Aeroplane or Helicopter FSTD training credits".

3. ICAO Document 9625 proposes the qualification of seven qualification levels (standards) established by taking the following into consideration:
   (a) licences, ratings, and types of training (PPL, CPL, ATPL, instrument rating, class rating, type rating, recency, recurrent training etc);
   (b) training tasks and competency elements for each licence, rating and type of training (contained in Appendix 3 of ICAO Document 9868); and
   (c) training versus training to proficiency;
   (d) FSTD features:
      (i) flight deck layout and structure;
      (ii) flight model;
      (iii) ground handling;
      (iv) aircraft systems;
      (v) flight controls and forces;
      (vi) sound cues;
      (vii) visual cues;
      (viii) motion cues; and

(ix) environment (ATS, NAV, WX, AD, AIRSPACE and TERRAIN).

(e) levels of fidelity for each feature (none, generic, representative, and specific).

4. Documents SACAA FSTD (A) and FSTD (H) provide the qualification criteria for 11 different FSTD types (standards) which are closely associated with the 7 FSTD types (standards) contained in ICAO DOC 9625 as shown in table 1.

Table 1: FSTD TYPES

ICAO	SACAA
VII	FFS Level C and Level D
VI	FFS Level A and Level B
V	FTD 1 & 2
IV	FNPT II/MCC
III	FNPT II
II	FNPT I
I	BITD & OTD

5. The training, testing, and checking credits allocated to each FSTD are established in line with the Master Matrix data sheet contained in appendix C of ICAO Document 9625 Part I, chapter 9. This appendix indicates the level of fidelity per FSTD feature for each competency element or training task.

6. The word "Partial" used in the approval credit table indicates that the FSTD type is limited to partial use for the training, testing, or checking. The partial training, testing, or checking elements are established by the SACAA FSTD specialist during the qualification process, in line with Attachment J of ICAO Document 9625.

7. Should the user of an FSTD wish to utilise the device for a purpose for which the FSTD is not approved, such user may apply for an approval in terms of Parts 121,127 or 135 of the Regulations.

8. A user of an FSTD may only utilise the device, provided that the intended training, checking or testing is clearly specified in the operation specification sheet of the particular FSTD.

9. The regulatory standards for the qualification of FSTDs shall continue to be developed to cater for:

   (a) changing training needs;

   (b) data revisions;

   (c) relocations;

   (d) the introduction of new equipment;

   (e) procedures and technologies; and

   (f) mandated measures to address safety issues.

10 The introduction of changes to the regulatory standards should not necessarily result in making existing qualified FSTDs obsolete. To enable accredited training to continue, "grandfathering" of the qualification should be considered. This allows continued training on the device provided to meet the qualification standard achieved at its initial qualification. When the Authority implement the technical requirements into regulations, the Authority should consider provisions for the grandfathering of FSTDs that are in existence, on order, or under development.

11 Flight time recorded in a pilot logbook excludes time accumulated in a simulator.

Table 2: FSTD TRAINING CREDITS

LICENSE / RATING	APPLICABILITY	OTD	BITD	FNPT I	FNPT II	FNPT II MCC	FTD 1/2	FFS LEVEL C	FFS LEVEL D	REMARKS
PPL (A)	Dual instruction	--------	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	5hrs	5 hrs	None
NIGHT RATING	Instrument appreciation	-------	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	None
INSTRUMENT RATING	Instrument training towards initial rating	--------	-------	20 hrs note 1	20 hrs	20 hrs	-------	-------	-------	**Note 1:** Only 10 hrs credit if not equipped with a visual system equivalent to FNPT II requirements.
	Instrument training towards initial rating	-------	--------	--------	30 hrs	30 hrs	30 hrs	30 hrs	30 hrs	The credit criteria are explained in section 2 below.
	Instrument training from the helicopter category to the aeroplane category	-------	--------	3 hrs	3 hrs	3 hrs	3 hrs	3 hrs	3 hrs	FSTD must represent an aircraft in the specific category for which the instrument rating is sought.
	Instrument training for the	-------	--------	--------	3 hrs	3 hrs	3 hrs	3 hrs	3 hrs	Must meet the fidelity feature level requirements for multi-

	multi-engine class rating (A)									engine aeroplane class rating training.
	Skills test	No	No	No	Yes note 1	Yes note 1	Yes note 1	Yes	Yes	**Note 1:** Only for the required LOE element and other aspects which cannot be completed in an aircraft.
	Revalidation check	No	No	No	Yes note 1	Yes	Yes	Yes	Yes	**Note 1:** Only for the revalidation of the competency of a PPL or CPL.
	Training for the revalidation of a lapsed instrument rating	No	No	No	Yes	Yes	Yes	Yes	Yes	None
CPL (A)	Instrument training	-------	--------	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	None
Integrated CPL / IR or Integrated ATPL training	Instrument Training	-------	--------	25 hrs	40 hrs note 1	40 Hrs note 1	-------	--------	-------	**Note 1:** Up to 10 hours of FNPT II instrument ground time may be completed in an FNPT I
ATPL (A)	Instrument time	-------	--------	25 hrs	30 hrs	30 hrs	30 hrs	30 hrs	30 hrs	None
	Skills test	No	No	No	No	Yes	Yes	Yes	Yes	

	Training for the revalidation of a lapsed ATPL (A)	No	No	No	No	Yes	Yes	Yes	Yes	The FSTD must represent a multi-engine, multi-crew aeroplane with fully functioning dual controls and dual instrumentation in a serviceable condition. Appropriate SOP, QRH and checklist must be made available to the user and the FSTD must be suitably equipped to achieve the training and testing objectives in a multi-crew environment to an acceptable standard.

LICENSE / RATING	APPLICABILITY	OTD	BITD	FNPT I	FNPT II	FNPT II MCC	FTD 1/2	FFS LEVEL C	FFS LEVEL D	REMARKS
FLIGHT INSTRUCTOR RATING GRADE III	Training	-------	--------	--------	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	The FSTD must be suitably equipped to achieve the training, testing and checking
	Skills Test	No	No	No	No	No	No	No	Yes	
	Revalidation Check	No	No	No	Yes	Yes	Yes	Yes	Yes	

	Training for the revalidation of a lapsed Grade III FI rating	No	No	No	Yes	Yes	Yes	Yes	Yes	objectives to an acceptable standard.
FLIGHT INSTRUCTOR RATING GRADE II	Training	No	No	No	Yes	Yes	Yes	Yes	Yes	The FSTD must be suitably equipped to achieve the training, testing and checking objectives to an acceptable standard.
	Skills test	No	No	No	No	No	No	No	Yes	
	Revalidation check	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Training for the revalidation of a lapsed Grade II FI rating	No	No	No	Yes	Yes	Yes	Yes	Yes	
FLIGHT INSTRUCTOR RATING GRADE I	Training	No	No	No	Yes	Yes	Yes	Yes	Yes	The FSTD must represent a multi engine aeroplane with retractable undercarriage and variable pitch propeller or an aeroplane with turbojet engines and have fully functioning dual controls in a serviceable condition. The FSTD must be suitably equipped to achieve the training, testing and checking
	Skills test	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Revalidation check	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Training for the revalidation of a lapsed Grade I FI rating	No	No	No	Yes	Yes	Yes	Yes	Yes	

										objectives to an acceptable standard.
FLIGHT INSTRUCTOR ENDORSEMENTS	Training & Demonstration of competency for the night rating instructor endorsement	No	No	No	Yes note 1	Yes note 1	Yes note 1	Yes note 1	Yes note 1	**Note 1:** Only to be used to assess the candidate's ability to give instruction on instrument flying to the level required for a night rating. The ability to give flight instruction at night must be assessed in an aeroplane. In all cases, the FSTD must be suitably equipped to achieve the training, testing and checking objectives to an acceptable standard.
	Training & Demonstration of competency for the multi-engine class rating instructor	No	No	No	No	No	No	Yes	Yes	
	Training & Demonstration of competency for the instrument rating instructor endorsement	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Training & Demonstration of competency for	No	No	No	Partial	Partial	Yes	Yes	Yes	

	the Single Engine Turbo-Propeller Class Rating Instructor endorsement									
	Training & Demonstration of competency for the Type Rating Instructor endorsement	No	No	No	No	No	Yes	Yes	Yes	
	Training and demonstration of competency for an FSTD instructor endorsement	No	No	No	Yes	Yes	Yes	Yes	Yes	

LICENSE / RATING	APPLICABILITY	OTD	BITD	FNPT I	FNPT II	FNPT II MCC	FTD 1/2	FFS LEVEL C	FFS LEVEL D	REMARKS
MULTI-ENGINE AEROPLANE	Training	-------	--------	--------	3 hrs	3 hrs	3 hrs	3 hrs	3 hrs	None
	Skills Test	No	No	No	No	No	Partial	Yes	Yes	

CLASS RATING										
TYPE RATING (Single- and multi-pilot aeroplanes)	Training	No	No	No	Yes Note 1	Yes Note 1	Yes Note 1	Yes	Yes	**Note 1:** Device Specific Approval is required
	Skills test	No	No	No	No	No	No	Yes	Yes	
GNSS/RNAV/ RNP PILOT CERTIFICATION	GNSS/RNAV/RNP Training/Testing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	The on-board navigation database of the FSTD shall contain current navigation data officially promulgated for civil aviation, which can be updated in accordance with the AIRAC cycle. The on-board navigation database must be protected against flight crew modification of the stored data. The FSTD equipment must provide a means to display the validity period for the on-board navigation database to the flight crew. (AIC001-2015)

VALIDATION / CONVERSION	Skills test for the validation or conversion of an instrument rating									See relevant skill test or revalidation check
	Skills test for the validation or conversion of an ATPL (A) or CPL(A)									
RECENCY	3 take-offs and three landing by day and night	No	No	No	No	No	No	Yes	Yes	None
	2 instrument approaches	No	No	No	Yes	Yes	Yes	Yes	Yes	
RE-CURRENT TRAINING AND PROFICIENCY CHECKING	Single pilot Certified	No	No	No	Yes Note 1	Yes Note 1	Yes Note 1	Yes	Yes	**Note 1:** Device Specific Approval is required For Parts 93, 121, 127 and 135
	Multi-crew Certified	No	No	No	Yes Note 1	Yes Note 1	Yes Note 1	Yes	Yes	
MCC	Multi-crew cooperation training	No	No	No	Yes Note 1	Yes	Yes Note 1	Yes Note 1	Yes Note 1	**Note 1:** The FSTD shall comply with the FNPT II/MCC qualification requirements.

LICENSE / RATING	APPLICABILITY	OTD	BITD	FNPT I	FNPT II	FNPT II MCC	FTD 1/2	FFS LEVEL C	FFS LEVEL D	REMARKS
PPL (H)	Dual instruction	-------	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	5hrs	5 hrs	None
NIGHT RATING	Instrument appreciation	-------	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	None
INSTRUMENT RATING	Instrument training towards initial rating	-------	-------	20 hrs note 1	20 hrs	20 hrs	-------	-------	-------	**Note 1:** Only 10 hrs credit if not equipped with a visual system equivalent to FNPT II requirements.
	Instrument training towards initial rating	-------	--------	--------	30 hrs	30 hrs	30 hrs	30 hrs	30 hrs	The credit criteria are explained in section 2 below.
	Instrument training from the aeroplane category to the helicopter category	-------	--------	3 hrs	3 hrs	3 hrs	3 hrs	3 hrs	3 hrs	FSTD must represent an aircraft in the specific category for which the instrument rating is sought.
	Skills test	No	No	No	Yes note 1	Yes note 1	Yes note 1	Yes	Yes	**Note 1:** Only for the required LOE element and other aspects which cannot be completed in an aircraft.

	Revalidation check	No	No	No	Yes note 1	Yes	Yes	Yes	Yes	**Note 1:** Only for the revalidation of the competency of a PPL, CPL or ATPL single-pilot operation.
	Training for the revalidation of a lapsed instrument rating	No	No	No	Yes	Yes	Yes	Yes	Yes	None
CPL (H)	Instrument training	-------	--------	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	None
ATPL (H)	Instrument training	-------	--------	10 hrs	10 hrs	10 hrs	10 hrs	10 hrs	10 hrs	None
	Skills test	No	No	No	No	Yes	Yes	Yes	Yes	The FSTD must represent a multi-engine, multi-pilot helicopter with fully functioning dual controls and dual instrumentation in a serviceable condition. Appropriate SOP, QRH and checklist must be made available to the user and the FSTD must be suitably
	Training for the revalidation of a lapsed ATPL (A)	No	No	No	No	Yes	Yes	Yes	Yes	

										equipped to achieve the training and testing objectives in a multi-crew environment to an acceptable standard.

LICENSE / RATING	APPLICABILITY	OTD	BITD	FNPT I	FNPT II	FNPT II MCC	FTD 1/2	FFS LEVEL C	FFS LEVEL D	REMARKS
FLIGHT INSTRUCTOR RATING GRADE III	Training	-------	--------	--------	5 hrs	5 hrs	5 hrs	5 hrs	5 hrs	The FSTD must be suitably equipped to achieve the training, testing and checking objectives to an acceptable standard.
	Skills Test	No	No	No	No	No	No	No	Yes	
	Revalidation Check	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Training for the revalidation of a lapsed Grade III FI rating	No	No	No	Yes	Yes	Yes	Yes	Yes	
FLIGHT INSTRUCTOR RATING GRADE II	Training	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Skills test	No	No	No	No	No	No	No	Yes	
	Revalidation check	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Training for the revalidation of a	No	No	No	Yes	Yes	Yes	Yes	Yes	

	lapsed Grade II FI rating									
FLIGHT INSTRUCTOR RATING GRADE I	Training	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Skills test	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Revalidation check	No	No	No	Yes	Yes	Yes	Yes	Yes	
	Training for the revalidation of a lapsed Grade I FI rating	No	No	No	Yes	Yes	Yes	Yes	Yes	
FLIGHT INSTRUCTOR ENDORSEMENTS	Training & Demonstration of competency for the night rating instructor endorsement	No	No	No	Yes note 1	Yes note 1	Yes note 1	Yes note 1	Yes note 1	**Note 1:** Only to be used to assess the candidate's ability to give instruction on instrument flying to the level required for a night rating. The ability to give flight instruction at night must be assessed in an helicopter.
	Training & Demonstration of competency for the instrument rating instructor endorsement	No	No	No	Yes	Yes	Yes	Yes	Yes	

	Training & Demonstration of competency for the Type Rating Instructor endorsement	No	No	No	No	No	Yes	Yes	Yes	In all cases, the FSTD must be suitably equipped to achieve the training, testing and checking objectives to an acceptable standard.
	Training and demonstration of competency for an FSTD instructor endorsement	No	No	No	Yes	Yes	Yes	Yes	Yes	

LICENSE / RATING	APPLICABILITY	OTD	BITD	FNPT I	FNPT II	FNPT II MCC	FTD 1/2	FFS LEVEL C	FFS LEVEL D	REMARKS
TYPE RATING (Single- and multi-pilot helicopters)	Training	No	No	No	Yes note 1	Yes note 1	Yes note 1	Yes	Yes	**Note 1:** Device Specific Approval is required
	Skills test	No	No	No	No	No	No	Yes	Yes	
GNSS/RNAV/ RNP Pilot Certification	GNSS/RNAV/RNP Training and Testing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	The on-board navigation database of the FSTD shall contain current navigation data officially promulgated for

										civil aviation, which can be updated in accordance with the AIRAC cycle. The on-board navigation database must be protected against flight crew modification of the stored data. The FSTD equipment must provide a means to display the validity period for the on-board navigation database to the flight crew. (AIC001-2015)
VALIDATION / CONVERSION	Skills test for the validation or conversion of an instrument rating									See relevant skill test or revalidation check
	Skills test for the validation or conversion of an ATPL (A) or CPL(A)									

RECENCY	3 take-offs and three landing by day and night	No	No	No	No	No	No	Yes	Yes	None
	2 instrument approaches	No	No	No	Yes	Yes	Yes	Yes	Yes	
RE-CURRENT TRAINING AND PROFICIENCY CHECKING	Single pilot	No	No	No	Yes note 1	Yes note 1	Yes note 1	Yes	Yes	**Note 1:** Device Specific Approval is required For Parts 93, 121, 127 and 135
	Multi-crew	No	No	No	Yes note 1	Yes note 1	Yes note 1	Yes	Yes	
MCC	Multi-crew cooperation training	No	No	No	No	Yes	Yes Note 1	Yes Note 1	Yes Note 1	**Note 1:** The FSTD shall comply with the FNPT II/MCC qualification requirements.

12. CRITERIA FOR 30 HOURS CREDITS TOWARDS THE INSTRUMENT RATING

12.1 CLASSIFICATION AS AIRCRAFT MODEL SPECIFIC OR AIRCAFT MODEL REPRESENTATIVE

(1) The FSTD must provide an accurate representation of the flight deck of a particular aircraft model to the extent that the mechanical, electrical, electronic, etc. aircraft systems control functions, the normal environment of flight crew members, and the performance and flight characteristics of that aircraft are realistically simulated (ICAO Annex 1 definitions).

(2) The technical standard to be applied to the FSTD evaluation towards the classification as aircraft model specific or aircraft model representative to qualify for the granting of the additional credits is based on:

(a) flight model fidelity;

(b) flight deck fidelity; and

(c) visual system.

12.2 Flight model fidelity

(1) To qualify for the additional user approvals, the FNPT II flight model needs to accurately represent a specific aircraft model so that the pilot being trained can realistically use POH data to operate the FNPT II as that specific aircraft model in terms of handling and performance.

(2) Flight model fidelity must be assessed during the following flight conditions:

(a) Climb and cruise performance (all engines operative, and one engine inoperative)

(i) the applicable FSTD-A test results shall be compared with the equivalent POH data;

(ii) allowable test result tolerances of 10% may be applied to the published POH data;

(iii) the FSTD-A test must be performed under specific and realistic weight, altitude and temperature conditions; and

(iv) the test results are to be compared quantitatively to the published POH data for the following parameters:

(aa) altitude (required for cruise performance);

(bb) airspeed;

(cc) rate of climb (as applicable);

(dd) power setting (manifold pressure/torque and RPM settings); and

(ee) fuel-flow.

(a) **VMCA Characteristics (multi engine only)**

(i) The applicable FSTD-A test results must be compared with the equivalent POH data. Allowable test result tolerances of 10% may be applied to the published POH data.

(ii) The FSTD-A test must be performed under the applicable weight, altitude, temperature conditions, and as instructed in the POH.

(b) **Stall characteristics**

(i) The applicable FSTD-A test shall be performed in a clean and landing aircraft configuration. The test results must be compared with the equivalent POH data. Allowable test result tolerances of 10% may be applied to the published POH data.

(ii) The FSTD-A test must be performed under the applicable weight, altitude, temperature conditions, and as instructed in the POH.

(c) **Additional requirements**

Additional to the flight model performance fidelity the following hardware requirements shall be complied with:

(i) The simulator shall be equipped with:

(aa) a functional autopilot and flight director capable of coupled approaches;

(bb) an Attitude Deviation Indicator (ADI) and Horizontal Situation Indicator (HSI) coupled to the autopilot/flight director, and RMI;

(cc) an ADF;

(dd) ILS;

(ee) VOR;

(ff) dual altimeters;

(gg) a DME;

(hh) a 3-way intercom system capable of emulating inter-crew communication as well as crew to ATS communication;

(ii) an IOS capable of artificially setting ground speed to values higher than the real time ground speed; and

(jj) an IOS which has position freeze function.

(ii) subjective or objective fidelity demonstration of behaviour trends for Vmc, Vs and Vso as a function of changes in weight, altitude, temperature and CG;

(iii) Subjective or objective demonstration of acceptable fidelity for airframe icing and anti/de-icing equipment simulation;

(iv) the simulator shall have an accurate geographical and visual scenery database for at least 5 South African airports with runways, navaids, aprons and taxiways realistically represented, to comply with Document SA-CATS 61;

(v) the simulator shall be equipped with an SOP and POH to enable a realistic operation. The POH shall consist of the following sections:

(aa) limitations;
(bb) normal procedures and checklists;
(cc) abnormal procedures and checklists;
(dd) QRH where applicable;
(ee) weight & balance;
(ff) performance section; and
(gg) system description.

(vi) subjective or objective demonstration of integration and fidelity of scenery, airfield, navaid, flight model performance, operating procedures and checklists to enable the crew to fly between these airfields in a realistic real-time LOFT, LOS or LOE session.

12.3 Flight deck fidelity

(1) Many FNPT II devices represent a generic flight deck layout to allow for the implementation of different flight models. As a result, the flight deck is aircraft model unspecific which may lead to negative training.

(2) To qualify for the additional credits the flight deck of the FSTD has to realistically represent the flight deck of the aircraft being simulated in terms of form, feel and function (i.e., correct relative positioning and functioning of the human-machine interfaces).

12.4 **Visual system**

The non-collimated visual system shall be fitted with a horizontal field of view of at least 140° and a vertical field of view of at least 30°.

13. **ADDITIONAL REQUIREMENTS**

The device shall be capable of simulating the technical malfunctions and accommodating the environmental/operational items listed in Document SA-CATS 61"."

AMENDMENT OF TECHNICAL STANDARD 61

14. Document SA-CATS 61 is hereby amended by the insertion after Annexure A of the following Appendix:

"Appendix B

FORMAT OF PILOT LICENCES

PILOT, CABIN CREW, AIR TRAFFIC SERVICE, AIRCRAFT MAINTENANCE ENGINEER, REMOTE PILOT AND RPAS MAINTENANCE TECHNICIAN

1. Personnel licences issued by the Authority shall conform to the following specifications:

1.1 Detail

1.1.1 The Authority shall ensure that other States are able to determine the licence privileges and validity of ratings.

1.1.2 The following details shall appear on the licence:

(i) name of State "SOUTH AFRICA";

(ii) title of license (If the holder has multiple FCL licences, only the highest FCL will be displayed);

(iii) serial number of the licence, starting with **027**XXXXXXX;

(iv) name of holder in full;

(v) identity number ;

(vi) address of holder (Reserved);

(vii) nationality of holder;

(viii) signature of holder;

(ix) South African Civil Aviation Authority logo;

(x) certification concerning validity and authorisation for holder to exercise privileges appropriate to licence;(License validity accessed by scanning the QR code on the license, which scans live to the server. The recommended application - PDF 417);

(xi) signature of officer issuing the licence and the date of such issue;

(xii) seal or stamp of the Authority (the Authority hologram);

(xiii) ratings, such as category, class, type of aircraft, airframe, aerodrome control; (Additional FCL licences are displayed. License ratings are accessed by scanning the QR code on the license, which scans live to the server. The recommended application - PDF 417);

(xiv) remarks, such as special endorsements relating to limitations and endorsements for privileges, including an endorsement of language proficiency, and other information required in pursuance to Article 39 of the Chicago Convention; and

(xv) any other details desired by the Authority.

1.2 Material

1.2.1 Finest quality paper or other suitable material, including a gold, white or blue plastic card, shall be used and the details in terms of 1.1.2 shall be clearly shown thereon.

1.3 Language

1.3.1 The Authority issues licenses in the English language.

1.4 Arrangement of items

1.4.1 Item headings on the license shall be uniformly numbered in capital roman numerals so that on any license the number will, under any arrangement, refer to the same item heading"."

AMENDMENT OF DOCUMENT SA-CATS 65

14. Document SA-CATS 65 is hereby amended by:

(a) the deletion of Technical Standard 65.01.9 .

(b) the insertion after technical standard 65.12.8 of the following Technical Standards:

"65.17.1 DESIGNATION OF VALIDATION EXAMINER AND RATING ASSESSMENT EXAMINERS

1. Conditions, rules, requirements, procedures, or standards for designation of validation examiner (operational)

1.1 An applicant shall hold a South African ATS licence with the appropriate valid rating(s).

1.2 Such an applicant shall have validated the rating(s) and have exercised the privileges of such rating(s) for a period of not less than two years per rating.

1.3 Such an applicant shall be a valid Grade 1 Instructor on the discipline applied for.

1.4 If an applicant complies with the requirements, he or she may be appointed by the Director in terms of regulation 65.17.1 (1)(a).

2. Conditions, rules, requirements, procedures or standards for designation of rating assessment examiner (training organisation)

2.1 An applicant shall hold or have held an ATS licence with the rating(s).

2.2 Such an applicant shall have validated the rating(s)at a South African ATSU and have exercised the privileges of such rating(s) for a period of not less than two years per rating.

2.3 An applicant shall be a valid Grade 1 Instructor on the discipline applied for.

2.4 If an applicant complies with the requirements, he or she may be appointed by the Director in terms of regulation 65.17.1 (1).

65.17.7 Conducting proficiency checks and assessments by Designated Examiner

1. When conducting proficiency checks and assessments, a Designated Examiner shall ensure that:
   (a) where applicable, an applicant's such as ATS license and ratings are valid, and the training records are up to date prior to commencing with the assessment;
   (b) a thorough pre-briefing is conducted; and
   (c) the proficiency checks and assessments are based on the competency framework which consists of:
      (i) competency elements;
      (ii) performance criteria; and
      (iii) tasks.

***Note**: A prescribed Authority assessment form for ATS personnel shall be completed to record the following outcomes: A debriefing is conducted as part of the assessment.*

(a) Where applicable, a remedial action which shall be recorded on the assessment form is recommended.

(b) An assessment record is kept on file"."

AMENDMENT OF DOCUMENT SA-CATS 66

15. Document SA CATS 66 is hereby amended by the substitution in Technical Standard 66.04.1 of the following Groups of Tables

16. **GROUP 2** – AEROPLANES CONSTRUCTED OF COMPOSITES, WITH A MAXIMUM CERTIFICATED MASS OF 5700KG OR LESS.

(i) When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	VERSIONS INCLUDED	ICAO CODE
CESSNA	400 Corvallis TT	LC40-550FG, LC41-550FG, LC42-550FG, T240	COL4
CIRRUS	SR20/SR22	SR20, SR22, SR22T	SR20/SR22
DIAMOND	**[DA-20 Katana]** DV20	DV20	DV20
DIAMOND	DA-40	DA-40, DA-40F, DA-40-NG	DA40
DIAMOND	DA-42	DA-42, DA-42-NG, DA-42 M-NG, DA62	DA42
EXTRA	300, 350	EA 300, EA 300/S, EA 300/L, EA 300/200, EA 300/LC	E300
[EXTREMEAIR]	**[XA42]**		**[XA42]**
GROB	**[**G-103C Twin 3SL**]** G103	G103 TWIN ASTIR, G103 TWIN II, G103A TWIN II ACRO, G103C TWIN III ACRO	G103
GROB	G-109, **[Ranger (Vigilant)]**	G-109, Ranger (Vigilant)	G104 G109
STEMME	S-10, S 10-V		S10S
XTREMEAIR	XA42	XA42	XA42

(c) **GROUP 3** – AEROPLANES OF FABRIC COVERED TUBULAR METAL CONSTRUCTION, WITH A MAXIMUM CERTIFICATED MASS OF 5700KG OR LESS.

(i) When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	VERSIONS INCLUDED	ICAO CODE
AERONCA 15	Sedan	Sedan	AR15
ANTONOV	AN-2	AN-2	AN2
AUSTER	J-5 Adventurer	J-5 Adventurer	ADVE
AUSTER	**[Auster]** AOP6 (K, 6A)	AOP6 (K, 6A)	AUS6
BEECH	**[17 Staggerwing (UC-43 Traveler)]**	D17S (Army UC-43, UC*43B, Navy GB-1, GB-2), SD17S	BE17
BELLANCA	7 **[**Champ, Citabria**]**	Bellanca, Champion, 7AC (Aeronca), 7ACA, 7EC, 7GCB, S7AC, S7EC, 7GCBA, (L-16A), 7BCM, 7ECA, 7GCBC, (L-16B), 7CCM, 7FC, 7HC, S7CCM, 7GC, 7JC, 7DC, 7GCA, 7KC, S7DC, 7GCAA, 7KCAB	AR7
BELLANCA	8 **[**Decathlon, Scout**]**	Bellanca, Champion, 8KCAB, 8GCBC	BL8
BELLANCA	17 Viking, Super Viking, Turbo Viking	17-30A, 17-31A, 17-31ATC	B L17
BOEING	75 Kaydet (PT-13, PT-17, PT-18, PT-27, N2S)	A75L3, 75 (Army PT-13), A75 (Army PT-13A, -13B, -13C), B75 (Navy N2S-5), E75 (Army PT-13D, Navy N2S-5, PT-13D/N2S-5), A75J1 (Army PT-18),	ST75

		A75L300, A75N1 (Army PT-17, -17A; Navy N2S-1, -4), B75N1 (Navy N2S-3), D75N1 (Army PT-27), IB75A, E75N1	
CHRISTEN	A-1 Husky	A-1, A-1A, A-1B, A-1C-180, A-1C-200	HUSK
DE HAVILLAND	DH-82 Tiger Moth		DH82
FAIRCHILD	F-24 (UC-61, JK, Forwarder, Argus)		FA24
MAULE	M-4 Bee Dee, Jetasen, Rocket, Astro Rocket, Strata Rocket	Bee-Dee M-4, M-4, M-4C, M-4S, M-4T, M-4-180C, M-4-180S, M-4-180T, M-4-210, M-4-210C, M-4-210S, M-4-210T, M-4-220, M-4-220C, M-4-220S, M-4-220T, M-4-180V	M4
MAULE	M-5, Strata Rocket, Lunar Rocket, Patroller	M-5-180C, M-5-200, M-5-210C, M-5-210TC, M-5-220C, M-5-235C	M5
MAULE	M-6 Super Rocket	M-6-180, M-6-235	M6
MAULE	M-7-235, MT-7, MX-7-160/180/235, MXT-7-160/180 Super Rocket, Star Rocket	M-7-235, MX-7-235, MX -7-180, MX-7-420, MXT-7-180, MT-7-235, MX-7-160, MXT-7-160, MX-7-180A, MXT-7-180A, MX-7-180B, M-7-235B, M-7-235A, M-7-235C, MX-7-180C, M-7-260, MT-7-260, M-7-260C, M-7-420AC, MX-7-160C, MX	M7
PIPER	J-3 Cub	J3F-50, J3F-50S, J3F-60, J3F-60S, (ARMY L-4D) J3F-65, J3F-65S	J3
PIPER	PA-12 Super Cruiser	PA-12, PA-12S	PQ12
PIPER	PA-14 Family Cruiser	L-14	PA14

PIPER	PA-17 Vagabond	PA-17	PA17
PIPER	PA-18 Super Cub variants	PA-18, PA-18S, PA-18 "105" (Special), PA-18S "105" (Special), PA-18A, PA-18 "125" (Army L-21A), PA-18S "125", PA-18AS "125", PA-18 "135" (Army L-21B), PA-18A "135", PA-18S "135", PA-18AS "135", PA-18 "150", PA-18A "150", PA-18S "150", PA-18AS "150", PA-19 (Army L-18C), PA-19S	PA18
PIPER	PA-20 Pacer	PA-20, PA-20S, PA-20 "115", PA-20S "115", PA-20 "135", PA-20S "135"	PA20
PIPER	PA-22 Tri-Pacer, Caribbean, Colt	PA-22, PA-22-108, PA-22-135, PA-22S-135, PA-22-150, PA-22S-150, PA-22-160, PA-22S-160	PA22
PIPER	PA-25 Pawnee	PA-25, PA-25-235, PA-25-260	PA25
PITTS	S-2 Special	S-1S, S-1T, S-2, S-2A, S-2S, S-2B, S-2C	PTS2
STINSON	108 Voyager, Station Wagon	108, 108-1, 108-2, 108-3, 108-5	S108
TAYLORCRAFT	BC, BF, BL, Ace, Sportsman, Traveller	BC, BCS12-D, BCS, BC12-D1, BC-65, BCS12-D1, BCS-65, BC12D-85, BC12-65 (Army L-2H), BCS12D-85, BCS12-65, BC12D-4-85, BC12-D, BCS12D-4-85 (Army L-2G) BF, BFS, BF-60, BFS-60, BF-65, BFS-65, (Army L-2K) BF12-65, BFS12-65 BL, BLS, (Army L-2F) BL-65, BLS-65, (Army L-2J) BL12-65, BLS12-65	TAYB
TAYLORCRAFT	Plus C/D (Auster 1)		PLUS

(d) **GROUP 4** – UNPRESSURISED AEROPLANES OF ALL-METAL CONSTRUCTION, WITH A MAXIMUM CERTIFICATED MASS OF 5700KG OR LESS.

(i) When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	VERSIONS INCLUDED	ICAO CODE
AERO	45	(Volaire) 10, (Volaire) 10A, (Aero Commander)100, (Aero Commander)100A, (Aero Commander)100-180	AE45
AERO COMMANDER	100 Commander 100	500, 500A, 500B, 500U, 520, 560, 560A, 560E, 500S	VO10
AERO COMMANDER	500 Commander 500	560-F, 685, 680, 690, 680E, 690A, 680F, 690B, 680F(P), 690C, 680FL, 690D, 680FL(P), 695, 680T, 695A, 680V, 695B, 680W, 720, 681	AC50
AERO COMMANDER	680F, Commander 680F	600 S-2D, S2R, S2R-T34, S2R-T15, S2R-	AC68
AERO COMMANDER	S-2 Ag Commander		SS2P

		T11, S2R-R3S, S2R-R1340 600 S-2D, S2R-R1340, S2R-G10, S2R, S2R-R1820, S2R-G5, S2R-T34, S2R-T65, S2R-G1, S2R-T15, S2RHG-T65, S2RHG-T34, S2R-R3S, S2R-T45, S2R-T660, S2R-T11, S2R-G6, S2R-H80	
AEROSTAR	600, 601	PA-60-600 (Aerostar 600), PA-60-601 (Aerostar 601), PA-60-601P (Aerostar 601P), PA-60-602P (Aerostar 602P), PA-60-700P (Aerostar 700P)	AEST
AIR TRACTOR	AT-301/401	AT-250, AT-300, AT-301, AT-302, AT-400, AT-400A	AR3P
AIR TRACTOR	AT-302/400/402	AT-401, AT-401A, AT-401B, AT-402, AT-402A, AT-402B, AT-501, AT-502, AT-502A, AT-502B, AT-	AT3T

		503, AT-503A, AT-504	
AIR TRACTOR	AT-502/503	AT-401, AT-401A, AT-401B, AT-402, AT-402A, AT-402B, AT-501, AT-502, AT-502A, AT-502B, AT-503, AT-503A, AT-504	AT5T
AIR TRACTOR	AT-602	AT-602,	AT6T
[AIR TRACTOR	**AT-802]**	AT-602, AT-802, AT-802A	**[AT8T]**
ALLISON	36 Turbine Bonanza	35-33, J35, 35-A33, K35, 35-B33, M35, 35-C33, N35, 35-C33A, P35, E33, S35, E33A, V35, E33C, V35A, F33, V35B, F33A, 36, F33C, A36, G33, A36TC, H35, B36TC, G36	B36T
AMERICAN	AG-5 Tiger	AA-5, AA-5A, AA-5B, AG-5B	AA5
ALPHA AVIATION	R2160i (Robin)	R2160	R200
AYRES	S-2R-600/R1340/R1820/R3S Thrush, Bull Thrush	600 S-2D, S2R-R1340, S2R-G10, S2R, S2R-R1820, S2R-G5, S2R-G1,	SS2P

		S2R-R3S, S2R-G6, S2R-H80	
AYRES	S-2R-T11/T15/T34/T65/G6/G10 Turbo Thrush, V-1 Vigilante	S2R-T34, S2R-T65, S2R-T15, S2RHG-T65, S2RHG-T34, S2R-T45, S2R-T660, S2R-T11	SS2T
BEAGLE	B-121 Pup		PUP
BEECH	18 (C-45, RC-45, TC-45, UC-45, AT-7, AT-11 Kansan, SNB, JRB, Expeditor, Navigator)	C18S, (Army C-45, -45A,-45F, UC-45B, -45F, AT-7, -7A, -7B, -7C, Navy JRB-1, -2, -3, -4, SNB-2, -2C)	BE18
BEECH	19 Musketeer Sport, Sport	19A, B19, M19A,	BE19
BEECH	23 Musketeer, Sundowner	C23, 23, A23, A23A, A23-19, A23-24	BE 23
BEECH	24 Musketeer Super, Sierra	A24, A24R, B24R	BE24
BEECH	33 Debonair, Bonanza (E-24)	E33, E33A, E33C, F33, F33A, F33C, G33	BE33
BEECH	35 Bonanza	35-33, J35, 35-A33, K35, 35-B33, M35, 35-C33, N35, 35-C33A, P35, S35,	BE35

BEECH	36 Bonanza	V35, V35A, V35B, H35, 36, A36, A36TC, B36TC, G36	BE36
BEECH	55 Baron (T-42 Cochise, C-55, E-20)	B95A, D55, D95A, D55A, E95, E55, 95-55, E55A, 95-A55, 56TC, 95-B55, A56TC, 95-B55A, 58, 95-B55B (T-42), 58A, 95-C55, 95, 95-C55A, B95, G58	BE55
BEECH	56 Baron	B95A, D55, D95A, D55A, E95, E55, 95-55, E55A, 95-A55, 56TC, 95-B55, A56TC, 95-B55A, 58, 95-B55B (T-42), 58A, 95-C55, 95, 95-C55A, B95, G58	BE56
BEECH	58 Baron	B95A, D55, D95A, D55A, E95, E55, 95-55, E55A, 95-A55, 56TC, 95-B55, A56TC, 95-B55A, 58, 95-B55B (T-42), 58A, 95-C55, 95, 95-C55A, B95, G58	BE58

BEECH	65 Queen Air (U-8F Seminole)	65 (L-23F), 65-A90-1 (JU-21A), A65 (U-21A), A-65-8200 (RU-21A), 65-80 (RU-21D), 65-A80 (U-21G), 65-A80-8800 (RU-21H), 65-B80, 65-A90-2 (RU-21B), 65-88, 65-A90-3 (RU-21C), 65-90, 65-A90-4 (RU-21E), 65-A90 (RU-21H), 70, C90, B90, C90A, E90, C90GT, H90 (T-44A), C90GTi	BE65
BEECH	76 Duchess B	76	BE76
BEECH	95 Travel Air The Travel Air is considered as a subset of the B55 and may be awarded to the holder of a B55	B95A, D55, D95A, D55A, E95, E55, 95-55, E55A, 95-A55, 56TC, 95-B55, A56TC, 95-B55A, 58, 95-B55B (T-42), 58A, 95-C55, 95, 95-C55A, B95, G58	BE95
BRITTEN-NORMAN	BN-2, BN-2A/B Islander, Defender, Maritime Defender	BN-2, BN-2A-21, BN-2A, BN-2A-26, BN-2A-6, BN-2A-27, BN-2A-8, BN-2B-20, BN-2A-2, BN-2B-21,	BN2P

		BN-2A-9, BN-2B-26, BN-2A-3, BN-2B-27, BN-2A-20, BN-2T, BN-2T-4R	
BRITTEN-NORMAN	BN-2T	BN-2, BN-2A-21, BN-2A, BN-2A-26, BN-2A-6, BN-2A-27, BN-2A-8, BN-2B-20, BN-2A-2, BN-2B-21, BN-2A-9, BN-2B-26, BN-2A-3, BN-2B-27, BN-2A-20, BN-2T, BN-2T-4R	BN-2T
CESSNA	120	120, 140	C120
CESSNA	140	120, 140	C140
CESSNA	150, A150, Commuter, Aerobat	150, 150J, 150A, 150K, 150B, A150K, 150C, 150L, 150D, A150L, 150E, 150M, 150F, A150M, 150G, 152, 150H, A152	C150
CESSNA	152, A152, Aerobat	150, 150J, 150A, 150K, 150B, A150K, 150C, 150L, 150D, A150L, 150E, 150M, 150F, A150M, 150G, 152, 150H, A152	C152
CESSNA	170	170, 170A, 170B	C170

CESSNA	172, P172, R172, Skyhawk, Hawk XP, Cutlass (T-41, Mescalero)	172, 172A, 172B, 172C, 172D, 172E, 172F (USAF T-41A), 172G, 172H (USAF T-41A), 172I, 172K, 172L, 172M, 172N, 172P, 172Q, 172R, 172S	C172
CESSNA	172RG Cutlass RG	175, 175A, 175B, 175C, P172D, R172E (USAF T-41B) (USAF T-41C or D), R172F (USAF T-41D), R172G (USAF T-41C or D), R172H (USAF T-41D), R172J, R172K, 172RG	C172R
CESSNA	175, Skylark	175, 175A, 175B, 175C, P172D, R172E (USAF T-41B) (USAF T-41C or D), R172F (USAF T-41D), R172G (USAF T-41C or D), R172H (USAF T-41D), R172J, R172K, 172RG	C175
CESSNA	177, Cardinal	177, 177A, 177B	C177
CESSNA	177RG Cardinal RG	177RG	C77R

CESSNA	180, Skywagon 180 (U-17C)	180, 180A, 180B, 180C, 180D, 180E, 180F, 180G, 180H, 180J, 180K	C180
CESSNA	182, Skylane	182, 182A, 182B, 182C, 182D, 182E, 182F, 182G, 182H, 182J, 182K, 182L, 182M, 182N, 182P, 182Q, 182R, 182S, 182T, T182, TR182, T182T	C182
CESSNA	R182, TR182 (Turbo) Skylane RG	182, 182A, 182B, 182C, 182D, 182E, 182F, 182G, 182H, 182J, 182K, 182L, 182M, 182N, 182P, 182Q, 182R, 182S, 182T, T182, TR182, T182T	C82R
CESSNA	185, A185 Skywagon, Skywagon 185, AgCarryall (U-17A/B)	185, 185A, 185B, 185C, 185D, 185E, A185E, A185F	C185
CESSNA	188, A188, T188 AgWagon, AgPickup, AgTruck, AgHusky	188, 188A, 188B, A188, A188A, A188B, T188C	C188

CESSNA	195 (LC-126)	190, 195 (LC-126A,B,C), 195A, 195B	C195
CESSNA	206, P206, TP206, U206, TU206, (Turbo) Super Skywagon, (Turbo) Super Skylane, (Turbo) Skywagon 206, (Turbo) Stationair, (Turbo) Stationair 6	206, P206, P206A, P206B, P206C, P206D, P206E, U206, U206A, 206H, U206B, U206C, U206D, U206E, U206F, U206G, TP206A, TP206B, TP206C, T206H, TP206D, TP206E, TU206A, TU206B, TU206C, TU206D, TU206E, TU206F, TU206G	C206
CESSNA	207 (Turbo) Skywagon 207, (Turbo) Stationair 7/8	207, 207A, T207, T207A	C207
CESSNA	208 Caravan 1, (Super) Cargomaster, Grand Caravan (U-27)	208, 208B	C208
CESSNA	210, T210, (Turbo) Centurion	210, 210K, 210A, T210K, 210B, 210L, 210C, T210L, 210D, 210M, 210E, T210M, 210F, 210N, T210F, P210N, 210G, T210N, T210G, 210R, 210H,	C210

		P210R, T210H, T210R, 210J, 210-5 (205),, 210J, 210-5A (205A)	
CESSNA	310, T310 (U-3, L-27)	310, 310J, 310A (USAF U-3A), 310J-1, 310B, E310J, 310C, 310K, 310D, 310L, 310E (USAF U-3B), 310N, 310F, 310P, 310G, T310P, 310H, 310Q, E310H, T310Q, 310I, 310R, T310R	C310
CESSNA	320 (Executive) Skyknight	320, 320-1, 320A, 320B, 320C, 320D, 320E, 320F, 335, 340, 340A	C320
CESSNA	335	320, 320-1, 320A, 320B, 320C, 320D, 320E, 320F, 335, 340, 340A	C335
CESSNA	336	336	C336
CESSNA	337, M337, MC337, T337B/C/D/E/F/H (Turbo) Super Skymaster (O-2)	337, 337E, 337A (USAF 02B), T337E, 337B, 337F, M337B (USAF 02A), T337F, T337B, 337G, 337C,	C337

		T337G, T337C, 337D, T337D, 337H, P337H, T337H, T337H-SP	
CESSNA	401, 402, Utililiner, Businessliner	401, 401A, 401B, 402, 402A, 402B, 402C, 411, 411A, 414, 414A, 421, 421A, 421B, 421C, 425	C402
CESSNA	404 Titan F406 Caravan 2	404, 406 F406	C404
CESSNA	T303 Crusader	T303.	C303
DE HAVILLAND	DHC-1 Chipmunk		DHC1
DE HAVILLAND CANADA	DHC-2 Mk1 Beaver (U-6, L-20)	DHC-2 Mk. I, DHC-2 Mk. II, DHC-2 Mk. III	DHC2
DE HAVILLAND CANADA	DHC-6 Twin Otter (UV-18, CC-138)	DHC-6-1, DHC-6-100, DHC-6-200, DHC-6-300, DHC-6-400DHC-6-300, DHC-6-400	DHC6
DORNIER	DO-27 (Fpl53)	Do 27 Q-6	DO27
DORNIER	228-100/200	Do 28 D, Do 28 D-1, Dornier 228-100, Dornier 228-101, Dornier 228-200, Dornier 228-201,	D228

		Dornier 228-202, Dornier 228-212	
EMBRAER	110	EMB-110P1, EMB-110P2	E110
ERCO	415 Ercoupe	(ERCO) 415-C, (ERCO) 415-CD	ERCO
FUJI	FA200-180		SUBA
GIPPSLAND	GA8	GA8, GA8-TC 320	GA8
GIPPSLAND	GA200	GA200, GA200C	GA20
GLOBE	GC-1 Swift	GC-1A, GC-1B	GC1
GRUMMAN	G-164 Ag-Cat, Super Ag-Cat	G-164, G-164A, G-164B, G-164B with 73", G-164B-15T, G-164B-34T, G-164B-20T, G-164C, G-164D, G-164D with 73" wing gap	G164
GRUMMAN AMERICAN	AA-1 Trainer, Tr2, T-Cat, Lynx	AA-1, AA-1A, AA-1B, AA-1C	AA1
GRUMMAN AMERICAN	AA-5 Traveler, Cheetah, Tiger	AA-5, AA-5A, AA-5B, AG-5B	AA5

GRUMMAN AMERICAN	G-164 Ag-Cat, Super Ag-Cat	G-164, G-164A, G-164B, G-164B with 73", G-164B-15T, G-164B-34T, G-164B-20T, G-164C, G-164D, G-164D with 73" wing gap	G164
GRUMMAN AMERICAN	G-164 Turbo Ag-Cat	G-164, G-164A, G-164B, G-164B with 73", G-164B-15T, G-164B-34T, G-164B-20T, G-164C, G-164D, G-164D with 73" wing gap	G64T
HELIO	H-391/392/395/250/295/700/800, HT-295 Courier, Strato-Courier, Super Courier (U-10)	H-250, (USAF U-10D) H-295, HT-295, (USAF YL-24) H-391, H-391B, (USAF L-28A or U-10B) H-395, H-395A, H-700, H-800	COUR
MOONEY	M-20, 201, 205, 231, 252, ATS, MSE, PFM, TLS, Mark 21, Super 21, Ranger, Master, Chaparral, Executive, Statesman, Ovation	M20, M20A, M20B, M20C, M20D, M20E, M20F, M20G, M20J, M20K, M20L, M20M, M20R, M20S, M20TN, M20U, M20V	M20
MOONEY	M22, Mustang	M22	M22

MORANE-SAULNIER	MS-880 to 893 Rallye, Rallye Club, Super Rallye, Rallye Commodore	MS 880 B, MS 880B-D, MS 881, MS 885, MS 886, MS 883, MS 887, MS 884, RALLYE, RALLYE 100 S-D, RALLYE 100 ST, RALLYE 100 ST-D, RALLYE 110 ST, RALLYE 150 T, RALLYE 150 T-D, RALLYE 150 ST, RALLYE 150 ST-D, RALLYE 150 SV, RALLYE 150 SVS, RALLYE 180 T, RALLYE 180 T-D, RALLYE 180 TS MS 890 and its variants: MS 890 A, MS 890 B; MS 892 and its variants: MS 892 A.150, MS 892 B, MS 892 E, MS 892 E-D; MS 893 and its variants: MS 893 A, MS 893 B, MS 893 E, MS 893 E-D; MS 894 and its variants: MS 894 A, MS 894 C, MS 894 E; RALLYE 235	RALL

		and its variants RALLYE 235 E, RALLYE 235 E-D, RALLYE 235 A, RALLYE 235 C, RALLYE 235 F	
PAKISTAN	Mushshak		MF17
PACIFIC AEROSPACE	750XL	750XL	P750
NAVION	Rangemaster	Navion (L-17A), Navion A (L-17B), (L-17C), Navion B, Navion D, Navion E, Navion F, Navion G, Navion H	RANG
PARTENAVIA	P-64/66 Oscar, Charlie OSCR	P.64 "Oscar", P.64B "Oscar B", P.64B "Oscar B 1155", P.64B "Oscar 200", P.66B "Oscar 100", P.66B "Oscar 150", P.66C "Charlie", Vulcanair V1.0 (formerly P.64B "Oscar B 1155"), Vulcanair V1.1 (formerly P.64B "Oscar 200"), Vulcanair V1.100L (formerly P.66B	OSCR

		"Oscar 100"), Vulcanair V1.150L (formerly P.66B "Oscar 150"), Vulcanair V1.CL (formerly P.66C "Charlie")	
PARTENAVIA	P-68, Victor, Observer P68	P.68, P.68B, P.68C, P.68C-TC, P.68 "OBSERVER", AP68TP-300 "SPARTACUS", P.68TC "OBSERVER", P.68R	P68
PARTENAVIA	AP-68TP-600 Viator VTOR	P.68, P.68B, P.68C, P.68C-TC, P.68 "OBSERVER", AP68TP-300 "SPARTACUS", P.68TC "OBSERVER", P.68R	VTOR
PIAGGIO	P-166, P-166A/B/C/DL2/M/S, Portofino, Albatross	P.166, P.166 B, P.166 C, P.166 S, P.166 DL3, P.166 DP1	P66P

PILATUS	PC-6A/B/C Turbo-Porter (UV-20 Chiricahua)	PC-6, PC-6-H1, PC-6-H2, PC-6/350, PC-6/350-H1, PC-6/350-H2, PC-6/A, PC-6/A-H1, PC-6/A-H2, PC-6/B-H2, PC-6/B1-H2, PC-6/B2-H2, PC-6/B2-H4, PC-6/C-H2, PC-6/C1-H2	PC6T
PIPER	PA-23-150/160 Apache	PA-23, PA-23-160, PA-23-235, PA-23-250, PA-23-250 (Navy UO-1), PA-E23-250	PA23
PIPER	PA-23-235/250 Aztec, Turbo Aztec (U-11, E-19, UC-26)	PA-23, PA-23-160, PA-23-235, PA-23-250, PA-23-250 (Navy UO-1), PA-E23-250	PA27
PIPER	PA-24 Comanche	PA-24, PA-24-250, PA-24-260, PA-24-400	PA24
PIPER	PA-28-140/150/151/160/161/180/181 Cherokee, Archer, Cadet, Dakota, Turbo Dakota, Warrior, Cherokee Archer/Challenger/Charger/Chief/	PA-28-140, PA-28-150, PA-28-160, PA-28-180, PA-28-235, PA-28-236, PA-28S-160, PA-28S-180, PA-28-151, PA-28-161, PA-28-181	PA28

	Cruiser/Flite Liner/Pathfinder/Warrior		
PIPER	PA-28R-180/200/201 Cherokee Arrow, Arrow 2/3, Turbo Arrow 3	PA-28R-180, PA-28R-200, PA-28R-201, PA-28R-201T	P28R
PIPER	PA-28RT-201/201T Arrow 4, Turbo Arrow 4 P28T	PA-28RT-201, PA-28RT-201T	P28T
PIPER	PA-30/39 Twin Comanche, Twin Comanche CR, Turbo Twin Comanche	PA-30, PA-39, PA-40	PA30
PIPER	PA-31 Navajo, Piper, Chieftain	PA-31, PA-31-300, PA-31-325, PA-31-350	PA31
PIPER	PA-32 Cherokee Six, Six, Saratoga, Turbo Saratoga	PA-32-260, PA-32-300,PA-32S-300, PA-32-301, PA-32-301T, PA-32-301FT, PA-32-301XTC	PA32
PIPER	PA-32R Cherokee Lance, Lance, Saratoga SP, Turbo Saratoga SP	PA-32R-300, PA-32R-301 (SP), PA-32R-301 (HP), PA-32R-301T	P32R
PIPER	PA-32RT Lance 2, Turbo Lance 2	PA-32RT-300, PA-32RT-300T	P32T
PIPER	PA-34 Seneca	PA-34-200, PA-34-200T, PA-34-220T	PA34

PIPER	PA-36 Pawnee Brave	PA-36-285, PA-36-300, PA-36-375	PA36
PIPER	PA-38 Tomahawk	PA-38-112	PA38
PIPER	PA-44 Seminole, Turbo Seminole	PA-44-180, PA-44-180T	PA44
PIPER	PA-60, Aerostar	PA-60-600 (Aerostar 600), PA-60-601 (Aerostar 601), PA-60-601P (Aerostar 601P), PA-60-602P (Aerostar 602P), PA-60-700P (Aerostar 700P)	AEST
PZL-MIELEC	M-18 Dromader	PZL M18, PZL M18A, PZL M18B	M18
PZL-OKECIE	PZL-106AT/BT Turbo Kruk	PZL-106 BT-601 TURBO KRUK, PZL-106 BTU-34 TURBO KRUK	PZ6T
PZL-OKECIE	PZL-104 Wilga	PZL-104 Wilga 80, PZL-104M Wilga 2000, PZL-104MN Wilga 2000, PZL-104MF Wilga 2000, PZL-104MA Wilga 2000, PZL-104 Wilga	PZ04

		32, PZL-104 Wilga 32A, PZL-104 Wilga 35, PZL-104 Wilga 35A	
REIMS	F172, FP172, FR172, Skyhawk, Reims Rocket, Hawk XP	F172D, F172E, F172F, F172G, F172H, F172K, F172L, F172M, F172N, F172P, FP172D FR172E, FR172F, FR172G, FR172H, FR172J, FR172K	C172
REIMS	F182	.	C182
REIMS	F406 Caravan II		F406
ROCKWELL	112, 114 Commander 112/114, Alpine Commander, Gran Turismo Commander	112, 112TC, 112B, 112TCA, 114, 114A, 114B, 114TC	CM11
SCHWEIZER	G-164 Ag-Cat, Super Ag-Cat	G-164, G-164A, G-164B, G-164B with 73", G-164C, G-164D, G-164D with 73" wing gap	G164

SCHWEIZER	G-164 Turbo Ag-Cat, Ag-Cat Turbine	G-164B-15T, G-164B-34T, G-164B-20T	G64T
SIAI-MARCHETTI	S-205-18F/20F	S.205 - 18/F, S.205 - 20/F,	S05F
SIAI-MARCHETTI	S-205-18R/20R/22R	S.205 - 18/R, S.205 - 20/R, S.205 - 22/R,	S05R
SIAI-MARCHETTI	S-208	S.208, S.208A	S208
SIAI-MARCHETTI	SF-260A/B/C/D/M/W, Warrior	F.260, F.260B, F.260C, F.260D, F.260E, F.260F	F260
SHORTS	SC-7 Skyvan	SC-7 Series 2, SC-7 Series 3	SC7
SOCATA	MS-880 to 894, Rallye, Rallye Club/Minerva/ Commodore, Gabier, Gaillard, Galérien, Galopin, Garnement, Gaucho, Guerrier	MORANE SAULNIER (Rallye) Series, MS 880B, MS 885, MS 894A, MS 893A, MS 892A-150, MS 892E-150, MS 893E, MS 894E, Rallye 100S, Rallye 150T, Rallye 150ST, Rallye 235E, Rallye 235C	RALL
SOCATA	TB-10/20 Tobago, GT	TB 9, TB 10, TB 200	TOBA

SOCATA	TB-20/21 Trinidad, GT, Pashosh	TB 20, TB 21,	TRIN
TECNAM	P2002-JF	P2002-JF, P2002-JR	SIRA
TRANSAVIA	PL-12 Airtruk, Skyfarmer	PL-12/T-300	PL12
ROBIN	HR-100 Royal, Safari, Tiara, President	HR 100-200, HR 100-200 B, HR 100-210, HR 100-210 D, HR 100-285 TIARA, HR 100-250 TR, HR 100-285 C, R 1180 T, R 1180 TD	HR10
ROBIN	HR-200, R-200, Acrobin	HR200-100, R2160, R2160i, HR200-120, R2100, R2120U, HR200-120B, R2100A, HR200-160, R2160D, HR200-100S, R2112	HR20
ROBIN	DR-400 Cadet, Chevalier, Dauphin 4/80/2+2, Earl, Major, Major 80, Petit Prince, Regent, Remo 180/200/212, Remorqueur, 2+2	DR 200, DR 220, DR 220 A, DR 220 B, DR 220 AB, DR 221, DR 221 B, DR 250, DR 250-160, DR 250 B, DR 250 B-160, DR 253, DR 253 B, DR 340, DR 315, DR 360,	DR40

		DR 380, DR 300/108, DR 300/180 R, DR 300/140, DR 300/125, DR 300/120, DR 400/125, DR 400/140, DR 400/160, DR 400/180, DR 400/180 R, DR 400/2+2, DR 400/120, DR 400/125i, DR 400/140 B, DR 400/120 A,DR 400/160 D, DR 400/120 D, DR 400/180 S, DR 400/100, DR 400 RP, DR 400 NGL, DR 400/200 R, DR 400/500, DR400/200 I	
ZLIN	Z-42/142/242	Z 42 M, Z 42 MU, Z 142, Z 142 C, Z 242 L	Z42
ZLIN	Z-50	Z 50 L; Z 50 LA; Z 50 LS; Z 50 M; Z 50 LX	Z50

(e) **Group 5** – Pressurised aeroplanes of all-metal construction, with a maximum certificated mass of 5700kg or less.

(i) When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	VERSIONS INCLUDED	ICAO CODE
AERO COMMANDER	680F, 680FP Commander 680F/680FP	560-F, 680, 680E, 680F, 680F(P), 680FL, 680FL(P), 680T, 680V, 680W, 681, 685, 690, 690A, 690B, 690C, 690D, 695, 695A, 695B, 720	AC68
AERO COMMANDER	680FL Grand Commander	560-F, 680, 680E, 680F, 680F(P), 680FL, 680FL(P), 680T, 680V, 680W, 681, 685, 690, 690A, 690B, 690C, 690D, 695, 695A, 695B, 720	AC6L
AEROSTAR	601P	PA-60-600 (Aerostar 600), PA-60-601 (Aerostar 601), PA-60-601P (Aerostar 601P), PA-60-602P (Aerostar 602P), PA-60-700P (Aerostar 700P)	AEST
BEECH	58P Baron (Pressurised)	B95A, D55, D95A, D55A, E95, E55, 95-55, E55A, 95-A55, 56TC, 95-B55, A56TC, 95-B55A, 58, 95-B55B (T-	BE58

		42), 58A, 95-C55, 95, 95-C55A, B95, G58	
BEECH	60 Duke	60, A60, B60	BE60
BEECH	90, A90 to E90 King Air (T-44, VC-6)	65 (L-23F), 65-A90-1 (JU-21A), A65 (U-21A), A-65-8200 (RU-21A), 65-80 (RU-21D), 65-A80 (U-21G), 65-A80-8800 (RU-21H), 65-B80, 65-A90-2 (RU-21B), 65-88, 65-A90-3 (RU-21C), 65-90, 65-A90-4 (RU-21E), 65-A90 (RU-21H), 70, C90, B90, C90A, E90, C90GT, H90 (T-44A), C90GTi	BE9L
BEECH	F90 King Air	F90	BE9T
BEECH	100 King Air (U-21F Ute)	99, 100, 99A, A100, 99A, (U-21F), (FACH), A100A, A99, A100C, A99A, B100, B99, C99	BE10
BEECH	200, 300, Super King Air, Commuter (C-12A to F, C-12L, UC-12, RC-12, Tp101, Huron)	200, A100-1 (U-21J), 200C, A200 (C-12A), 200CT, A200 (C-12C), 200T, A200C (UC-12B), B200, A200CT (C-12D),B200C, A200CT (FWC-12D),B200CT, A200CT (C-12F), B200T, A200CT (RC-	BE20/B30

		12D), 300, A200CT (RC-12G), 300LW, A200CT (RC-12H), B300, A200CT (RC-12K), B300C, A200CT (RC-12P), B300C (MC-12W), A200CT (RC-12Q), B300C (UC-12W), B200C (C-12F), 1900, B200C (UC-12M), 1900C, B200C (C-12R), 1900C (C-12J), B200C (UC-12F), 1900D, B200GT, B200CGT	
CESSNA	P210 Pressurised Centurion	210, 210K, 210A, T210K, 210B, 210L, 210C, T210L, 210D, 210M, 210E, T210M, 210F, 210N, T210F, P210N, 210G, T210N, T210G, 210R, 210H, P210R, T210H, T210R, 210J, 210-5 (205),, 210J, 210-5A (205A)	P210
CESSNA	340	320, 320F, 320-1, 335, 320A, 340, 320B, 340A, 320C, 320D, 320E	C340
CESSNA	414, Chancellor	402	C414
CESSNA	421, Golden Eagle, Executive Commuter	421, 421A, 421B, 421C	C421
CESSNA	425 Corsair, Conquest 1	425	C425

CESSNA	441 Conquest, Conquest 2	441	C441
CESSNA	500, 501 Citation, Citation 1/1SP	500, 550, S550, 552, 560, 560XL 501, 551	C500
CESSNA	510 Mustang		C510
CESSNA	525 CitationJet, Citation CJ	525, 525A, 525B, 525C	C525
CESSNA	525A Citation CJ2	525, 525A, 525B, 525C	C25A
EMBRAER	500 (Phenom 100)		E50P
FAIRCHILD-SWEARINGENS	SA226 Merlin	SA26-T, SA26-AT, SA226-T, SA226-AT, SA226-T(B), SA227-AT, SA227-TT	SW4
GULFSTREAM – AEROSPACE	690, 695 Jetprop Commander 840/900/980/1000	560-F, 685, 680, 690, 680E, 690A, 680F, 690B, 680F(P), 690C, 680FL, 690D, 680FL(P), 695, 680T, 695A, 680V, 695B, 680W, 720, 681	AC90/95
LEAR JET	23	23	LJ23
MITSUBISHI	MU-2, Marquise, Solitaire (LR-1)	MU-2B, MU-2B-10, MU-2B-20, MU-2B-15, MU-2B-30, MU-2B-35, MU-2B-25, MU-2B-36, MU-2B-26	MU2

PILATUS	PC-12 PC12	PILATUS PC-12, PILATUS PC-12/45, PILATUS PC-12/47, PILATUS PC-12/47E	PC12
PIPER	PA-31P Navajo, Pressurised Navajo, Mojave, T-1020 (E-18)	PA-31P, PA-31P-350	PA31
PIPER	PA-31T Cheyenne, Cheyenne 1/2, T-1040 (E-18B)	PA-31T, PA-31T1, PA-31T2, PA-31T3	P31T
PIPER	PA-42 Cheyenne 3/400/1000	PA-42, PA-42-720, PA-42-1000	PA42
PIPER	PA-46 Malibu, Malibu Mirage	PA-46-310P, PA-46-350P, PA-46-500TP, PA-46R-350T, PA-46-600TP	PA46
PIPER	PA-60, Aerostar (Pressurised)	PA-60-600 (Aerostar 600), PA-60-601 (Aerostar 601), PA-60-601P (Aerostar 601P), PA-60-602P (Aerostar 602P), PA-60-700P (Aerostar 700P)	AEST
RAYTHEON	390 Premier 1	390	PRM1
ROCKWELL	690, 695 Turbo Commander, Jetprop Commander 840/980/1000	560-F, 685, 680, 690, 680E, 690A, 680F, 690B, 680F(P), 690C, 680FL, 690D,	AC690/95

		680FL(P), 695, 680T, 695A, 680V, 695B, 680W, 720, 681	
SOCATA	TBM 700/850	TBM 700	TBM7

(f) **Group 6** – Unpressurised aeroplanes of all-metal construction, with a maximum certificated mass exceeding 5700kg.

(i) Certification of these aircraft is subject to valid company certification held, and will be granted on individual aircraft types only.

MANUFACTURER	MODEL	ICAO CODE
AIR TRACTOR	AT-802, AT-802A	AT8T
BASLER	Turbo 67	DC3T
CASA	352L, C-212, CN-235 JU52/	C212/CN35
DORNIER	228-201/202	D228
DOUGLAS	DC-3, DST (C-47, C-47A to J, AC-47, EC-47, HC-47, LC-47, RC-47, TC-47, VC-47 Skytrain, C-53 Skytrooper, C-117A/B/C, R4D-1 to 7, Dakota)	DC3
DOUGLAS	DC-4 (C-54, EC-54, HC-54, TC-54, VC-54, R5D Skymaster)	DC4
LET	L-410/420 Turbolet	L410
SCHAFER	DC-3-65TP	DC3T
SHORTS	SD3-60	SH36

(i) **Group 9** – Rotorcraft powered by turbine engines, with a maximum certificated mass of 3175kg or less.

(i) When reference is made in a licence to this group, the privileges of the licence may be exercised in respect of the following airframes:

MANUFACTURER	MODEL	ICAO CODE
AEROSPATIALE/ AIRBUS HELICOPTERS	AS-350 Ecureuil, Astar, SuperStar,	AS50
AEROSPATIALE/ EUROCOPTER/ AIRBUS HELICOPTERS	AS-355 Ecureuil 2, TwinStar, TwinSquirrel	AS55
AEROSPATIALE/ EUROCOPTER	SA-341/342 Gazelle	GAZL
AEROSPATIALE/ EUROCOPTER	SA-315 Lama	LAMA
AEROSPATIALE	SA-316/319 Alouette 3	ALO3
AEROSPATIALE	SA-318 Alouette 2	ALO2
AGUSTA WESTLAND	A-109 Series, AW-109SP, AW109 Grand Nexus Power	A109
AGUSTA WESTLAND	A-119 (koala), AW119MKII	A119
BELL	206A/B/L, 406, JetRanger, LongRanger	B06
BELL	407	B407
BELL	427	B427
BELL	429, Global Ranger	B429
ENSTROM	480, TH-28	EN48

EUROCOPTER/ AIRBUS HELICOPTERS	EC-120 Colibri,	EC20
EUROCOPTER/ AIRBUS HELICOPTERS	EC-130	EC30
EUROCOPTER/ AIRBUS HELICOPTERS	EC-135	EC35
FAIRCHILD HILLER	FH-1100	FH11
HUGHES/ MCDONNELL DOUGLAS	369, 500 series/530F	H500
MCDONNELL DOUGLAS	520N	MD52
MCDONNELL DOUGLAS	600N	MD60
MESSERSCHMITT – BOLKOW BLOM/ EUROCOPTER	BO-105, BO-105 Twin Jet, BO-105 Super Five	B105
SCHWEIZER/ SIKORSKY	330, 333, 269D	S330

(ii) Robinson R66 is excluded from group 9 and the holder of a rating in group 9 who has more than 5 years uninterrupted experience since the first AME licence with a category A rating was granted to the holder, is eligible to apply for issuance of the R66 provided he or she holds an R22 or R44 rating and has passed the differences course on the R66.

(iii) In group 9, as a build-up to a complete group 9 licence, a candidate may qualify for the issue of a licence for a 'family' of aircraft of similar construction.

(iv) The holder of a rating in group 9 who has more than 5 years uninterrupted experience since the first AME licence with a cat A rating was granted to the holder, is eligible to apply for the issuance of a 'family' licence for any of the defined 'families' as follows:

(aa) Augusta Helicopters

Person holding an A109 licence qualifies to apply for the A119, as the A119 is derived from the A109.

Due to the fact that the AS109 is a single engine version of the AS119, a person holding an AS109 series with 30 days experience on AS119 and difference course qualifies to apply for the AS109/119 family.

(bb) Eurocopter/Airbus family

The AS350 and EC130 are an evolution of the same basic design philosophy over a period of time with the primary difference being engine type fitted and avionics.

Any person holding an AS350B3 licence qualifies to apply for the AS350 series.

Any person who has an AS350 licence and has completed the EC130 difference course qualifies to apply for the EC130 series.

Due to the fact that the AS355 is a twin engine version of the AS350, A person holding an AS350 series with 30 days experience on AS355 and difference course qualifies to apply for the AS350/355 family.

A person with a EC135 qualifies to apply for the EC135 family, limited to the engine type covered through the respective engine course.

A person who has completed a BO105 course, qualifies for the BO105 family with different engine variants fitted

(cc) Bell Helicopters

Any person with a 206L qualifies to apply for the 206 family as it is the latest version of the 206 series of helicopters mainly evolved using variations on the RR 250 engine.

The 407 is a derivative of the 206L.

Any person who has a 407 licence qualifies to apply for the 206/407 series.

Due to the fact that the 427 is a twin engine version of the 407, a person holding a 407 series with 30 days experience on 427 and difference course qualifies to apply for the 427/407 series.

An applicant who holds 60% of the aircraft in group 9, at the date of application, is eligible to apply for the issue of a group 9 licence.

(j) **Group 10** – Rotorcraft powered by turbine engines, with a maximum certificated mass exceeding 3175kg.

(i) Certification of these aircraft is subject to valid company certification held and will be granted on individual aircraft types only.

MANUFACTURER	MODEL	ICAO CODE
AEROSPATIALE **[/ AIRBUS]**	SA-330 Puma, CH-33 Puma, HT-19 **[(CH-33, HT-19)]**	PUMA
EUROCOPTER/ AIRBUS HELICOPTERS	EC-225 Super Puma, EC-215	EC25
AEROSPATIALE/ EUROCOPTER/ AIRBUS HELICOPTERS	AS-332 B1/B/C/~~F1~~/L/L1/L2 Super Puma	AS32
AEROSPATIALE **[/ AIRBUS]**	SA-365C, Dauphin 2	S65C
AEROSPATIALE **[/ AIRBUS]**	SA-360/361 Dauphin	S360
AEROSPATIALE/ EUROCOPTER/	SA-365F/N, AS-365 Dauphin 2	AS65

AIRBUS HELICOPTERS		
AUGUSTAWESTLAND	AW-101	EH10
AGUSTA WESTLAND	AB/AW-139	A139
Bell	205 (UH-1D, UH-1E, UH-1F, UH-1H, UH-1L, UH-1P, UH-1V)	UH1
BELL	212, Twin Two-Twelve, Griffon (UH-1N, VH-1, CUH-1N, CH-135/146, Twin Huey) **[222, 230, 430]**	B212
BELL	214, B/C, Biglifter	B214
BELL	222	B222
BELL	230	B230
BELL	412 Arapaho, Sentinel, Griffon	B412
BELL	430	B430
EUROCOPTER/ AIRBUS HELICOPTERS	EC-145, BK117C-2, BK117D, BK 117E	EC45
EUROCOPTER/ AIRBUS HELICOPTERS	EC-155	EC55
EUROCOPTER/ MBB	BK-117 B/C-1	BK17
MD HELICOPTER	MF-902, EXPLORER	EXPL
MIL	Mi-8/9/17/19/171/172	MI8
SIKORSKY	S-62 (HH-52 Seaguard)	S62
SIKORSKY	SS-76, H-76, AUH-76, Spirit, Eagle (HE-24)	S76

SIKORSKY	S-61A/B/D/L/N (SH-3, UH-3, VH-3, HSS-2, CH-124, HS-9, Sea King, Nuri)	S61
SIKORSKY	S-92, Helibus, Superhawk	S92

(aa) Augusta Westland

Person holding an AW109 licence qualifies to apply for the AW119, as the AW119 is derived from the AW109.

Due to the fact that AW119 is a single engine version of the AW109, a person holding an AW109 series within 30 days experience on AW119 and difference course qualifies to apply for the AW109/119 family.

(bb) Aerospatiale, Eurocopter, Airbus Helicopters

A person who has completed a SA330 course, qualifies for the SA330 family with engines fitted to the airframe

The EC-225 and EC-215 is an evolution of the AS332. A person with a AS332 license will qualify for the EC-225/EC-215 license if a difference course is completed.

A person qualifies for a group license on the EC-225/215 family if the airframe type course is completed.

The AS-365 Dauphin is an evolution of the SA365 aircraft, a person with a SA365 license qualifies for the AS-365 Dauphine family if a difference course is completed

The BK-117 A/B/C-1 is considered as a group family and a person qualifies for the group license with an airframe type course within the family

The EC-145/BK117C-2/BK117D/BK 117E is considered as a group family and a person qualifies for the group license provided a differences course is completed.

(2) 66.01.4(2): For the purposes of licensing of AME's, engines are classified into the following groups:

(a) **GROUP 01**: ALL CERTIFIED HORIZONTAL OPPOSED NORMALLY ASPIRATED PISTON ENGINES:

(i) *Continental Motors*:

[A and C series, O and GO-300 series, E, O- and IO-360, -470, -520, 550 and 6-285 series].

6-260 6-285 6-320
A-40 A-50 A-60 A-65 A-70 A-75 A-80 A-100
C-75 C-85 C-90 C-115 C-125 C-145
E165 E185 E225
FSO-470 FSO-526
GIO-470 GIO-550
GO-300
GSO-526
IO-240 IO-346 IO-360 IO-370 IO-470 IO-520 IO-550
IOF-550
LIO-520 LIO-470
O-200 O-300 O-470

Either the IO-520 or the IO-550 qualify **[has been selected]** as the representative engine in this group of engines. The candidate must therefore pass the theoretical examination for the IO-520 or the IO-550.

Experience on the IO-520 and/or the IO-550 will qualify for the issue or addition of the rating 'Continental engines in group 01'.

(ii) *Franklin*:

[6A-335, 6A-350, 6A4-150, and 6A8-215 series].

4A-235

4A4-75 4A4-85 4A4-95 4A4-100 4A4-235

4AC-150 4AC-176

6A-335 6A-350

6A4-150 6A4-165 6A4-200

6A8-215

6V-335

6V4-178 6V4-200

6AS-335 6AS-350

6VS-335

The theoretical examination on any of the engines in this group will be considered as representative of the group. An exam paper is available at the CAA on the 6A4-150 Six months experience on any combination of the engines in this group qualifies for the issue or addition of the group rating.

For the holder of a group 01 Continental and a group 01 Lycoming rating, one month's experience on the Franklin engines will be acceptable.

(iii) *Lycoming*:

[O-145, O-235 and O-290 series. O-, IO-, AEIO-, VO-, IVO-, HO- and HIO-320, -360, -480, -540 and -720 series].

AEIO-320 AEIO-360 AEIO-390 AEIO-540 AEIO-580

AIO-320 AIO-360

GO-145 GO-435 GO-480

HIO-360 HIO-390 HIO-540

HO-360

IGO-480 IGO-540

IO-320 IO-360 IO-390 IO-540 IO-580

IVO-360

LO-360

LTO-360

SO-580

VO-360 VO-435 VO-540

LIO-320 LIO-360

O-135 O-145 O-233 O-235 O-290 O-320 0-340

O-350 O-360 O-435 O-540

The IO-540 has been selected as the representative engine in this group of engines. The candidate must therefore pass the theoretical examination for the IO-540.

Experience on the IO-540 will qualify for the issue or addition of the rating 'Lycoming engines in group 01'.

(iv) Rotax Engines

Rotax 912S2:

[This engine is in its own group, and requires a theoretical examination and six months experience on the type].

(b) **GROUP 02:** ALL CERTIFICATED HORIZONTALLY OPPOSED TURBO NORMALISED, TURBOCHARGED AND SUPERCHARGED PISTON ENGINES:

(i) *Continental Motors*:

[TIO -, TSIO-, LTSIO-, GTSIO-360, -470, -520 and -550 series].

GTSIO-520
LTSIO-360 LTSIO-520
TSIO-360 TSIO-470 TSIO-520 TSIO-550
TSIOF-550
TSIOL-550

Either the TSIO-520 or the TSIO-550 qualify **[has been selected]** as the representative engine in this group of engines. The candidate must therefore pass the theoretical examination for either the TSIO-520 or the TSIO-550.

Experience on the TSIO-520 and/or the TSIO-550 will qualify for the issue or addition of the rating 'Continental engines in group 02'.

(ii) *Lycoming*:

[TSO-, TSIO-, TGSIO-, and IGSO-360, -480, -540, and -541 series engines].
GSO-435 GSO-480 GSO-580
IGSO-480 IGSO-540
TEO-540
LTIO-540
TIGO-541
TIO-360 TIO-540 TIO-541
TIVO-540
TO-360

TVO-435 TVO-540The TIO-540 **[TSIO-540]** has been selected as the representative engine in this group of engines. The candidate must therefore pass the theoretical examination for the TIO-540 **[TSIO-540]**.

Experience on the TIO-540 will qualify for the issue or addition of the rating 'Lycoming engines in group 02'.

(iii) Diesel Engines

- Austro Diesel Engines
  E4 (AE 300)
  E4P (AE 330)

- Continental Aerospace Technologies
  TAE 125 Series
  TAE 125-01 (Centurion 1.7)
  TAE 125-02-99 (CD135)
  TAE 125-02-114 (CD 155)

- Safran (Previously SMA)
  SR305-230, SMA SR305 230E:

[This engine is in its own group, and requires a theoretical examination and six months experience on the type].

(c) **GROUP 03:** ALL INLINE PISTON ENGINES:

Blackburn Cirrus minor and major series. DH Gipsy major, Gipsy six and Gipsy Queen. Walter 337A, M137, M601Z, minor series 4/111, minor 6-111 and mikron 111AE, Ranger 6-440 series.

These engines are considered vintage engines. The opportunity to work on these engines is scarce. The rule of six months experience is not practical.

If the candidate does not hold the rating, application for a special approval (through the AMO) should be made. Completion of the MPI (C rating) or the overhaul or shockload or major repair (D rating) will be considered acceptable training and experience for the issue of the rating (C or D as applicable).

(Rating is issued per individual type certificate).

(d) **GROUP 04:** RADIAL ENGINES.

Lycoming R-680 series. Pratt and Whitney R985, R1340, R1830, R2000, R2800 and Double Wasp series. Pezetel AF2-620R. Warner Super Scarab 165. Curtiss Wright R1820 – C9CC Series. PZL-Kalisz 1 AS2-621-M18. Jacobs R-755 series. PZL A1-14 RA, Continental W670.

These engines are considered vintage engines. The opportunity to work on these engines is scarce. The rule of six months experience is not practical.

If the candidate does not hold the rating, application for a special approval (through the AMO) should be made. Completion of the MPI (C rating) or the overhaul or shockload or major repair (D rating) will be considered acceptable training and experience for the issue of the rating (C or D as applicable). (Rating is issued per individual type certificate) "."

AMENDMENT OF SA CATS 67

17. Document SA-CATS 67 is hereby amendment by:

(a) the insertion in Technical Standard 67.00.2 after section 1 of the following section:

"1.1 Medical self-declaration

(1) The medical self-declaration referred to in regulation 67.00.2(8) shall be submitted to the Authority within 60 days of declaration.

(a) The self declaration shall disclose of a medical history that would preclude holding a Class 5 medical certificate;

(b) The Authority may, subject to the declaration form to further verification or assessment, and

(c) The Authority may request further supporting information or examination.

(2) An algorithm for common medical problems, such as coronary artery disease and other cardiac diseases, diabetes, drug or alcohol disorders, epilepsy, neurological diseases, physical disability; psychiatric disorders, respiratory disease and visual disorders and others, is available and shall indicate when a Class 5 applicant shall be required to be assessed by a Designated Aviation Examiner and additional specialists' reports may be required.

(3) A holder of a Class 5 medical certificate shall, before resuming any flight operation, notify the Authority if he or she becomes aware of the following:

(a) injury that inhibits or interferes with the safe operation of an aircraft;

(b) surgical operation or invasive procedure;

(c) regular use of medication;

(d) pregnancy;

(e) giving birth in the preceding six weeks; or

(f) illness or injury that requires hospitalisation for a period of more than 21 days.

(4) A Class 5 applicant shall complete and sign a declaration form and provide the Authority's medical assessor with a statement of the medical facts detailing personal, familial and hereditary history.

(5) A Class 5 applicant shall sign a declaration confirming the accuracy, completeness and truthfulness of the information contained in the medical examination form, and failure to disclose or misrepresentation in respect of the required medical information shall constitute an offence in terms of Part 185.".

(b) the insertion after Technical Standard 67.00.13 of the following Technical Standard:

"67.00.16 LANGUAGE

1. Language proficiency

(1) The following but not limited to, shall be recognised as proof of the ability to read, write, speak, and understand the English language:

(a) certified copy of either a school-leaver's certificate or a statement of results indicating Matric or Grade 12;

(b) M Level, with a pass in English first language with a minimum symbol of D or its equivalent;

(c) either a school leaver's certificate or a statement of results indicating Matric or Grade 12, O or M Level, with a pass in English second language with a minimum symbol of C or its equivalent;

(d) certified copy from the South African Quality Assurance recognised 2-year tertiary qualification with English either as a subject or English as the language of tuition and examination; or

(e) proof of being a present or past native of a nation where English is the first language, such as UK, USA, Australia or New Zealand.".

THE INSERTION OF DOCUMENT SA-CATS 71

4. Document SA-CATS 71 is hereby inserted after Document SA-CATS 69:

"SA CATS 71: RPAS PERSONNEL LICENSING

71.02.2 FLIGHT TRAINING

1. General

Flight training may be a combination of simulator and aircraft training. The exercises do not need to comply with the sequence provided below.

2. Items applicable to RPL:

2.1 aircraft pre-flight inspection and setup.

2.2 post-launch in-flight evaluation procedures (checking of systems directly after launch – if applicable to the category of licence).
2.3 automated flying and flight controller flight modes.
2.4 first person view (FPV) flying (if applicable).
2.5 parachute-assisted landing (if applicable to the category of licence).
2.6 evasive action (manoeuvres) to avoid collisions.
2.7 post-flight inspection.

3. Items applicable to the RPL(A):

3.1 climbing and descending.
3.2 turning whilst maintaining altitude.
3.3 climbing and descending turns.
3.4 speed changes while maintaining altitude.
3.5 horizontal figure eight.
3.6 Stalls.
3.7 recovery from a spin;
3.8 take-offs.
3.9 catapult launch if applicable
3.10 hand launch f applicable.
3.11 approaches and landings
3.12 hand launching if applicable.
3.13 engine failure at altitude, after take-off and on the approach.
3.14 VTOL – Vertical take-off and landing if applicable.

4. Items applicable to RPL(H):

4.1 tail-in hover.
4.2 tail-in hover performing squares and circles.
4.3 take-offs.
4.4 tail-in hover performing a horizontal figure eight.
4.5 tail-in hover performing a vertical rectangle.
4.6 6 Side-on hover (both sides).
4.7 transition from hover to forward flight.

4.8 transition from forward flight to hover.

4.9 turns from level flight.

4.10 climbing and descending from level flight.

4.11 approach and landing.

4.12 nose-in hover.

4.13 autorotation.

5. Items applicable to RPL(MR):

5.1 tail-in hover.

5.2 tail-in hover yawing slowly to right and left.

5.3 tail-in hover, move to right then to the left.

5.4 tail-in hover, move forwards then backwards.

5.5 tail-in hover, ascend and descend.

5.6 take-offs.

5.7 tail-in hover performing a horizontal rectangle.

5.8 tail-in hover performing a vertical rectangle.

5.9 nose-in hover.

5.10 from hover fly a square box rotating (yawing) the multi-rotor in the direction of flight.

5.11 from hover fly a circle rotating (yawing) the multi-rotor nose-in to the centre of the circle.

5.12 transition from hover to forward flight.

5.13 climbing and descending from level flight.

5.14 turns from level flight.

5.15 speed control in level flight.

5.16 approach and landings. and

5.17 actions after failure of a motor.

71.02.3 THEORETICAL KNOWLEDGE EXAMINATION

1. General

The subjects and items relevant to the different categories of licence (aeroplane, helicopter and multi-rotor) are specified in section 2.

2. Rewrite after failure

2.1 A candidate may not apply to rewrite an examination until he or she has received the official result notification.

2.2 A candidate who has failed an examination conducted by the Authority for the issue of a flight crew licence may not rewrite the examination –

(a) in the case of a first or second failure, within a period of 7 calendar days;

(b) in the case of a third or subsequent failure, within a period of 2 calendar months; and

(c) where a mark of less than 50% was achieved, within a period of 2 calendar months.

2.3 If a mark of less than 50% is achieved in conjunction with a third or subsequent failure, the respective periods of 2 calendar months shall run concurrently.

3. Re-mark after failure

3.1 A candidate who fails an examination with a mark of 65% or above may, within 30 days from the date of notification of the examination results, apply in writing for re-mark.

3.2 The application shall be accompanied by the appropriate fee prescribed in Part 187.

3.3 If the re-mark results in a pass of the examination concerned, the remarking fee shall be refunded.

3.4 A candidate may not rewrite any examination in respect of which re-mark has been requested and for which he or she has not been notified of the official result. Failure to comply with this condition shall result in the premature re-write being invalidated and the applicable examination fee forfeited.

4. Remote pilot general examination

4.1 The remote pilot general examination shall be passed before the first licence examination may be written.

4.2 The examination is not required for any subsequent licence examinations.

5. Licence examinations –

5.1 RPL (A):

5.2 RPL (H); and

5.3 RPL (MR).

6. Items applicable to the remote pilot general examination

6.1 Air law for RPA in terms of Parts 71, 101 and Document SA -CATS 101.

(2) Human factors:

(a) Vision-

(i) empty field myopia;

(ii) adaptation to darkness;

(b) autokinesis;

(i) stress management;

(ii) causes of stress (stressors); and

(iii) signs and symptoms of fatigue;

(c) Meteorology-

(i) factors affecting air density;

(ii) fog and mist;

(iii) wind and gusts;

(iv) thunderstorms; and

(v) aviation weather reports;

(d) Navigation-

(i) latitude and longitude;

(ii) aeronautical chart information (VFR); and

(iii) GPS (Components of a GPS system as used on an RPA);

(e) Lighting for remotely piloted aircraft.

(3) Items applicable to all RPL

(a) Construction and parts of the RPA (as applicable to the category of licence).

(b) Forces acting on an aircraft (as applicable to the category of licence)-

(i) weight;

(ii) lift;

(iii) drag; and

(iv) thrust.

(c) Axes of an aircraft and motion about the axes-

(i) lateral axis – pitch;

(ii) longitudinal axis – roll; and

(iii) normal axis – yaw.

(d) Control of motion about the axes (as applicable to the category of licence).

(e) Propulsion systems (as applicable to the category of licence)-

(i) electric motors;

(ii) Brushed motors;

(iii) Brushless motors;

(iv) Motor ratings;

(v) Electronic speed controllers;

(vi) Petrol engines;

(vii) Fuel mixtures;

(viii) Propellers and rotors;

(ix) Sizes of propellers (length and pitch); and

(x) Rotors.

(f) Weight and balance (as applicable to the category of licence)-

(i) dimensions and weight of aircraft;

(ii) arm, moment, reference datum, flight station, centre of gravity; and

(iii) forward and aft limitations of CG.

(g) Servo motors and servo actuators used in remotely piloted aircraft.

(h) Radio control link (C2 link)-

(i) radio control transmitter and receiver;

(ii) setup (as applicable to the category of licence);and

(iii) frequencies used.

(i) Data link-

(i) airborne receiver;

(ii) remote pilot station-

(aa) command and control functions;

(bb) telemetry;

(cc) detect and avoid uplink and downlink;

(dd) first person view (FPV);

(ee) mission planner software;

(ff) position and obstacle mapping; and

(gg) waypoint navigation;

(iii) frequencies used; and

(iv) setup.

(j) Wireless links general-

(i) line-of-sight;

(ii) fresnel zones;

(iii) interference;

(iv) coverage range;

(v) antennas as used in remotely piloted aircraft systems;

(vi) flight controller (autopilot system)-

(aa) inputs and outputs;

(bb) inertial measurement unit (IMU);

(cc) flight modes and facilities; and

(dd) setup.

(k) Batteries-

(i) sealed lead-acid (SLA);

(ii) nickel-cadmium (NiCad);

(iii) nickel-metal hydride (NiMH);

(iv) lithium-ion (Li-Ion);

(v) lithium polymer (Li-Poly/LiPo);

(vi) charging of batteries;

(vii) Safety concerns; and

(viii) Battery fires.

(l) The functions and required actions of the RPA observer.

7. Items applicable to the RPL (A).

(1) The stall-

(a) boundary layer;

(b) stalling angle of attack; and

(c) aeroplane characteristics at the stall.

8. Items applicable to the RPL (H).

(8.1) Flight controls-

(a) collective control;

(b) cyclic control; and

(c) anti-torque control.

(8.2) Main and tail rotors-

(a) swashplate;

(b) rotor head;

(c) rotor blade stal;

(d) fly bar;

(e) ground effect; and

(f) helicopter setup.

9. Items applicable to the RPL (MR).

Different configurations and frames". "

AMENDMENT OF TECHNICAL STANDARD 91

5. Document SA-CATS 91 is hereby amended by:

(a) the substitution in Technical Standard 91.03.5 of subsection (3) and the insertion after sub-section (3) of the following subsection:

"(3) An owner or operator shall ensure that all entries are made concurrently and that they are made in ink **[or other permanent marking]** or electronic method.

(4) electronic flight folio system shall record the parameters as detailed in subsection (1):

(a) electronic flight folio system shall record personnel interactions with the system and changes made on the system;

(b) electronic flight folio system shall track changes made by personnel and archived records shall be available as a read only document;

(c) electronic flight folio system shall address location and time of signatories;

(d) electronic flight folio system may require airworthiness approval if it incorporates changes in the type design. Installed Electric Flight Folio's may be incorporated during the aircraft type design, by a change to the type design or added by a supplemental type certificate;

(e) an off the shelf electric flight folio hardware that is not connected to an aircraft system does not need an airworthiness approval;

(f) an off the shelf equipment may only connect to aircraft power through a certified power source;

(g) a hardware that transmit data or acquire data from the aircraft systems on any phase of the flight needs an approval by the Authority; and

(h) a software that interfaces with aircraft systems"."

(b) the insertion in the Table of contents of the following heading:

"91.04.10 flight recorders

91.04.11 Seats, seat safety belts, harnesses and child restraint devices and carriage of infants

91.04.13 First aid and universal precaution KITS"

(c) the addition in Technical Standard 91.04.10.1 subsection (3) after paragraph (a) (iii) of the following paragraph:

"(iv) aeroplane age and requirements.";

Notes: "The following requirements shall be applicable with effect from 1 January 2023"

TABLE A1			
AEROPLANE AGE AND REQUIRMENTS			
The weight of the aircraft (take-off mass)		Age of Aircraft	Parameters to be recorded by FDR
1	5700kg or Less	All turbine engine aeroplanes for which the individual Certificate of airworthiness is first issued on or after 01 Jan 2016.	(a) At least the first 16 parameters in the table in sub-regulation (h) (b)A class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to the sub-regulation (h) or (c) An ADRS which shall record at least the first 7 parameters listed in the table in sub-regulation (h)
2	Over 27000kg	All aeroplanes for which the individual Certificate of airworthiness is first issued on or after	At least the first 32 parameters in the table in sub-regulation (h)

		01 Jan 1989.	
3	Over 5700kg up to and including 2700kg	All aeroplanes for which the individual Certificate of airworthiness is first issued on or after 01 Jan 1989.	At least the first 16 parameters in the table in sub-regulation (h)
4	5 700kg or less	All multi-engine turbine engine aeroplanes for which individual certificate of airworthiness first issued on or after 01 January 1990	At least the first 16 parameters in the table in sub-regulation (h)
5	Maximum 5 700kg	All multi-engine aircraft for which individual airworthiness certificate is first issued on or after 01 January 1990	At least the first 16 parameters in the table in sub-regulation (h)
6	Over 5700kg	All turbine-engined aeroplanes,for which the individual certificate of airworthiness was first issued before 01 January 1989,with a maximum certificated take-off mass of over 5700 kg, EXCEPT THOSE MENTIONED IN NO 7 ON THIS TABLE	At least the first 5 parameters in the table in sub-regulation (h)

7	Over 5700kg	All turbine engine aeroplanes, for which the individual certificate of airworthiness was first issued on or after 01 January 1987 but before 01 January 1989 Except those mentioned on item no 7 in this table	At least the first 9 parameters in the table in sub-regulation (h)
8	Over 27000kg	Individual certificate of airworthiness first issued on or after 01 January 1987 but before 01 January 1989 types of which the prototype was certified by the appropriate authority after 30 September 1969	At least the first 16 parameters in the table in sub-regulation (h)
9	Over 27000kg	All turbine engine aeroplanes for which the individual certificate of airworthiness was first issued before 01 Jan 1987 but the prototype was certified by the appropriate authority after 30 September 1969	At least the first 05 parameters listed in the table in sub-regulation (h) And meet the objectives of (a) The attitude of the aeroplane in achieving its flight path; and (b) The basic forces acting upon the aeroplane resulting in the achieved flight path and the origin of such basic forces.

10	Over 5700kg	First individual airworthiness certificate issued on or after 01 January 2005	Record at least the first 78 parameters listed in the table in sub-regulation (h)
11	Over 5700kg	All aeroplanes with a mass of over 5700kg Take Off Mass of which application for type certification is submitted to the contracting state on or after 01 January 2023	At least the first 82 parameters in the table in sub-regulation (h)

(d) the substitution in Technical Standard 91.04.10 for subsection (3)(b) of the following subsection:

"(3) Parameters

(b) The parameters for a helicopter are –

(i) **[A]** a Type IVA FDR shall be capable of recording, as appropriate to the helicopter, at least the 48 parameters in the table in sub-paragraph (j);

(ii) **[A]** a Type IV FDR shall be capable of recording, as appropriate to the helicopter, at least the first 30 parameters in the table in sub-paragraph (j); **[and]**

(iii) **[A]** a Type V FDR shall be capable of recording, as appropriate to the helicopter, at least the first 15 parameters in the table in sub-paragraph (j); and

(iv) helicopter age and requirements.

Note: The following requirements shall apply with effect from 1 January 2023, and shall replace the requirements of subsection (3(b) (i),(ii) and (iii) .

TABLE B1		
Helicopter age and requirements		
Weight of Aircraft	**Condition**	**Parameters**
All helicopters of with a MTOW of over 3 175kg.	Individual Certificate of Airworthiness first issued on or after 1 January 2016	An FDR shall record the first 48 parameters of the table listed in (3)(I)
All helicopters of Certified take –off mass of over 7000kg or having a passenger seating configuration of more than nineteen	Individual Certificate of Airworthiness first issued on or after 1 January 1989	An FDR shall record the first 30 parameters of the table listed in (3)(I)
All helicopters of a maximum certificated take-off mass of over 3 175 kg to 7 000 kg (3 175 kg – 7000 kg)	Individual Certificate of Airworthiness first issued on or after 1 January 1989	An FDR shall record the first 15 parameters of the table listed in (3)(I)
All turbine-engine helicopters of a maximum certificated take-off mass of over 2 250kg, up to and including 3 175 kg	The application for type certification was submitted to a contracting state on or after 1 January 2018	(a)An FDR shall record the first 48 parameters of the table listed in (3)(I) (b)A Class C AIR or AIRS which should record at least the flight path and speed parameters displayed to the pilot, as defined in Appendix 4 Table 6 (b) (c)An ADRS which shall record the first 7 parameters listed in Table 6 (b)
All helicopters of a maximum certificated take-off mass of 3 175kg or less	The individual Certificate of Airworthiness is first	(a)An FDR shall record the first 48 parameters listed in Table (3)(I)

	issued on or after 1 January 2018	(b)A Class C AIR or AIRS which should record at least the flight path and speed parameters displayed to the pilot, as defined in Appendix 6 (b) (c)An ADRS which shall record the first 7 parameters listed in Table 6 (b)
All helicopters of a maximum certificated take-off mass of over 3 175kg	Application for type certificate is submitted to a contracting state on or after 1 January 2023	FDR record shall record the at least the first 53 parameters listed in Table (3)(l)
Weight of Aircraft	**Condition**	**Parameters**
All helicopters of a maximum certificated take-off mass of over 3 175kg	Individual certificate of airworthiness is first issued on or after 1 January 2023	FDR record shall record the at least the first 53 parameters listed in Table (3)(l)

(e) the substitution in Technical Standard 91.04.10 for the renaming a Table in subsection (3)(j) and the insertion of a subsequent Table of the following Table:

TABLE C1
PARAMETERS FOR HELICOPTER FLIGHT DATA RECORDERS

Serial #	Parameter	Measurement range	Maximum sampling and recording interval	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time	24 hours	4	±0.125% per hour	1s
2	Pressure altitude	–1 000ft (–300m) to maximum certificated altitude of aircraft +5 000ft (+1 500m)	1	±100ft to ±700ft (±30m to ±200m)	5ft (1.5m)
3	Indicated airspeed	As the installed pilot display measuring system	1	±3%	1kt
4	Heading	360°	1	±2°	0.5°
5	Normal acceleration	–3g to +6g	0.125	±0.09g excluding a datum error	0.004g
6	Pitch attitude	±75° or 100% of useable	0.5	±2°	0.5°

		range whichever is greater			
7	Roll attitude	±180°	0.5	±2°	0.5°
8	Radio transmission keying	On-off (one discrete)	1	—	—
9	Power on each engine	Full range	1 (per engine)	±2%	0.1% of full range
10	Main rotor: Main rotor speed rotor brake	50–130% Discrete	0.51	±2%	0.3% of full range
11	Pilot input and/or control surface position – primary controls (collective pitch, longitudinal	Full range	0.5 (0.25 recommended)	±2% unless higher accuracy uniquely required	0.5% of operating range
12	Hydraulics, each system (low pressure and	Discrete	1	—	—
13	Outside air temperature	Sensor range	2	±2°C	0.3°C
14*	Autopilot/autothrottle/AFCS mode and engagement	A suitable combination of discretes	1	—	—
15*	Stability augmentation system	Discrete	1	—	—
Note – *The preceding 15 parameters satisfy the requirements for a Type V FDR.*					
16*	Main gearbox oil pressure	As installed	1	As installed	6.895kN/m2 (1psi)
17*	Main gearbox oil temperature	As installed	2	As installed	1°C

18	Yaw rate	±400°/second	0.25	±1.5% maximum range excluding datum error	±2°/s
19*	Sling load force	0 to 200% of certified load	0.5	f ±5% ±3% of maximum range	0.5% for maximum certified load
20	Longitudinal acceleration	±1g	0.25	±0.015g excluding a datum error of ±0.05 g	0.004g
21	Lateral acceleration	±1g	0.25	±0.015g excluding a datum error	0.004g
22*	Radio altitude	–20ft to 2 500ft (–6m to 750m)	1	±2f ft (±0.6m) or ±3% whichever is greater below 500ft (150m) and ±5% above 500ft (150m)	1ft (0.3m) below 500ft (150m), 1ft (0.3m) + 0.5% of full range above 500ft (150m)

23*	Vertical beam deviation	Signal range	1	±3%	0.3% of full range
24*	Horizontal beam deviation	Signal range	1	±3%	0.3% of full range
25	Marker beacon passage	Discrete	1	—	—
26	Warnings	Discrete(s)	1	—	—
27	Each navigation receiver frequency	Sufficient to determine selected frequency	4	As installed	—
28*	DME 1 and 2 distances	0–200NM (0-370km)	4	As installed	1 NM (1 852m)
29*	Navigation data (latitude/ longitude, ground speed, drift angle, wind speed, wind direction)	As installed	2	As installed	As installed
30*	Landing gear or gear selector	Discrete	4	—	—
Note – *The preceding 30 parameters satisfy the requirements for a Type IV FDR.*					
31*	Engine exhaust gas temperature (T4)	As installed	1	As installed	-
32*	Turbine inlet temperature (TIT/ITT)	As installed	1	As installed	-
33*	Fuel contents	As installed	4	As installed	-
34*	Altitude rate	As installed	1	As installed	-
35*	Ice detection	As installed	4	As installed	-

36*	Helicopter health and usage monitor	As installed	—	As installed	—
37	Engine control modes	Discrete	1	—	—
38*	Selected barometric setting (pilot and co-pilot)	As installed	64 (4 recommended)	As installed	0.1mb (0.0 in-Hg)
39*	Selected altitude (all pilot selectable	As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation	As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable operation)	As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection

45*	Selected decision height	As installed	4	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot and co-pilot)	Discrete(s)	4	—	—
47*	Multi-function/engine/alerts display format	Discrete(s)	4	—	—
48*	Event marker	Discrete	1	—	—
Note – *The preceding 48 parameters satisfy the requirements for a Type IVA FDR.*					

Note: The following requirements shall apply with effect from 1 January 2023 and shall replace the requirements of subsection (3)(j) Table C1.

TABLE D1

PARAMETERS FOR HELICOPTERS FLIGHT DATA RECORDER TABLE

Ser	Parameter	applicability	Measure range	Recording intervals	Accuracy limits	Recording resolution
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	±0.125% /h	1 s
2	Pressure altitude		–300 m (–1 000 ft) to	1	±30 m to ±200 m	1.5 m (5 ft)

			maximum certificated altitude of aircraft +1 500 m (+5 000 ft)		(±100 ft to ±700 ft)	
3	Indicated airspeed		As the installed pilot display measuring system	1	±3%	1 kt
4	Heading		360°	1	±2°	0.5°
5	Normal acceleration		–3 g to +6 g	0.125	±0.09 g excluding a datum error of ±0.045 g	0.004 g
6	Pitch attitude		±75° or 100% of useable range whichever is greater	0.5	±2°	0.5°
7	Roll attitude		±180°	0.5	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1	—	—
9	Power on each engine		Full range	1 (per engine)	±2%	0.1% of full range
10	Main rotor speed Rotor brake		50–130% Discrete	0.51	±2% —	0.3% of full range

11	Pilot input and/or control surface position — primary controls (collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)		Full range	0.5 (0.25 recommended)	±2% unless higher accuracy uniquely required	0.5% of operating range
12	Hydraulics, each system (low pressure and selection)		Discrete	1	—	—
13	Outside air temperature		Sensor range	2	±2°C	0.3°C
14*	Autopilot/ autothrottle/AFCS mode and engagement status		A suitable combination of discretes	1	—	—
15*	Stability augmentation system engagement		Discrete	1	—	—
16*	Main gearbox oil pressure		As installed	1	As installed	6.895 kN/m2 (1 psi)
17*	Main gearbox oil temperature		As installed	2	As installed	1°C
18	Yaw rate		±400° /second	0.25	±1.5% maximum range	2°/s

					excluding datum error of ±5%	
19*	Sling load force		0 to 200% of certified load	0.5	±3% of maximum range	0.5% for maximum certified load
20	Longitudinal acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
21	Lateral acceleration		+-1g	0,25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
22*	Radio altitude		–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft), 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation		Signal range	1	±3%	0.3% of full range

24*	Horizontal beam deviation		Signal range	1	—	0.3% of full range
25	Marker beacon passage		Discrete	1	—	—
26	Warnings		Discrete(s)	1	—	—
27	Each navigation receiver frequency selection		Sufficient to determine selected frequency	4	As installed	—
28*	DME 1 and distances		0–370 km (0–200 NM)	4	As installed	1 852 m (1 NM)
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)		As installed	2	As installed	As installed
30*	Landing gear and gear selector position		Discrete	4	–	–
31*	Engine exhaust gas temperature (T4)		As installed	1	As installed	
32*	Turbine inlet temperature (TIT/ITT)		As installed	1	As installed	
33*	Fuel contents		As installed	4	As installed	
34*	Altitude rate		As installed	1	As installed	
35*	Ice detection		As installed	4	As installed	
36*	Helicopter health and usage monitor system		As installed	–	As installed	

37	Engine control modes		Discrete	1	—	–
38*	Selected barometric setting (pilot and co-pilot)		As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)
39*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable		As installed	1	As installed	Sufficient to determin

	modes of operation)					e crew selection
44*	Selected flight path (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
45*	Selected decision height		As installed	4	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot and co-pilot)		Discrete(s)	4	—	—
47*	Multi-function/ engine/alerts display format		Discrete(s)	4	—	—
48*	Event marker		Discrete	1	—	—
49*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	

	position) and (operational status)					
50*	TCAS/ACAS (traffic alert and collision avoidance system) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
51*	Primary flight controls – pilot input forces	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Full range	0.125 (0.0625 recommended)	± 3% unless higher accuracy is uniquely required	0.5% of operating range
52*	Computed centre of gravity	Application for type certification is submitted to a Contracting State on or after 1	As installed	64	As installed	1% of full range

		January 2023				
53*	Helicopter computed weight	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range

(f) the substitution in Technical Standard 91.04.10 section 6 for the renaming of a Table in subsection (1) and the insertion of a subsequent Table of the following Table:

TABLE E1

PARAMETERS FOR AIRCRAFT DATA RECORDER SYSTEMS

Serial number	Parameter and Category	Minimum recording range	Maximum recording interval (seconds)	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading (magnetic or true) R*	±180 degrees	1	±2 degrees	0.5 degree	* If not available, record rates
2	Pitch attitude E*	±90 degrees	0.25	±2 degrees	0.5 degree	* If not available, record rates

3	Roll attitude E*	±180 degrees	0.25	±2 degrees	0.5 degree	* If not available, record rates
4	Yaw rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no heading available
5	Pitch rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no pitch attitude available
6	Roll rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no roll attitude available
7	Positioning system: latitude/ longitude E	Latitude: ±90 degrees Longitude: ±180 degrees	2 (1 if available)	As installed (0.00015 degree recom-mended)	0.00005 degree	-
8	Positioning system: estimated error E*	Available range	2 (1 if available)	As installed	As installed	*If available
9	Positioning system: altitude E	–300m (–1 000ft) to maximum certificated altitude of	2 (1 if available)	As installed (±50ft) (±15m)	5ft (1.5m)	-

		aircraft + 1 500m (5 000ft)		recom-mended)		
10	Positioning system: time* E	24 hrs	1	±.5 second	0.1 second	* UTC time preferred where available
11	Positioning system: ground speed E	0 – 1 000kt	2 (1 if available)	As installed (±5kt recom-mended)	1kt	-
12	Positioning system: channel E	0 – 360 degrees	2 (1 if available)	As installed (±2 degrees recom-mended)	0.5 degree	-
13	Normal acceleration E	–3g to +6g	0.25 (0.125 if available)	As installed (±0.09g excluding a datum error of ±0.45g recom-mended)	0.004g	-
14	Longitudinal acceleration E	±1g	0.25 (0.125 if available)	As installed (±0.015g excluding	0.004g	-

				a datum error of ±0.05g recom-mended)		
15	Lateral acceleration E	±1g	0.25 (0.125 if available)	As installed (±0.015g excluding a datum error of ±0.05g recom-mended)	0.004g	-
16	External static pressure (or pressure altitude) R	34.4mb (3.44in-Hg) to 310.2mb (31.02in-Hg) or available sensor range	1	As installed (±1mb) (0.1in-Hg) or ±100ft (±30m) to ±700ft (±210m) recom-mended)	0.1mb (0.01in-Hg) or 5ft (1.5m)	-
17	Outside air temperature (or total air temperature) R	-50° to +90°C or available sensor range	2	As installed (±2°C recom-mended)	1°C	-

18	Indicated air speed R	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recom-mended)	1kt (0.5kt recom-mended)	-
19	Engine RPM R	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	-
20	Engine oil pressure R	Full range	Each engine each second	As installed (5% of full range recom-mended)	2% of full range	-
21	Engine oil temperature R	Full range	Each engine each second	As installed (5% of full range recom-mended)	2% of full range	-
22	Fuel flow or pressure R	Full range	Each engine each second	As installed	2% of full range	-

23	Manifold pressure R	Full range	Each engine each second	As installed	0.2% of full range	-
24	Engine thrust/ power/ torque parameters required to determine propulsive thrust/ power* R	Full range	Each engine each second	As installed	0.2% of full range	* Sufficient parameters e.g. EPR/N1 or torque/ Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed should be provided.
25	Engine gas generator speed (Ng) R	0 – 150%	Each engine each second	As installed	0.2% of full range	-
26	Free power turbine	0 – 150%	Each engine	As installed	0.2% of full range	-

	speed (Nf) R		each second			
27	Coolant temperature R	Full range	1	As installed (±5° C recom-mended)	1° C	-
28	Main voltage R	Full range	Each engine each second	As installed	1 Volt	-
29	Cylinder head temperature R	Full range	Each engine each second	As installed	2% of full range	-
30	Flaps position R	Full range or each discrete position	2	As installed	0.5 degree	-
31	Primary flight control surface position R	Full range	0.25	As installed	0.2% of full range	-
32	Fuel quantity R	Full range	4	As installed	1% of full range	-
33	Exhaust gas temperature R	Full range	Each engine each second	As installed	2% of full range	-

34	Emergency voltage R	Full range	Each engine each second	As installed	1 Volt	-
35	Trim surface position R	Full range or each discrete position	1	As installed	0.3% of full range	-
36	Landing gear position R	Each discrete position*	1	Each gear every two seconds	-	* Where available, record up-and-locked and down-and-locked position
37	Novel/ unique aircraft features R	As required	As required	As required	As required	-

Note: The following requirements shall apply with effect from 1 January 2023 and shall replace Table E1..

TABLE F1

PARAMETER GUIDANCE CHARACTERISTICS FOR AIRCRAFT DATA RECORDING SYSTEMS

N°	Parameter name	Parameter category	Minimum	Maximum recording	Minimum recording accuracy	Minimum recording	Remarks

			recording range	interval in seconds		resolution	
1	Heading: a) Heading (Magnetic or True) b) Yaw rate		 ±180° ±300°/s	 1 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Heading is preferred, if not available, yaw rate shall be recorded
2	Pitch: A) Pitch attitude b) Pitch rate		 ±90° ±300°/s	 0.25 0.25	 ±2° ±1% + drift of 360°/h	 0.5° 2°/s	*Pitch attitude is preferred, if not available, pitch rate shall be recorded
3	Roll: (a)Roll attitude (b) Roll rate		 ±180° ±300°/s	 0.25 0.25	 ±2° ±1% + drift of 360°/h	 0.5° 2°/s	*Roll attitude is preferred, if not available, roll rate shall be recorded
4	Positioning system (a)Time (b)Latitude/Longitude (c) Altitude (d) Ground speed		24 hours Latitude: ±90° Longitude: ±180° –300 m (–1 000 ft) to maxi	1 2 (if available) 2 (if available)	±0.5° As installed (0.00015° recommended) As installed	0.1° 0.00005° 1.5m(5 ft) 1 kt 0.5°	UCT time preferred where available

	(e)Track (f) Estimate error		mum certificated altitude of aircraft +1 500 m (5 000 ft) 0-1 000 kt 0-360° Available range	2 (if available) 2 (if available) 2 (if available)	(±15 m (±50 ft) recommended) As installed (±5 kt recommended) As installed (±2t recommended) As installed	As installed	Shall be recorded if readily available
5	Normal acceleration		–3 g to + 6g	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of	0.004 g	

					±0.05 g recommended)		
6	Longitudinal acceleration		±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration		±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)		34.4 hPa (1.02 in-Hg) to 310.2 hPa	1	As installed (±1 hPa (0.3 in-Hg) or ±30 m (±100 ft)	0.1 hPa (0.03 in-Hg) or 1.5 m (5 ft)	

			(9.16 in-Hg) or availa ble senso r range		to ±210 m (±700 ft) recomm ended)		
9	Outside air temperature (or total air temperature)		–50° to +90°C or availa ble senso r range	2	As installed (±2°C recomm ended)	1°C	
10	Indicated air speed		As the install ed pilot displa y meas uring syste m or availa ble senso r range	1	As installed (±3% recomm ended)	1 kt (0.5 kt recomm ended)	

11	Main rotor speed (Nr)		50% to 130% or availa ble senso r range	0.5	As installed	0.3% of full range	
12	Engine RPM (*)		Full range includi ng overs peed conditi on	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters
13	Engine oil pressure		Full range	Each engine each second	As installed (5% of full range recomm ended)	2% of full range	
14	Engine oil temperature		Full range	Each engine each second	As installed (5% of full range recomm ended)	2% of full range	

15	Fuel flow or pressure		Full range	Each engine each second	As installed	2% of full range	
16	Manifold pressure (*)		Full range	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters
17	Engine thrust/power/ torque parameters required to determine propulsive thrust/power*		Full range	Each engine each second	As installed	0.1% of full range	*Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power. A margin for possible overspeed should be provided. Only for turbine-engined helicopters.
18	Engine gas generator speed (Ng) (*)		0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
19	Free power turbine speed (Nf) (*)		0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters

20	Collective pitch		Full range	0.5	As installed	0.1% of full range	
21	Coolant temperature (*)		Full range	1	As installed (±5°C recommended	1°C	*Only for piston-engined helicopters
22	Main voltage		Full range	Each engine each second	As installed	1 Volt	
23	Cylinder head temperature (*)		Full range	Each cylinder each second	As installed	2% of full range	*Only for piston-engined helicopters
24	Fuel quantity		Full range	4	As installed	1% of full range	
25	Exhaust gas temperature		Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage		Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position		Full range or each discre	1	As installed	0.3% of full range	

			te positio n				
28	Landing gear position		Each discre te positio n*	Each gear every two second s	As installed		*Where available, record up-and-locked and down-and-locked position
29	Novel/unique aircraft features		As requir ed	As require d	As required	As required	

(g) the addition in Technical Standard 91.04.10.1 subsection (3) after paragraph (iv) of the following Note:

"Note: The following requirements shall be applicable with effect from 1 January 2023, and shall replace the requirements of subsection (3) paragraph (h) (table for parameters to be recorded by FDR):

(h) the insertion in Technical Standard 91.04.10.3 after sub-section (5) of the following sub-section:

"(5A) Installation of flight recorder systems

Note: The following requirements apply with effect from 1 January 2023

(a) Flight data recorder shall be non-deployable container or automatic deployable container

The following requirements shall be applicable with effect from 1 January 2023.

1.1 Non-deployable flight recorder containers shall be painted with a distinctive orange colour.

1.2 Non-deployable crash-protected flight recorder containers shall:

(a) carry reflective material to facilitate their location; and

(b) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 KHz and this device shall operate for a minimum of 90 days.

1.3. Automatic deployable flight recorder containers shall:

(a) be painted a distinctive orange colour, however the surface visible from outside an aircraft may be of another colour;

(b) carry reflective material to facilitate their location; and

(c) have an integrated automatically activated ELT.

1.4. Installation of the flight recorder shall ensure:

(a) the probability of damage to the recordings is minimised;

(b) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly;

(c) if the flight recorder systems have a erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact; and

(d) aeroplanes for which the individual certificate of airworthiness is first issued on or after 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of inadvertent activation of an erase function during an accident shall also be minimised;

Note.— The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but would not prevent accident investigation authorities access to such recordings by specialized replay or copying techniques.

(e) the flight recorder systems shall be installed to receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder systems without jeopardising service to essential or emergency loads;

(f) the flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate; and

(g) means shall be provided for an accurate time correlation between the flight recorder systems recordings.

1.5 The manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recorder systems:

(a) manufacturer's operating instructions, equipment limitations and installation procedures;

(b) parameter origin or source and equations which relate counts to units of measurement; and

(c) manufacturer's test reports or reports from a service provider."

(i) the renaming of the Table and the insertion of Table G1 in Technical Standard 91.04.10 after sub-section (1) of the following subsection(3)(i):

TABLE G1

PARAMETERS FOR AEROPLANE FLIGHT DATA RECORDERS

Serial number	**Parameter**	**Measurement range**	**Maximum sampling and recording interval (seconds)**	**Accuracy limits (sensor input compared to FDR read-out)**	**Recording resolution (Note 1)**
1	Time (UTC when available, otherwise	24 hours	4	± 0.125% per hour	1 second

	relative time count or GPS time sync)				
2	Pressure altitude	–1 000ft (–300m) to maximum certificated altitude of aircraft +5000ft (+1 500m)	1	± 100ft to ±700ft (±30m to ± 200m)	5ft (1.5m)
3	Indicated airspeed or calibrated airspeed	50kt to max Vso (Note 2) Vso to 1.2 VD (Note 3)	1	± 5% ± 3%	1kt (0.5kt recommended
4	Heading (primary flight crew reference)	360°	1	± 2°	0.5°
5	Normal acceleration (Note 4)	–3g to +6g	0.125	±1% of maximum range excluding datum error of ± 5%	0.004g
6	Pitch attitude	±75° or usable range whichever is greater	1 (0.25 Note 1)	± 2°	0.5°
7	Roll attitude	± 180°	1 (0.25 Note 1)	± 2°	0.5°

8	Radio transmission keying	On-off (one discrete)	1	-	-
9	Power on each engine (Note 5)	Full range	1 (per engine)	± 2°	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control section	Full range on each discrete position	2	± 5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
11*	Leading edge flap and cockpit control section	Full range on each discrete position	2	± 5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position	Stowed, in transit, and reverse	1 (per engine)	-	-
13*	Ground spoiler/ speed brake selection (selection and position)	Full range on each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature	Sensor range	2	± 2°C	0.3° C
15*	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discretes	1	-	-
16	Longitudinal acceleration (Note 4)	±1g	0.25	±0.015g excluding a datum	0.004g

				error of ±0.05g	
Note – *The preceding 16 parameters satisfy the requirements for a Type II FDR*					
17	Lateral acceleration (Note 4)	±1g	0.25	±0.015g excluding a datum error of ±0.05g	0.004g
18	Pilot input and/or control surface position – primary controls (pitch, roll, yaw) (Notes 6 and 7)	Full range	1 (0.25 Note 1)	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude	– 20ft to 2 500ft (–6m to 750m)	1	±2ft (±0.6m) or ±3% whichever is greater below 500ft (150m) and ±5% above 500ft (150m)	1ft (0.3m) below 500ft (150m); 1ft (0.3m)/0.5% of full range above 500ft (150m)

21*	Vertical beam deviation (ILS/GPS/ GLS glide path, MLS elevation, IRNAV/ IAN vertical deviation)	Signal range	1	±3%	0.3% of full range
22*	Horizontal beam deviation (ILS/GPS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)	Signal range	1	±3%	0.3% of full range
23	Marker beacon passage	Discrete	1	-	-
24	Master warning	Discrete	1	-	-
25	Each NAV receiver frequency selection (Note 8)	Full range	4	As installed	-
26*	DME 1 and 2 distance (includes distance to runway threshold (GLS) and distance to missed approach point (IRNAV/IAN)) (Notes 8 and 9)	0 – 200NM (0 – 370km)	4	As installed	1NM (1852m)
27	Air/ground status	Discrete	1	-	-
28*	GPWS/TAWS/GCAS status (selection of terrain display mode	Discrete	1	-	-

	including pop-up display status and terrain alerts, both cautions and warnings, and advisories and on/off switch position)				
29*	Angle of attack	Full range	0.5	As installed	0.3% of full range
30*	Hydraulics, each system (low pressure)	Discrete	2	-	0.5% of full range
31*	Navigation data (latitude/longitude, ground speed and drift angle) (Note 10)	As installed	1	As installed	-
32*	Landing gear or gear selector position	Discrete	4	As installed	-
Note – *The preceding 32 parameters satisfy the requirements for a Type I FDR*					
33*	Groundspeed	As installed	1	Data shall be obtained from the most accurate system	1kt
34	Brakes (left and right brake pressure, left and right brake pedal position)	(Maximum metered brake range,	1	±5%	2% of full range

		discretes or full range)			
35*	Additional engine parameters (EPR, N1, indicated vibration level, N2, EGT, fuel flow, fuel cut-off lever position, N3)	As installed	Each engine each second	As installed	2% of full range
36*	ACAS (airborne collision avoidance system)	Discretes	1	As installed	-
37*	Windshear warning	Discrete	1	As installed	-
38*	Selected barometric setting (pilot, co-pilot)	As installed	64	As installed	0.1mb (0.01in-Hg)
39*	Selected altitude (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection

43*	Selected heading (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path (IRNAV/IAN))	-	1	As installed	-
45*	Selected decision height	As installed	64	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot, co-pilot)	Discrete(s)	4	As installed	-
47*	Multi-function/ engine/alerts display format	Discrete(s)	4	As installed	-
48*	AC electrical bus status	Discrete(s)	4	As installed	-
49*	DC electrical bus status	Discrete(s)	4	As installed	-
50*	Engine bleed valve position	Discrete(s)	4	As installed	-
51*	APU bleed valve position	Discrete(s)	4	As installed	-
52*	Computer failure	Discrete(s)	4	As installed	-
53*	Engine thrust command	As installed	2	As installed	-

54*	Engine thrust target	As installed	4	As installed	2% of full range
55*	Computed centre of gravity	As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank	As installed	64	As installed	1% of full range
57*	Head up display in use	As installed	4	As installed	-
58*	Para visual display on/off	As installed	1	As installed	-
59*	Operational stall protection, stick shaker and pusher activation	As installed	1	As installed	-
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)	As installed	4	As installed	-
61*	Ice detection	As installed	4	As installed	-
62*	Engine warning each engine vibration	As installed	1	As installed	-
63*	Engine warning each engine over temperature	As installed	1	As installed	-

64*	Engine warning each engine oil pressure low	As installed	1	As installed	-
65*	Engine warning each engine over speed	As installed	1	As installed	-
66*	Yaw trim surface position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll trim surface position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle	Full range	1	±5%	0.5
69*	De-icing and/or anti-icing systems selection	Discrete(s)	4	±5%	-
70*	Hydraulic pressure (each system)	Full range	2	±5%	100psi
71*	Loss of cabin pressure	Discrete	1	±5%	-
72*	Cockpit trim control input position – Pitch	Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position – Roll	Full range	1	±5%	0.2% of full range or as installed

74*	Cockpit trim control input position – Yaw	Full range	1	±5%	0.2% of full range or as installed
75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)	Full range (±311N (±70lbf), ± 378N (±85lbf), ± 734N (±165lbf))	1	±5%	0.2% of full range or as installed
76*	Event marker	Discrete	1	-	-
77*	Date	365 days	64	-	-
78*	ANP or EPE or EPU	As installed	4	As installed	-
Note – *The preceding 78 parameters satisfy the requirements for a Type IA FDR*					

Note: The following requirements shall be applicable with effect from 1 January 2023, and shall replace the requirements of Table G1 in total with the effect of 1 January 2023

TABLE H1						
PARAMETERS FOR AEROPLANE FLIGHT DATA RECORDERS						
Serial Number	**Parameter**	**Applicability**	**Measurement range**	**Maximum sampling and recording interval**	**Accuracy limits (sensor input compared to FDR read-out)**	**Recording resolution**

				(seconds)		
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	±0.125%/h	1s
2	Pressure-altitude		–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max V_{so} *(note 1)* V_{so} to 1.2 V_D *(note 2)*	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5	Normal acceleration *Note 8*	Application for type certification is submitted to a Contracting State	–3 g to +6 g	0.125	±1% of maximum range excluding datum error of ±5%	0.004 g

		before 1 January 2016 Application for type certification is submitted to a Contracting State on or after 1 January 2016	–3 g to +6 g	0.0625	±1% of maximum range excluding datum error of ±5%	0.004 g
6	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude		±180°	0.25	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1		
9	Power on each engine *Note 3*		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft

10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position		Stowed, in transit, &reverse		1 (per engine)	
13*	Ground spoiler/speed brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discretes	1		
16	Longitudinal acceleration *Note 8*	Application for type certification	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g

		submitted to a Contracting State before 1 January 2016				
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17	Lateral acceleration *Note 8*	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004
		Application for type	±1 g	0.0625	±0.015 g	0.004 g

		certification submitted to a Contracting State on or after 1 January 2016			excluding a datum error of ±0.05 g	
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) *notes 4&8*	Application for type certification submitted to a Contracting State before 1 January 2016	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	±2° unless higher accuracy uniquely required	0.2% of full range or as installed

19	Pitch trim position		Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude		–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
21*	Vertical beam deviation (ILS/GNSS/GLS glide path, MLS elevation, IRNAV/IAN vertical deviation)		Signal range	1	±3%	0.3% of full range
22*	Horizontal beam deviation (ILS/GNSS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)		Signal range	1	±3%	0.3% of full range
23	Marker beacon passage		Discrete	1		
24	Master warning		Discrete	1		

25	Each NAV receiver frequency Selection *note 5*		Full range	4	As installed	
26*	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/IAN)) *notes 5 &6*		0 – 370 km (0 – 200 NM)	4	As installed	1 852 m (1 NM)
27	Air/ground status		Discrete	1		
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)		Discrete	1		
29*	Angle of attack		Full range	0.5	As installed	0.3 % of full range
30*	Hydraulics, each system		Discrete	2		0.5% of full range

	(low pressure)					
31*	Navigation data (latitude/longitude, ground speed, and drift angle) *note 7*		As installed	1	As installed	
32*	Landing gear and gear selector position		Discrete	4	As installed	
33*	Groundspeed		As installed	1	Data shall be obtained from the most accurate system	1 kt
34	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N_1, indicated vibration level, N_2, EGT, fuel flow, fuel cut-off lever position, N_3, engine fuel metering valve position)	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on	As installed	Each engine each second	As installed	2% of full range

		or after 1 January 2023				
36*	TCAS/ACAS (traffic alert and collision avoidance system)		Discrete	1	As installed	
37*	Wind shear warning		Discrete	1	As installed	
38*	Selected barometric setting (pilot, co-pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot		As installed	1	As installed	Sufficient to determine

	selectable modes of operation)					crew selection
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path (IRNAV/IAN))			1	As installed	
45*	Selected decision height		As installed	64	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot, co-pilot)		Discrete(s)	4	As installed	
47*	Multi-function/engine/alerts display format		Discrete(s)	4	As installed	
48*	AC electrical bus status		Discrete(s)	4	As installed	
49*	DC electrical bus status		Discrete(s)	4	As installed	
50*	Engine bleed valve position		Discrete(s)	4	As installed	
51*	APU bleed valve position		Discrete(s)	4	As installed	
52*	Computer failure		Discrete(s)	4	As installed	
53*	Engine thrust command		As installed	2	As installed	

54*	Engine thrust target		As installed	4	As installed	2% of full range
55*	Computed centre of gravity		As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank		As installed	64	As installed	1% of full range
57*	Head up display in use		As installed	4	As installed	
58*	Para visual display on/off		As installed	1	As installed	
59*	Operational stall protection, stick shaker and pusher activation		As installed	1	As installed	
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)		As installed	4	As installed	
61*	Ice detection		As installed	4	As installed	
62*	Engine warning each engine vibration		As installed	1	As installed	
63*	Engine warning each engine over temperature		As installed	1	As installed	
64*	Engine warning each engine oil pressure low		As installed	1	As installed	

65*	Engine warning each engine over speed		As installed	1	As installed	
66*	Yaw trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle		Full range	1	±5%	0.5°
69*	De-icing and/or anti-icing systems selection		Discrete(s)	4		
70*	Hydraulic pressure (each system)		Full range	2	±5%	100 psi
71*	Loss of cabin pressure		Discrete	1		
72*	Cockpit trim control input position, Pitch		Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll		Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position, Yaw		Full range	1	±5%	0.2% of full range or as installed

75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)		Full range (±311 N (±70 lbf), ± 378 N (±85 lbf), ± 734 N (±165 lbf))	1	±5%	0.2% of full range or as installed
76*	Event marker		Discrete	1		
77*	Date		365 days	64		
78*	ANP or EPE or EPU		As installed	4	As installed	
79*	Cabin pressure altitude	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed (0 ft to 40 000 ft recommended)	1	As installed	100 ft
80*	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range

81*	Flight director command	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	± 2°	0.5°
82*	Vertical speed	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	0.25	As installed (32 ft/min recommended)	16 ft/min

Notes.—

1. V_{so} stalling speed or minimum steady flight speed in the landing configuration is in Section "Abbreviations and Symbols".

2. V_D design diving speed.

3. Record sufficient inputs to determine power.

4. For aeroplanes with control systems in which movement of a control surface shall back drive the pilot's control, "or" applies. For aeroplanes with control systems in which movement of a control surface shall not back drive the pilot's control, "and" applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable *in lieu* of

recording each surface separately. In aeroplanes with independent pilot input on primary controls, each pilot input on primary controls needs to be recorded separately.

5. If signal available in digital form.

6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.

7. If signals readily available.

8. It is not intended that aeroplanes issued with an individual certificate of airworthiness before 1 January 2016 be modified to meet the measurement range, maximum sampling and recording interval, accuracy limits or recording resolution description detailed in this Part.

9. The number of parameters to be recorded shall depend on aeroplane complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of aeroplane complexity

(j) the renaming of the Table and insertion after Table G1 in Technical Standard 91.04.10 after section 6 (1) of the following Table:

6. Aircraft data recording systems

(1) An **[Operators]** operator of aircraft using aircraft data recording systems (ADRS) shall ensure the ADRS is capable of recording, as appropriate to the aeroplane, at least the essential (E) parameters in the following Table –

TABLE I1

PARAMETERS FOR AIRCRAFT DATA RECORDER SYSTEMS

Serial number	Parameter and Category	Minimum recording range	Maximum recording interval (seconds)	Minimum recording accuracy	Minimum recording resolution	Remarks

1	Heading (magnetic or true) R*	±180 degrees	1	±2 degrees	0.5 degree	*If not available, record rates
2	Pitch attitude E*	±90 degrees	0.25	±2 degrees	0.5 degree	*If not available, record rates
3	Roll attitude E*	±180 degrees	0.25	±2 degrees	0.5 degree	*If not available, record rates
4	Yaw rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no heading available
5	Pitch rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no pitch attitude available
6	Roll rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no roll attitude available
7	Positioning system: latitude/longitude E	Latitude: ±90 degrees Longitude: ±180 degrees	2 (1 if available)	As installed (0.00015 degree recom-mended)	0.00005 degree	-
8	Positioning system: estimated error E*	Available range	2 (1 if available)	As installed	As installed	*If available
9	Positioning system: altitude E	-300m (-1 000ft) to	2 (1 if available)	As installed	5ft (1.5m)	-

		maximum certificated altitude of aircraft +1 500m (5 000ft)		(±50ft (±15m) recom-mended)		
10	Positioning system: time* E	24 hrs	1	±.5 second	0.1 second	*UTC time preferred where available
11	Positioning system: ground speed E	0 – 1 000kt	2 (1 if available)	As installed (±5kt recom-mended)	1kt	-
12	Positioning system: channel E	0 – 360 degrees	2 (1 if available)	As installed (±2 degrees recom-mended)	0.5 degree	-
13	Normal acceleration E	-3g to +6g	0.25 (0.125 if available)	As installed (±0.09g excluding a datum error of ±0.45g recom-mended)	0.004g	-

14	Longitudinal acceleration E	±1g	0.25 (0.125 if available)	As installed (±0.015g excluding a datum error of ±0.05g recom-mended)	0.004g	-
15	Lateral acceleration E	±1g	0.25 (0.125 if available)	As installed (±0.015g excluding a datum error of ±0.05g recom-mended)	0.004g	-
16	External static pressure (or pressure altitude) R	34.4mb (3.44in-Hg) to 310.2mb (31.02in-Hg) or available sensor range	1	As installed (±1mb (0.1in-Hg) or ±100ft (±30m) to ±700ft (±210m) recom-mended)	0.1mb (0.01in-Hg) or 5ft (1.5m)	-
17	Outside air temperature (or total air temperature) R	-50° to +90°C or available	2	As installed (±2°C	1°C	-

		sensor range		recom-mended)		
18	Indicated air speed R	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recom-mended)	1kt (0.5kt recom-mended)	-
19	Engine RPM R	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	-
20	Engine oil pressure R	Full range	Each engine each second	As installed (5% of full range recom-mended)	2% of full range	-
21	Engine oil temperature R	Full range	Each engine each second	As installed (5% of full range recom-mended)	2% of full range	-
22	Fuel flow or pressure R	Full range	Each engine each second	As installed	2% of full range	-

23	Manifold pressure R	Full range	Each engine each second	As installed	0.2% of full range	-
24	Engine thrust/power/torque parameters required to determine propulsive thrust/ power* R	Full range	Each engine each second	As installed	0.2% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed shall be provided.
25	Engine gas generator speed (Ng) R	0 – 150%	Each engine each second	As installed	0.2% of full range	-
26	Free power turbine speed (Nf) R	0 – 150%	Each engine each second	As installed	0.2% of full range	-

27	Coolant temperature R	Full range	1	As installed (±5°C recom-mended)	1°C	-
28	Main voltage R	Full range	Each engine each second	As installed	1 Volt	-
29	Cylinder head temperature R	Full range	Each engine each second	As installed	2% of full range	-
30	Flaps position R	Full range or each discrete position	2	As installed	0.5 degree	-
31	Primary flight control surface position R	Full range	0.25	As installed	0.2% of full range	-
32	Fuel quantity R	Full range	4	As installed	1% of full range	-
33	Exhaust gas temperature R	Full range	Each engine each second	As installed	2% of full range	-
34	Emergency voltage R	Full range	Each engine each second	As installed	1 Volt	-

35	Trim surface position R	Full range or each discrete position	1	As installed	0.3% of full range	-
36	Landing gear position R	Each discrete position*	1	Each gear every two seconds	-	*Where available, record up-and-locked and down-and-locked position
37	Novel/unique aircraft features R	As required	As required	As required	As required	-

(2) Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator. The documentation needs to be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

(3) The documentation referred to in paragraph (2) shall be in electronic format where possible and take account of industry standards.

Note – *Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.*

Note :The following requirements shall be applicable with effect from 1 January 2023 and shall replace the requirements of Table I1 with the effect from 1 January 2023

TABLE J1:

Parameter Guidance Characteristics for Aircraft Data Recording Systems

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading: a) Heading (Magnetic or True) b) Yaw rate	±180° ±300°/s	1 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Heading is preferred, if not available, yaw rate shall be recorded
2	Pitch: A) Pitch attitude b) Pitch rate	±90° ±300°/s	0.25 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Pitch attitude is preferred, if not available,pitch rate shall be recorded
3	Roll: (a)Roll attitude (b) Roll rate	±180° ±300°/s	0.25 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Roll attitude is preferred, if not available, roll rate shall be recorded

4	Positioning system (a)Time (b)Latitude/Longitude (c) Altitude (d) Ground speed (e)Track (f) Estimate error	24 hours Lattitude: ±90° Longitude: ±180° –300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (5 000 ft) 0-1 000 kt 0-360° Available range	1 2 (if available) 2 (if available) 2 (if available) 2 (if available) 2 (if available)	±0.5s As installed (0.00015° recommended) As installed (±15 m (±50 ft) recommended) As installed (±5 kt recommended) As installed (±2° recommended) As installed	0.1 0.00005° 1.5m (5 ft) 1 kt 0.5° As installed	UCT time preferred where available Shall be recorded if readily available
5	Normal acceleration	–3 g to + 6g	0.25 (0.125 if available)	As installed (±0.09 g excluding a	0.004 g	

				datum error of ±0.045 g recommended)		
6	Longitudinal acceleration	±1 g(*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g(*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	–50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	

10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
11	Engine RPM (*)	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
13	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	

16	Engine thrust/power/ torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed shall be provided
17	Engine gas generator speed (Ng)	0–150%	Each engine each second	As installed	0.2% of full range	
18	Free power turbine speed (Nf)	0–150%	Each engine each second	As installed	0.2% of full range	
19	Coolant temperature (*)	Full range	1	As installed (±5°C recommended	1°C	

20	Main voltage	Full range	Each engine each second	As installed	1 Volt	
21	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range	
22	Fuel quantity	Full range	4	As installed	1% of full range	
23	Primary flight control surface position	Full range	0.25	As installed	0.2% of full range	
24				As installed		
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		*Where available, record up-and-locked and down-

						and-locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	

(k) the insertion after Technical Standard 91.04.10 of the following Technical Standard:

"91.04.11 Seats, seat safety belts, harnesses and child restraint devices and carriage of infants

(1) An owner or operator of an aircraft shall not operate the aircraft unless such aircraft is equipped, as applicable, for the carriage of infants with-

(a) an air service operator shall ensure that an infant is only carried when properly secured in the arms or on the lap of an adult passenger, or with a child restraint system or in a sky cot.

(b) a sky cot may be used provided that it-

(i) is restrained so as to prevent it from moving under the maximum accelerations to be expected in flight;

(ii) is fitted with a restraining device so as to ensure that the infant shall not be thrown from such sky cot under the maximum accelerations to be expected in flight;

(iii) may not be used during critical phases of flight;

(iv) shall be positioned in such a way that they do not prevent or hinder the movement of adjacent passengers or block exits;

(c) a child restraint system may be used provided that–

(i) infants shall not be carried behind a bulkhead unless a child restraint device is used during critical phases of flight and during turbulence.

(ii) an infant may be seated in a car-type infant seat, provided that the infants seat

(aa) is secured to the aeroplane seat in accordance with the instructions provided with the child seat;

(bb) is designed to be secured to a passenger seat by means of a single lap strap and face the same direction as the passenger seat;

(cc) of the lower part of the shell does not unreasonably extend beyond the forward position of the passenger seat cushion on which it rests;

(dd) is secured to the passenger seat at all times during flight, even when it is unoccupied by the child;

(ee) may not be removed only the infant shall be removed from an aircraft in an emergency evacuation;

(ff) is positioned in such a way that it does not prevent or hinder the movement of adjacent passengers or block exits;

(gg) is not placed in an aisle seat, depending on cabin configuration;

(hh) is used in accordance with infant weight limitations specified for such device;

(iii) is fitted with a single release harness, which secures the infant's lap, torso and shalers, but designed that the child can easily be secured in or removed from it; and

(iv) shall not be located in the same row or row directly forward or aft of an overwing emergency exit; or in the same row as any other exit unless such exit and row are separated by a bulkhead.

(d) When an infant is carried in the arms or on the lap of an adult passenger –

(i) the seat belt, when required to be worn, shall be fastened around the passenger carrying or nursing the infant, but not around the infant; and

(ii) the name of the infant shall be bracketed on the passenger list with the name of the person carrying or nursing the infant"."

(l) by the insertion after Technical Standard 91.05.4 of the following Technical Standard:

"91.05.5 Automatic Dependent Surveillance

1. Broadcast (ADS-B) Transmitting Equipment

(1) An aircraft operating in RVSM, Class A and any other airspace considered and approved through the appropriate structures shall use the **RTCA DO-260B / EUROCAE ED-102A**, as the adopted standard, unless a different standard has been specified by the Director.

(2) An aircraft with a MCTOW 5700KG or less and capable of a speed of up to 250 KIAS, operating below RVSM airspace but intending to operate in Class A, and any other airspace considered and approved through the appropriate structures, shall use the **RTCA DO-260A/EUROCAE ED-102** adopted standard, unless a different standard has been specified by the Director"."

(m) by the substitution in Technical Standard 91.06.13 for section 5 of the following section:

"5. Marshalling signals

(1) Upon observing or receiving any of the signals given in this TS, aircraft shall take such action as may be required by the interpretation of the signal given.

(2) The signals contained in this TS shall, when used, have the meaning indicated therein. They shall be used only for the purpose indicated and no other signals likely to be confused with them shall be used.

(3) A signalman shall be responsible for providing standard marshalling signals to aircraft in a clear and precise manner using the signals shown herein.

(4) A person shall not guide an aircraft unless trained, qualified and approved by the appropriate authority to carry out the functions of a signalman.

(5) A signalman shall wear a distinctive fluorescent identification vest to allow the flight crew to identify that he or she is the person responsible for the marshalling operation.

(6) Daylight-fluorescent wands, table-tennis bats or gloves shall be used for all signalling by all participating ground staff during daylight hours. Illuminated wands shall be used at night or in low visibility.

(7) Prior to using the following signals, the signalman must ascertain that the area within which an aircraft is to be guided is clear of objects which the aircraft, in complying with this Technical Standard, might otherwise strike –

(a) from a signalman to an aircraft –

Notes:

1. The design of many aircraft is such that the path of the wing tips, engines and other extremities cannot always be monitored visually from the flight deck while the aircraft is being manoeuvred on the ground.

2. These signals are designed for use by the signalman, with hands illuminated as necessary to facilitate observation by the pilot, and facing the aircraft in a position:

a. for fixed wing aircraft, on left side if aircraft, where best seen by the pilot; and;

b. for helicopters, where the signalman can best be seen by the pilot.

3. The meaning of the relevant signals remains the same if bats, illuminated wands or torchlights are held.

4. The aircraft engines are numbered for the signalman facing the aircraft, from right to left (i.e. No. 1 engine being the port outer engine).

5. Signals marked with an asterisk (*) are designed for use to hovering helicopters.

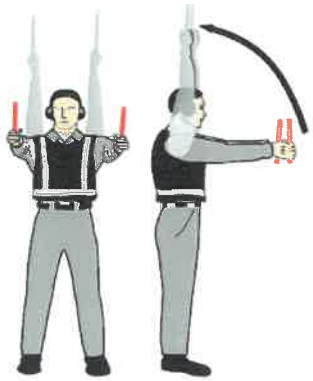
6. References to wands may also be read to refer to daylight-fluorescent table-tennis bats or gloves (daytime only).

7. References to the signalman may also be read to refer to marshaller.

1. Wingwalker/guide

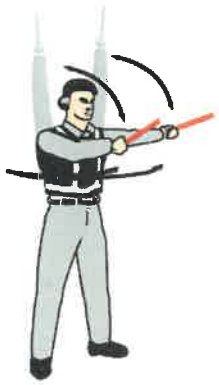
Raise right hand above head level with wand pointing up; move left-hand wand pointing down toward body.

Note.— This signal provides an indication by a person positioned at the aircraft wing tip, to the pilot/ marshaller/ push-back operator, that the aircraft movement on/off a parking position would be unobstructed.



2. Identify gate

Raise fully extended arms straight above head with wands pointing up.



3. Proceed to next signalman or as directed by tower/ground control

Point both arms upward; move and extend arms outward to sides of body and point with wands to direction of next signalman or taxi area.

4. Straight ahead

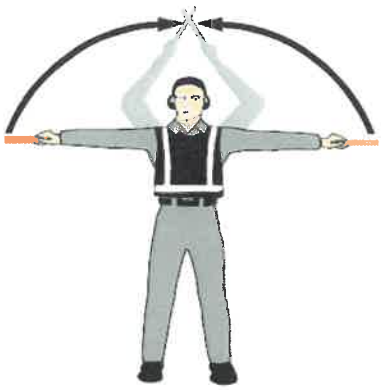
Bend extended arms at elbows and move wands up and down from chest height to head.

5 a). Turn left
(from pilot's point of view)

With right arm and wand extended at a 90-degree angle to body, make "come ahead" signal with left hand. The rate of signal motion indicates to pilot the rate of aircraft turn.

5 b). Turn right
(from pilot's point of view)

With left arm and wand extended at a 90-degree angle to body, make "come ahead" signal with right hand. The rate of signal motion indicates to pilot the rate of aircraft turn.



6 a). Normal stop

Fully extend arms and wands at a 90-degree angle to sides and slowly move to above head until wands cross.

6 b). Emergency stop

Abruptly extend arms and wands to top of head, crossing wands.

7 a). Set brakes

Raise hand just above shoulder height with open palm. Ensuring eye contact with flight crew, close hand into a fist. **Do not** move until receipt of "thumbs up" acknowledgement from flight crew.

7 b). Release brakes

Raise hand just above shoulder height with hand closed in a fist. Ensuring eye contact with flight crew, open palm. **Do not** move until receipt of "thumbs up" acknowledgement from flight crew.

8 a). Chocks inserted

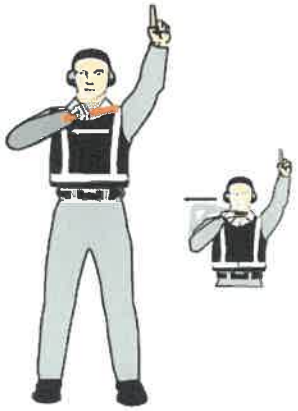
With arms and wands fully extended above head, move wands inward in a "jabbing" motion until wands touch. **Ensure** acknowledgement is received from flight crew.

8 b). Chocks removed

With arms and wands fully extended above head, move wands outward in a "jabbing" motion. **Do not** remove chocks until authorized by flight crew.

9. Start engine(s)

Raise right arm to head level with wand pointing up and start a circular motion with hand; at the same time, with left arm raised above head level, point to engine to be started.

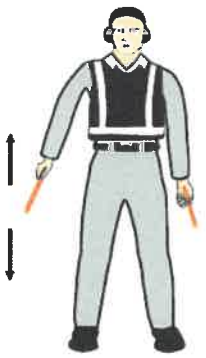


10. Cut engines

Extend arm with wand forward of body at shoulder level; move hand and wand to top of left shoulder and draw wand to top of right shoulder in a slicing motion across throat.

11. Slow down

Move extended arms downwards in a "patting" gesture, moving wands up and down from waist to knees.



12. Slow down engine(s) on indicated side

With arms down and wands toward ground, wave either *right* or *left* wand up and down indicating engine(s) on *left* or *right* side respectively should be slowed down.

13. Move back

With arms in front of body at waist height, rotate arms in a forward motion. To stop rearward movement, use signal 6 a) or 6 b).

14 a). Turns while backing (for tail to starboard)

Point left arm with wand down and bring right arm from overhead vertical position to horizontal forward position, repeating right-arm movement.

14 b). Turns while backing (for tail to port)

Point right arm with wand down and bring left arm from overhead vertical position to horizontal forward position, repeating left-arm movement.

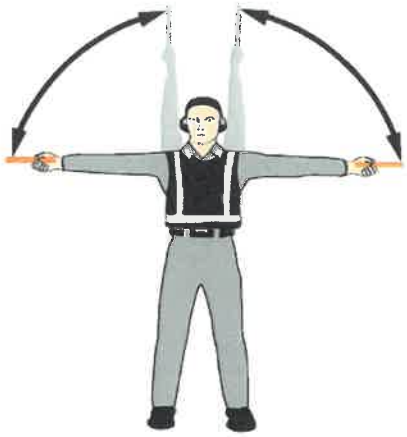
15. Affirmative/all clear

Raise right arm to head level with wand pointing up or display hand with "thumbs up"; left arm remains at side by knee.

Note.— This signal is also used as a technical/ servicing communication signal.

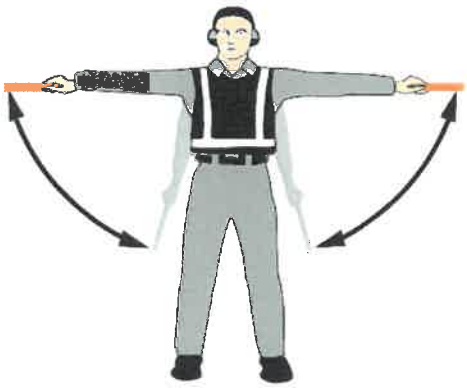
***16. Hover**

Fully extend arms and wands at a 90-degree angle to sides.



***17. Move upwards**

Fully extend arms and wands at a 90-degree angle to sides and, with palms turned up, move hands upwards. Speed of movement indicates rate of ascent.



***18. Move downwards**

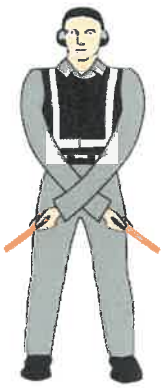
Fully extend arms and wands at a 90-degree angle to sides and, with palms turned down, move hands downwards. Speed of movement indicates rate of descent.

***19 a). Move horizontally left (from pilot's point of view)**

Extend arm horizontally at a 90-degree angle to right side of body. Move other arm in same direction in a sweeping motion.

***19 b). Move horizontally right (from pilot's point of view)**

Extend arm horizontally at a 90-degree angle to left side of body. Move other arm in same direction in a sweeping motion.



***20. Land**

Cross arms with wands downwards and in front of body.

21. Hold position/stand by

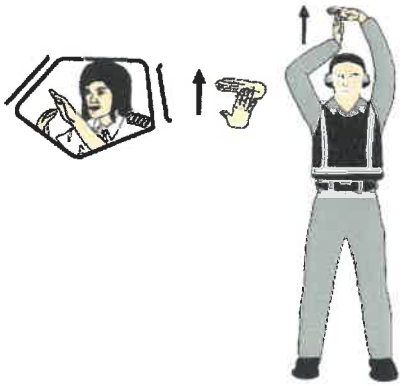
Fully extend arms and wands downwards at a 45-degree angle to sides. Hold position until aircraft is clear for next manoeuvre.

22. Dispatch aircraft

Perform a standard salute with right hand and/or wand to dispatch the aircraft. Maintain eye contact with flight crew until aircraft has begun to taxi.

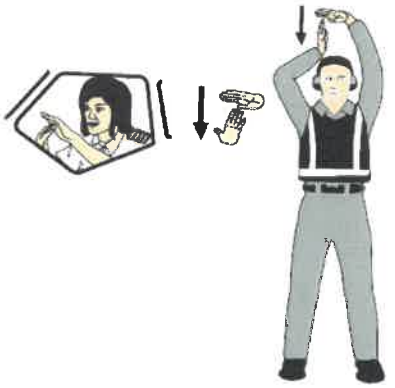
23. Do not touch controls (technical/servicing communication signal)

Extend right arm fully above head and close fist or hold wand in horizontal position; left arm remains at side by knee.



24. Connect ground power (technical/servicing communication signal)

Hold arms fully extended above head; open left hand horizontally and move finger tips of right hand into and touch open palm of left hand (forming a "T"). At night, illuminated wands can also be used to form the "T" above head.

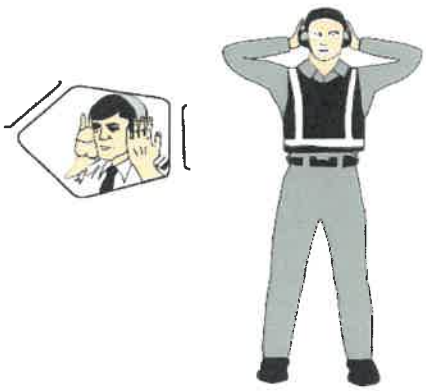


25. Disconnect power (technical/servicing communication signal)

Hold arms fully extended above head with finger tips of right hand touching open horizontal palm of left hand (forming a "T"); then move right hand away from the left. **Do not** disconnect power until authorized by flight crew. At night, illuminated wands can also be used to form the "T" above head.

26. Negative (technical/servicing communication signal)

Hold right arm straight out at 90 degrees from shoulder and point wand down to ground or display hand with "thumbs down"; left hand remains at side by knee.



27. Establish communication via interphone (technical/servicing communication signal)

Extend both arms at 90 degrees from body and move hands to cup both ears.

28. Open/close stairs (technical/servicing communication signal)

With right arm at side and left arm raised above head at a 45-degree angle, move right arm in a sweeping motion towards top of left shoulder.

Note.— This signal is intended mainly for aircraft with the set of integral stairs at the front.

5.1 From the pilot of an aircraft to a signalman

Notes:

1. *These signals are designed for use by a pilot in the cockpit with hands plainly visible to the signalman and illuminated as necessary to facilitate observation by the signalman.*
2. *The aircraft engines are numbered in relation to the signalman facing the aircraft, from right to left (i.e. No. 1 engine being the port outer engine).*

5.1.1 Brakes

Note – *The moment the fist is clenched, or the fingers are extended indicates, respectively, the moment of brake engagement or release.*

(a) Brakes engaged: raise arm and hand, with fingers extended, horizontally in front of face, then clench fist.

(b) Brakes released: raise arm, with fist clenched, horizontally in front of face, then extend fingers.

5.1.2 Chocks

(a) Insert chocks: arms extended, palms outwards, move hands inwards to cross in front of face.

(b) Remove chocks: hands crossed in front of face, palms outwards, move arms outwards.

5.1.3 Ready to start engine(s)

(a) Raise [raise] the appropriate number of fingers on one hand indicating the number of the engine to be started.

5.2 **Technical or servicing communication signals**

(a) Manual signals shall only be used when verbal communication is not possible with respect to technical or servicing communication signals.

(b) Signalmen shall ensure that an acknowledgement is received from the flight crew with respect to technical or servicing communication signals.

Note— The technical or servicing communication signals are included in this TS to standardize the use of hand signals used to communicate to flight crews during the aircraft movement process that relate to servicing or handling functions"."

(n) by the substitution of the note in Technical Standard 91.07.5 for the following note:

"*Note – Reference in this TS to "category" of aircraft (e.g.Category A aircraft) means the category based on the aircraft's stall speed in the landing configuration x 1.3 for departure, and the highest approach speed flown after passing the final approach fix during an approach and are as follows –*

(a) Category A – ≤**[90K]** 91kt;

(b) Category B – 91-**[120K]** 121kt;

(c) Category C – 121-**[140K]** 141kt;

(d) Category D – 141-**[165K]** 166kt; and

(e) Category E – >**[165K]** 166kt (not normally associated with civil aircraft)"."

(o) by substitution in section (1) of Technical Standard 91.07.34 for subsection (2) and (3) and the addition in section 3 after subsection (9) of the following of subsections:

"1. Introduction

(2) Installed EFBs may be incorporated during- **[the aeroplane type design, by a change to the type design or added by a supplemental type certificate.]**

(a) an aeroplane type design,

(b) by a change to the type design, or

(c) if added by a STC.

(3) Portable EFBs are not considered to be part of the certified aeroplane configuration. They do not require airworthiness approval but require an operational approval"."

[Note: Refer to section 2 for additional information concerning portable EFBs]

"3. Operational approval

(10) The EFB risk assessment to assess the risks associated with the use of each EFB function shall be done in accordance with the principles prescribed in Part 140 and be performed before the beginning of the approval process (if applicable) and its results shall be reviewed on a periodic basis.

(11) The EFB management system is responsible for hardware and software version and configuration management, maintenance of EFB security and integrity in accordance with documented policies and procedures and shall have an appropriately trained designate to be responsible for the system"."

(p) the insertion after Technical Standard 91.07.37 of the following Technical Standard:

"91.07.38 Operations in RNP designated airspace

1. RNP operation procedures manual

(1) An RNP operation procedures manual shall contain—

(a) the name of an operator; and

(b) the registration, make, and model of an aircraft to which it applies;

(c) the type, manufacturer, and model of an aircraft navigation system to which it applies;

(d) normal, abnormal and contingency procedures;

(e) flight crew and maintenance engineer qualification and proficiency requirements in accordance with the appropriate navigation specifications;

(f) a training program for relevant personnel consistent with the intended operations;

(g) a maintenance programme that ensures continued airworthiness in accordance with the appropriate navigation specifications, including procedures for the—

(i) test and inspection of each instrument and item of equipment required by technical standard 91.05.2 for RNP operations at intervals that ensure the RNP required for the particular operation is maintained; and

(ii) recording in the maintenance records the date, departure aerodrome, destination airport, and reasons for each RNP operation discontinued because of instrument or equipment malfunction.

(h) procedures and instructions related to—

(i) the mitigation of large navigational errors due to equipment malfunction or operational error;

(ii) in-flight drills that include cross checking procedures to identify navigation errors in sufficient time to prevent inadvertent deviation from ATC cleared routes;

(iii) updating the navigation system to ensure that the required RNP is maintained during operations in RNP designated airspace;

(iv) the maximum permissible deviations of the RNP system within the RNP designated airspace;

(v) the calculation of time limits to meet RNP criteria;

(vi) instrument and equipment failure warning systems;

(vii) system failure;

(viii) system monitoring and the collection of reliability and performance data; and

(ix) other procedures, instructions, and limitations that may be found necessary by the Authority.

TABLE 1- PBN Navigation specifications

NAV Spec	Intended Application	Optional functions and comments
RNAV10	To support 50nm lateral and 50nm longitudinal distance-based separation minima in oceanic and remote area airspace	Requires dual independent systems.
RNAV 5	Enroute phase of flight in airspace where 5nm lateral accuracy is required	
RNAV 1 and RNAV 2	Applicable to all ATS routes, including routings in the enroute domain, SIDs and STARs and IAPs up to the FAF. Primarily for use in a radar environment.	BARO-VNAV is optional.
RNP 4	To support 30nm lateral and the 30nm longitudinal distance-based separation minima in oceanic and remote area airspace.	Requires dual independent systems.
RNP 2	Intended for enroute operations in oceanic/ remote continental airspace, particularly areas with little or no ground NAVAIDS, limited or no ATS surveillance and low-medium density traffic.	Requires dual independent systems for oceanic/ remote continental airspace. Fixed radius transitions and parallel offset capabilities are optional.
RNP 1	Intended for routings connecting the enroute structure and terminal airspace with little or no ATS surveillance, with low or medium density traffic including SIDs and STARs, and IAPs up to the FAF.	Baro-VNAV and RF path terminators are optional
A-RNP	Designed for oceanic/ remote airspace, on	Requires dual independent

	the continental enroute structure and on arrival and departure routings and approaches.	systems for oceanic/ remote continental airspace to meet the higher continuity requirement. RF path terminator is required.
RNP APCH	Approach applications based on GNSS and minima designated as LNAV or LNAV/VNAV, and augmented GNSS with minima designated as LP or LPV.	RF path terminators are optional
RNP AR APCH	Intended for approach operations to airports where limiting obstacles exist and/or significant operational efficiencies can be gained.	Requires specific operator regulatory approval. Aircraft qualified in this category do not meet A-RNP requirements.
RNP 0.3	Intended for helicopter operations where benefit can be gained from a single accuracy or 0.3nm for all phases of flight.	
Radius to Fix Path Terminator	RF leg enables aircraft to fly a curved path of a defined radius between 2 waypoints. Can be used in the initial and intermediate approach segments, the final phase of a missed approach, SIDs and STARs.	Capability is a required function for A-RNP but optional for RNP 1, RNP 0.3 and RNP APCH.
Fixed Radius Transition	Intended to define transitions along airways where separation between parallel routings is also required in the transition, and the fly-by transition is not compatible with the separation criteria. The default radius is 15nm below FL 195 and 22.5nm above FL195; the turn radius can also be set to a value loaded from the nav database.	This is an optional function.
Barometric Vertical Nav	Enables the use of barometric altitude and area nav information in the definition of vertical flight paths, and vertical tracking to a path.	Baro- VNAV is an optional function

Notes:

1. Aircraft that are qualified for A-RNP need no further airworthiness examination for Nav accuracy or functional requirements for RNAV 5, RNAV 1 & 2, RNP 2, RNP 1 and RNP APCH nav specifications.
2. Aircraft that are qualified for RNP AR APCH need no further airworthiness examination for Baro-VNAV.
3. Aircraft that are qualified for RNP AR APCH with RF path terminators need no further airworthiness examination for RF path terminators.

Table 2: Application of Navigation Specification by Flight Phase

Nav Spec	FLIGHT PHASE (nm)							
	Enroute oceanic/ remote	Enroute continental	Arrival	Approach				Departure
				initial	Inter-mediate	Final	Missed	
RNAV 10	10							
RNAV 5		5	5					
RNAV 2		2	2					
RNAV 1		1	1	1	1		1	1
RNP 4	4							
RNP 2	2	2						
RNP 1			1	1	1		1	1
A-RNP	2	2 or 1	1	1	1	0.3	1	1
RNP APCH				1	1	0.3	1	
RNP AR APCH				1-0.1	1-0.1	0.3-0.1	1-0.1	
RNP 0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3"

AMENDMENT OF SA-CATS 93

18. Document SA-CATS 93 is hereby amended by:

(a) the insertion after Technical Standard 93.06.4 of the following Technical Standard:

"93.06.5 Safety inspections and audits

1. **Classifications of findings or non-compliance**

1.1 Level 1 Finding

A level 1 non-compliance or finding poses imminent danger, safety and security risk to persons in an aircraft or to persons or to property on the ground and shall necessitate the exercising of immediate discretionary enforcement powers vested in the inspectors, authorised officers and authorised persons in the interest of safeguarding aviation safety and security in line with section 115 and 116 of the Civil Aviation Act, 2009 (Act No. 13 of 2009) A level 1 finding is in all instances a safety concern and shall require remedial action acceptable to the Director within 24 hours by an approval holder.

1.2. Level 2 Finding

A level 2 non-compliance or finding poses a serious safety and security risk to persons in an aircraft or to persons or to property on the ground and shall be resolved within a short time frame. It shall be required of an approval holder to develop action plans within agreed time frames and follow-up inspections or audits to verify rectification of the non-compliances. A response containing a corrective action plan shall be acceptable to the Director within 7 days.

Note : *Previous findings, which have not been addressed (repetitive or continuous non-compliance findings or blatant disregard for the Authority findings), may be upgraded to a Level 2 or Level 1 finding.*

Note: *A level 2 or level 1 non-compliance on one part of the operation may not necessarily affect the whole operation*

1.3. Level 3 Finding:

A non-compliance / finding which shall not necessarily have an immediate direct impact on safety or security on its own. It is the responsibility of an approval holder to rectify and shall not necessitate a follow-up inspection. An approval holder is required to notify the Authority within a specified time frame, when rectification has been effected. These findings are normally administrative in nature. Generally, a response containing corrective actions shall be received within 14 working days.

1.4. Observation:

A practice or condition that indicates a trend that may lead to a future non-compliance, it is highly recommended that an operator shall respond to the observation"."

(b) the insertion after 93.07.29 in the Table of contents for the following headings:

"93.07.29 Safety features card

93.07.30 Seats, seat safety belts, harnesses and child restraint devices and carriage of infants.

93.08.1 General requirements";"

(c) the insertion after Technical Standard 93.07.29 of the following Technical Standard:

"93.07.30 Seats, seat safety belts, harnesses and child restraint devices and carriage of infants

(1) An owner or an operator of an aircraft shall not operate the aircraft unless such aircraft is equipped, as applicable, for the carriage of infants with:

(a) an air service operator which ensures that an infant is only carried when properly secured in the arms or on the lap of an adult passenger, or with a child restraint system or in a sky cot;

(b) a sky cot may be used provided that it-

(i) is restrained so as to prevent it from moving under the maximumaccelerations to be expected in flight;

(ii) is fitted with a restraining device so as to ensure that an infant shall not be thrown from such sky cot under the maximum accelerations to be expected in flight;

(iii) may not be used during critical phases of flight; and

(iv) shall be positioned in such a way that they do not prevent or finder the movement of adjacent passengers or block exits.

(c) a child restraint system may be used provided that–

(i) an infant shall not be carried behind a bulkhead unless a child restraint device is used during critical phases of flight and during turbulence;

(ii) an infant may be seated in a car-type infant seat, provided that an infant seat —

(aa) is secured to the aeroplane seat in accordance with the instructions provided with the child seat;

(bb) is designed to be secured to a passenger seat by means of a single lap strap and face the same direction as the passenger seat;

(cc) does not unreasonably extend beyond the forward position of the passenger seat cushion on which it rests;

(dd) is always secured to the passenger seat during flight, even when it is unoccupied by the child;

(ee) shall not be removed from the aircraft, only the infant shall be removed from the aircraft in an emergency evacuation;

(ff) is positioned in such a way that it does not prevent or hinder the movement of adjacent passengers or block exits;

(gg) is not placed in an aisle seat, depending on cabin configuration;

(hh) is used in accordance with infant weight limitations specified for such device;

(iii) is fitted with a single release harness, which secures the infant's lap, torso and shalers, but designed that the child can easily be secured in or removed from it; and

(iv) shall not be located in the same row or row directly forward or aft of an overwing emergency exit; or in the same row as any other exit unless such exit and row are separated by a bulkhead.

(d) When an infant is carried in the arms or on the lap of an adult passenger –

(i) the seat belt, when required to be worn, shall be fastened around the passenger carrying or nursing the infant, but not around the infant; and

(ii) where applicable, the name of the infant shall be bracketed on the passenger list with the name of the person carrying or nursing the infant"."

AMENDMENT OF SA-CATS 101

8. Subpart 3 of Document SA-CATS 101 is hereby deleted.

AMENDMENT OF TECHNICAL STANDARDS 121

9. Document SA-CATS 121 is hereby amended by-

(a) the substitution in Technical Standard 121.05.17 for section 3 of the following section:

"3. **Flight recorder specifications**

(1) Digital flight recorders shall comply with one of the following specifications as applicable:

(a) ARINC 542A;

(b) ARINC 573-717;

(c) ARINC 717; or

(d) ICAO Annex 6, Part I, Appendix 7.

(2) Flight data recorder shall be non-deployable container or automatic deployable container.

(d) the following requirements shall apply with effect from 1 January 2023:

(i) non deployable flight recorder containers shall be painted a distinctive orange colour;

(ii) non-deployable crash-protected flight recorder containers shall:

(aa) carry reflective material to facilitate their location; and

(bb) have securely attached an automatically activated underwater locating device operating at a frequency of 37.5 KHz, this device shall operate for a minimum of 90 days.

(e) automatic deployable flight recorder containers shall:

(i) be painted a distinctive orange colour, however the surface visible from outside an aircraft may be of another colour;

(ii) carry reflective material to facilitate their location; and

(iii) have an integrated automatically activated ELT.

(f) installation of the flight recorder

(i) the probability of damage to the recordings is minimised;

(ii) there is an aural or visual means for pre-flight checking that the flight recorder systems are operating properly;

(iii) if the flight recorder systems have an erasure device, the installation shall be designed to prevent operation of the device during flight time or crash impact;

(iv) an aeroplane for which the individual certificate of airworthiness is first issued on or after 1 January 2023, a flight crew-operated erase function shall be provided on the flight deck which, when activated, modifies the recording of a CVR and AIR so that it cannot be retrieved using normal replay or copying techniques. The installation shall be designed to prevent activation during flight. In addition, the probability of inadvertent activation of an erase function during an accident shall also be minimised;

Note.— The erase function is intended to prevent access to CVR and AIR recordings by normal replay or copying means, but shall not prevent accident investigation authorities access to such recordings by specialised replay or copying techniques.

(v) the flight recorder systems shall be installed so that they receive electrical power from a bus that provides the maximum reliability for operation of the flight recorder systems without jeopardizing service to essential or emergency loads;

(vi) the flight recorder systems, when tested by methods approved by the appropriate certificating authority, shall be demonstrated to be suitable for the environmental extremes over which they are designed to operate; and

(vii) means shall be provided for an accurate time correlation between the flight recorder systems recordings.

(3) A manufacturer shall provide the appropriate certificating authority with the following information in respect of the flight recorder systems:

(a) manufacturer's operating instructions, equipment limitations and installation procedures;

(b) parameter origin or source and equations which relate counts to units of measurement; and

(c) manufacturer's test reports or reports from a service provider"."

121.07.32

(b) the renaming of a Table of section 4 in Technical Standard 121.05.17 for the following section

"4. [Aeroplanes] An aeroplane for which flight data recorders are required.

An operator shall ensure any aeroplane operated in a commercial air transport operation is equipped with an FDR in accordance with the following Table –

TABLE A1

Group	Conditions See note 1.	Maximum Certificated Take-Off Mass (kg)	Propulsion System	FDR T.A.A.A.H See note 2.	FDR TYPE 1	FDR TYPE 1A	FDR TYPE II	Class C AIR or AIRS	ADRS
1	Application for type certification submitted to Contracting State on or after 1 January 2016 **See note 3**	≤5700	Turbine	-	-	-	X	X	X

2	Individual certificate of airworthiness first issued on or after 1 January 1989	> 27000	All	-	X	-	-	-	-
3	Individual certificate of airworthiness first issued on or after 1 January 1989	> 5700 but ≤ 27000	All	-	-	-	X	-	-
4	Individual certificate of airworthiness first issued on or after 1 January 1987 but before 1 January 1989 **Except those in Group 5**	>5700	Turbine	X	-	-	-	-	-
5	Individual certificate of airworthiness first issued on or after 1	> 27000	Turbine	-	-	-	X	-	-

	January 1987 but before 1 January 1989 whose types of which the prototype was certificated by the appropriate national authority after 30 September 1969								
6	Individual certificate of airworthiness first issued before 1 January 1987	>5700	Turbine	X	-	-	-	-	-
7	Individual certificate of airworthiness first issued after 1 January 2005	>5700	All	-	-	X	-	-	-

Notes –

1.For the purposes of this Technical Standard, any reference to the application for the type certification being submitted to a Contracting State on or after a specified date means the date an application is made for a new aircraft type, not the date of certification of particular aircraft variants or derivative models. Any reference to the individual certificate of airworthiness being issued first on or after a specified date means the first time a certificate of airworthiness is issued for a new individual aircraft serial number that has just come off the assembly line.

2.FDR T.A.A.A.H means a FDR that records time, altitude, airspeed, normal acceleration and heading.

3. The recording system may be any one of the three.

[Section 4 substituted by SA-CATS 1/2017 w.e.f. 1 June 2017.]

(c) the insertion of a Table in section 4 of Technical Standard 121.05.17 after Table A of the following Table:

"**AEROPLANE AGE AND REQUIREMENTS**

Note: The following requirements shall be applicable with the effect from 1 January 2023 and shall replace the requirements of Table A1.

TABLE B1			
AEROPLANE AGE AND REQUIREMENTS			
The weight of the aircraft (take-off mass)		Age of Aircraft	Parameters to be recorded by FDR
1	5700kg or Less	All turbine engine aeroplanes for which the individual Certificate of airworthiness is first issued on or after	(a) At least the first 16 parameters in the table in subsection 5 (10) (b)A class C AIR or AIRS which shall record at least the flight path and speed

		01 Jan 2016.	parameters displayed to the subsection 5 (10) or (c) An ADRS which shall record at least the first 7 parameters listed in the table in subsection 9
2	Over 27000kg	All aeroplanes for which the individual Certificate of airworthiness is first issued on or after 01 Jan 1989.	At least the first 32 parameters in the table in subsection 5 (10)
3	Over 5700kg up to and including 2700kg	All aeroplanes for which the individual Certificate of airworthiness is first issued on or after 01 Jan 1989.	At least the first 16 parameters in the table in subsection 5 (10)
4	5 700kg or less	All multi-engine turbine engine aeroplanes for which individual certificate of airworthiness first issued on or after 01 January 1990	At least the first 16 parameters in the table in subsection 5 (10)
5	Maximum 5 700kg	All multi-engine aircraft for which individual airworthiness certificate is first issued on or after 01 January 1990	At least the first 16 parameters in the table in subsection 5 (10)
6	Over 5700kg	All turbine-engined aeroplanes,for which the individual certificate of airworthiness was first issued before 01 january 1989,with a maximum	At least the first 5 parameters in the table in subsection 5 (10)

		certificated take-off mass of over 5700 kg, except those mentioned in item no 7 on this table	
7	Over 5700kg	All turbine engine aeroplanes, for which the individual certificate of airworthiness was first issued on or after 01 January 1987 but before 01 January 1989. Except those mentioned on item no 7 in this table	At least the first 9 parameters in the table in subsection 5 (10)
8	Over 27000kg	Individual certificate of airworthiness first issued on or after 01 January 1987 but before 01 January 1989 types of which the prototype was certified by the appropriate authority after 30 September 1969	At least the first 16 parameters in the table in subsection 5 (10)
9	Over 27000kg	All turbine engine aeroplanes for which the individual certificate of airworthiness was first issued before 01 Jan 1987 but the prototype was certified by the appropriate authority after	At least the first 05 parameters listed in the table in subsection 5(10) And meet the objectives of (a) The attitude of the aeroplane in achieving its flight path; and (b) The basic forces acting upon the aeroplane resulting in the achieved flight path and the origin of such basic forces.

		30 September 1969	
10	Over 5700kg	First individual airworthiness certificate issued on or after 01 January 2005	Record at least the first 78 parameters listed in the table in subsection 5(10)
11	Over 5700kg	All aeroplanes with a mass of over 5700kg Take Off Mass of which application for type certification is submitted to the contracting state on or after 1 January 2023	At least the first 82 parameters in the table in subsection 5(10)

5. FDR Parameters

[(5) The following parameters satisfy the requirements for flight path and speed –

(a) pressure altitude;

(b) indicated airspeed or calibrated airspeed;

(c) air-ground status and each landing gear air-ground sensor when practicable;

(d) total or outside air temperature;

(e) heading (primary flight crew reference);

(f) normal acceleration;

(g) lateral acceleration;

(h) longitudinal acceleration (body axis);

(i) time or relative time count;

(j) navigation data* (drift angle, wind speed, wind direction, latitude/longitude, groundspeed*); and

(k) radio altitude*.

(6) The following parameters satisfy the requirements for attitude –

(a) pitch attitude;

(b) roll attitude;

(c) yaw or sideslip angle*; and

(d) angle of attack*.

(7) The following parameters satisfy the requirements for engine power –

(a) engine thrust/power (propulsive thrust/power on each engine, cockpit thrust/power lever position);

(b) thrust reverse status*;

(c) engine thrust command*;

(d) engine thrust target*;

(e) engine bleed valve position*; and

(f) additional engine parameters* (EPR, N1, indicated vibration level, N2, EGT, TLA, fuel flow, fuel cut-off lever position, N3).

(8) The following parameters satisfy the requirements for configuration –

(a) pitch trim surface position;

(b) flaps* (trailing edge flap position, cockpit control selection);

(c) slats* (leading edge flap (slat) position, cockpit control selection);

(d) landing gear* (landing gear, gear selector position);

(e) yaw trim surface position*;

(f) roll trim surface position*;

(g) cockpit trim control input position pitch*;

(h) cockpit trim control input position roll*;

(i) cockpit trim control input position yaw*;

(j) ground spoiler and speed brake* (ground spoiler position, ground spoiler selection, speed brake position, speed brake selection);

(k) de-icing and/or anti-icing systems selection*;

(l) hydraulic pressure (each system)*;

(m) fuel quantity in CG trim tank*;

(n) AC electrical bus status*;

(o) DC electrical bus status*;

(p) APU bleed valve position*; and

(q) computed centre of gravity*.

(9) The following parameters satisfy the requirements for operation –

(a) warnings;

(b) primary flight control surface and primary flight control pilot input (pitch axis, roll axis, yaw axis);

(c) marker beacon passage;

(d) each navigation receiver frequency selection;

(e) manual radio transmission keying and CVR/FDR synchronisation reference;

(f) autopilot/autothrottle/AFCS mode and engagement status*;

(g) selected barometric setting* (pilot, first officer);

(h) selected altitude (all pilot selectable modes of operation)*;

(i) selected speed (all pilot selectable modes of operation)*;

(j) selected mach (all pilot selectable modes of operation)*;

(k) selected vertical speed (all pilot selectable modes of operation)*;

(l) selected heading (all pilot selectable modes of operation)*;

(m) selected flight path (all pilot selectable modes of operation)* (course/DSTRK, path angle);

(n) selected decision height*;

(o) EFIS display format* (pilot, first officer);

(p) multi-function/engine/alerts display format*;

(q) GPWS/TAWS/GCAS status* (selection of terrain display mode including pop-up display status, terrain alerts, both cautions and warnings and advisories, on/off switch position);

(r) low pressure warning* (hydraulic pressure, pneumatic pressure);

(s) computer failure*;

(t) loss of cabin pressure*;

(u) airborne collision avoidance system (ACAS)*;

(v) ice detection*;

(w) engine warning each engine vibration*;

(x) engine warning each engine over temperature*;

(y) engine warning each engine oil pressure low*;

(z) engine warning each engine over speed*;

(aa) wind shear warning*;

(bb) operational stall protection, stick shaker and pusher activation*;

(cc) all cockpit flight control input forces* (control wheel, control column, rudder pedal cockpit input forces);

(dd) vertical deviation* (ILS glide path, MLS elevation, GNSS approach path);

(ee) horizontal deviation* (ILS localizer, MLS azimuth, GNSS approach path);

(ff) DME 1 and 2 distances*;

(gg) primary navigation system reference* (GNSS, INS, VOR/DME, MLS, Loran C, ILS);

(hh) brakes* (left and right brake pressure, left and right brake pedal position);

(ii) date*;

(jj) event marker*;

(kk) head-up display in use*; and

(ll) para-visual display on*.]

(d) the renaming of a Table in section 5 subsection 10 of Technical Standard 121.05.17 for the following subsection:

"(10) The measurement range, recording interval and accuracy of parameters on installed FDR equipment shall meet the specifications in the following Table.

TABLE C1

PARAMETERS FOR AEROPLANE FLIGHT DATA RECORDERS

Serial number	**Parameter**	**Measurement range**	**Maximum sampling and recording interval (seconds)**	**Accuracy limits (sensor input compared to FDR read-out)**	**Recording resolution (Note 1)**
1	Time (UTC when available, otherwise relative time count or GPS time sync)	24 hours	4	± 0.125% per hour	1 second

2	Pressure altitude	–1 000ft (–300m) to maximum certificated altitude of aircraft +5000ft (+1 500m)	1	± 100ft to ±700ft (±30m to ± 200m)	5ft (1.5m)
3	Indicated airspeed or calibrated airspeed	50kt to max Vso (Note 2) Vso to 1.2 VD (Note 3)	1	± 5% ± 3%	1kt (0.5kt recommended
4	Heading (primary flight crew reference)	360°	1	± 2°	0.5°
5	Normal acceleration (Note 4)	–3g to +6g	0.125	±1% of maximum range excluding datum error of ± 5%	0.004g
6	Pitch attitude	±75° or usable range whichever is greater	1 (0.25 Note 1)	± 2°	0.5°
7	Roll attitude	± 180°	1 (0.25 Note 1)	± 2°	0.5°
8	Radio transmission keying	On-off (one discrete)	1	-	-
9	Power on each engine (Note 5)	Full range	1 (per engine)	± 2°	0.2% of full range or the resolution required to

					operate the aircraft
10*	Trailing edge flap and cockpit control section	Full range on each discrete position	2	± 5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
11*	Leading edge flap and cockpit control section	Full range on each discrete position	2	± 5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position	Stowed, in transit, and reverse	1 (per engine)	-	-
13*	Ground spoiler/ speed brake selection (selection and position)	Full range on each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature	Sensor range	2	± 2°C	0.3° C
15*	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discretes	1	-	-
16	Longitudinal acceleration (Note 4)	±1g	0.25	±0.015g excluding a datum error of ±0.05g	0.004g

Note – *The preceding 16 parameters satisfy the requirements for a Type II FDR*					
17	Lateral acceleration (Note 4)	±1g	0.25	±0.015g excluding a datum error of ±0.05g	0.004g
18	Pilot input and/or control surface position – primary controls (pitch, roll, yaw) (Notes 6 and 7)	Full range	1 (0.25 Note 1)	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude	– 20ft to 2 500ft (–6m to 750m)	1	±2ft (±0.6m) or ±3% whichever is greater below 500ft (150m) and ±5% above 500ft (150m)	1ft (0.3m) below 500ft (150m); 1ft (0.3m)/0.5% of full range above 500ft (150m)
21*	Vertical beam deviation (ILS/GPS/ GLS glide path, MLS elevation, IRNAV/ IAN vertical deviation)	Signal range	1	±3%	0.3% of full range

22*	Horizontal beam deviation (ILS/GPS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)	Signal range	1	±3%	0.3% of full range
23	Marker beacon passage	Discrete	1	-	-
24	Master warning	Discrete	1	-	-
25	Each NAV receiver frequency selection (Note 8)	Full range	4	As installed	-
26*	DME 1 and 2 distance (includes distance to runway threshold (GLS) and distance to missed approach point (IRNAV/IAN)) (Notes 8 and 9)	0 – 200NM (0 – 370km)	4	As installed	1NM (1852m)
27	Air/ground status	Discrete	1	-	-
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status and terrain alerts, both cautions and warnings, and advisories and on/off switch position)	Discrete	1	-	-
29*	Angle of attack	Full range	0.5	As installed	0.3% of full range

30*	Hydraulics, each system (low pressure)	Discrete	2	-	0.5% of full range
31*	Navigation data (latitude/longitude, ground speed and drift angle) (Note 10)	As installed	1	As installed	-
32*	Landing gear or gear selector position	Discrete	4	As installed	-
Note – *The preceding 32 parameters satisfy the requirements for a Type I FDR*					
33*	Groundspeed	As installed	1	Data shall be obtained from the most accurate system	1kt
34	Brakes (left and right brake pressure, left and right brake pedal position)	(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N1, indicated vibration level, N2, EGT, fuel flow, fuel cut-off lever position, N3)	As installed	Each engine each second	As installed	2% of full range
36*	ACAS (airborne collision avoidance system)	Discretes	1	As installed	-
37*	Windshear warning	Discrete	1	As installed	-
38*	Selected barometric setting (pilot, co-pilot)	As installed	64	As installed	0.1mb (0.01in-Hg)

39*	Selected altitude (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path (IRNAV/IAN))	-	1	As installed	-
45*	Selected decision height	As installed	64	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot, co-pilot)	Discrete(s)	4	As installed	-
47*	Multi-function/ engine/alerts display format	Discrete(s)	4	As installed	-
48*	AC electrical bus status	Discrete(s)	4	As installed	-

49*	DC electrical bus status	Discrete(s)	4	As installed	-
50*	Engine bleed valve position	Discrete(s)	4	As installed	-
51*	APU bleed valve position	Discrete(s)	4	As installed	-
52*	Computer failure	Discrete(s)	4	As installed	-
53*	Engine thrust command	As installed	2	As installed	-
54*	Engine thrust target	As installed	4	As installed	2% of full range
55*	Computed centre of gravity	As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank	As installed	64	As installed	1% of full range
57*	Head up display in use	As installed	4	As installed	-
58*	Para visual display on/off	As installed	1	As installed	-
59*	Operational stall protection, stick shaker and pusher activation	As installed	1	As installed	-
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)	As installed	4	As installed	-
61*	Ice detection	As installed	4	As installed	-
62*	Engine warning each engine vibration	As installed	1	As installed	-
63*	Engine warning each engine over temperature	As installed	1	As installed	-

64*	Engine warning each engine oil pressure low	As installed	1	As installed	-
65*	Engine warning each engine over speed	As installed	1	As installed	-
66*	Yaw trim surface position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll trim surface position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle	Full range	1	±5%	0.5
69*	De-icing and/or anti-icing systems selection	Discrete(s)	4	±5%	-
70*	Hydraulic pressure (each system)	Full range	2	±5%	100psi
71*	Loss of cabin pressure	Discrete	1	±5%	-
72*	Cockpit trim control input position – Pitch	Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position – Roll	Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position – Yaw	Full range	1	±5%	0.2% of full range or as installed

75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)	Full range (±311N (±70lbf), ± 378N (±85lbf), ± 734N (±165lbf))	1	±5%	0.2% of full range or as installed
76*	Event marker	Discrete	1	-	-
77*	Date	365 days	64	-	-
78*	ANP or EPE or EPU	As installed	4	As installed	-
Note – *The preceding 78 parameters satisfy the requirements for a Type IA FDR*					

(e) the insertion in section 5 of Technical Standard 121.05.17 after Table C in subsection (10) for the following Table

Note: The following requirements shall be applicable with effect from 1 January 2023 and shall replace the requirements of table C1 with the effect of 1 January 2023.

TABLE D1

PARAMETERS FOR AEROPLANE FLIGHT DATA RECORDERS

Serial number	Parameter	Applicability	Measurement range	Maximum sampling and recording interval (seconds)	Accuracy limits (sensor input compared to FDR read-out)	Recording resolution
1	Time (UTC when available,		24 hours	4	±0.125%/h	1s

	otherwise, relative time count or GNSS time sync)					
2	Pressure-altitude		–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max V_{so} *(note 1)* V_{so} to 1.2 V_D *(note 2)*	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5	Normal acceleration *Note 8*	Application for type certification is submitted to a Contracting State before 1 January 2016 Application for type certification	–3 g to +6 g –3 g to +6 g	0.125 0.0625	±1% of maximum range excluding datum error of ±5% ±1% of maximum range excluding	0.004 g 0.004 g

		is submitted to a Contracting State on or after 1 January 2016			datum error of ±5%	
6	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude		±180°	0.25	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1		
9	Power on each engine *Note 3*		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft

11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position		Stowed, in transit, &reverse		1 (per engine)	
13*	Ground spoiler/speed brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discretes	1		
16	Longitudinal acceleration *Note 8*	Application for type certification submitted to a Contracting State before	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g

		1 January 2016				
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g
17	Lateral acceleration *Note 8*	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g

18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) *notes 4&8*	Application for type certification submitted to a Contracting State before 1 January 2016	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position		Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude		–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range

					(500 ft)	above 150 m (500 ft)
21*	Vertical beam deviation (ILS/GNSS/GLS glide path, MLS elevation, IRNAV/IAN vertical deviation)		Signal range	1	±3%	0.3% of full range
22*	Horizontal beam deviation (ILS/GNSS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)		Signal range	1	±3%	0.3% of full range
23	Marker beacon passage		Discrete	1		
24	Master warning		Discrete	1		
25	Each NAV receiver frequency Selection *note 5*		Full range	4	As installed	
26*	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/IAN)) *notes 5 &6*		0 – 370 km (0 – 200 NM)	4	As installed	1 852 m (1 NM)

27	Air/ground status		Discrete	1		
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)		Discrete	1		
29*	Angle of attack		Full range	0.5	As installed	0.3 % of full range
30*	Hydraulics, each system (low pressure)		Discrete	2		0.5% of full range
31*	Navigation data (latitude/longitude, ground speed, and drift angle) *note 7*		As installed	1	As installed	
32*	Landing gear and gear selector position		Discrete	4	As installed	
33*	Groundspeed		As installed	1	Data shall be obtained from the most	1 kt

					accurate system	
34	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N_1, indicated vibration level, N_2, EGT, fuel flow, fuel cut-off lever position, N_3, engine fuel metering valve position)	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	Each engine each second	As installed	2% of full range
36*	TCAS/ACAS (traffic alert and collision avoidance system)		Discretes	1	As installed	
37*	Wind shear warning		Discrete	1	As installed	
38*	Selected barometric setting (pilot, co-pilot)		As installed	64	As installed	0.1 mb (0.01 in-Hg)
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determin

						e crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path (IRNAV/IAN))			1	As installed	
45*	Selected decision height		As installed	64	As installed	Sufficient to

						determine crew selection
46*	EFIS display format (pilot, co-pilot)		Discrete(s)	4	As installed	
47*	Multi-function/engine/alerts display format		Discrete(s)	4	As installed	
48*	AC electrical bus status		Discrete(s)	4	As installed	
49*	DC electrical bus status		Discrete(s)	4	As installed	
50*	Engine bleed valve position		Discrete(s)	4	As installed	
51*	APU bleed valve position		Discrete(s)	4	As installed	
52*	Computer failure		Discrete(s)	4	As installed	
53*	Engine thrust command		As installed	2	As installed	
54*	Engine thrust target		As installed	4	As installed	2% of full range
55*	Computed centre of gravity		As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank		As installed	64	As installed	1% of full range
57*	Head up display in use		As installed	4	As installed	
58*	Para visual display on/off		As installed	1	As installed	
59*	Operational stall protection, stick		As installed	1	As installed	

	shaker and pusher activation					
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)		As installed	4	As installed	
61*	Ice detection		As installed	4	As installed	
62*	Engine warning each engine vibration		As installed	1	As installed	
63*	Engine warning each engine over temperature		As installed	1	As installed	
64*	Engine warning each engine oil pressure low		As installed	1	As installed	
65*	Engine warning each engine over speed		As installed	1	As installed	
66*	Yaw trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range

68*	Yaw or sideslip angle		Full range	1	±5%	0.5°
69*	De-icing and/or anti-icing systems selection		Discrete(s)	4		
70*	Hydraulic pressure (each system)		Full range	2	±5%	100 psi
71*	Loss of cabin pressure		Discrete	1		
72*	Cockpit trim control input position, Pitch		Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll		Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position, Yaw		Full range	1	±5%	0.2% of full range or as installed
75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)		Full range (±311 N (±70 lbf), ± 378 N (±85 lbf), ± 734 N (±165 lbf))	1	±5%	0.2% of full range or as installed
76*	Event marker		Discrete	1		
77*	Date		365 days	64		
78*	ANP or EPE or EPU		As installed	4	As installed	
79*	Cabin pressure altitude	Application for type	As installed (0 ft to	1	As installed	100 ft

		certification submitted to a Contracting State on or after 1 January 2023	40 000 ft recommended)			
80*	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
81*	Flight director command	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	± 2°	0.5°
82*	Vertical speed	Application for type certification submitted to	As installed	0.25	As installed (32 ft/min recommended)	16 ft/min

		a Contracting State on or after 1 January 2023				

Notes.—

1. V_{SO} stalling speed or minimum steady flight speed in the landing configuration is in Section "Abbreviations and Symbols".

2. V_D design diving speed.

3. Record sufficient inputs to determine power.

4. For aeroplanes with control systems in which movement of a control surface shall back drive the pilot's control, "or" applies. For aeroplanes with control systems in which movement of a control surface shall not back drive the pilot's control, "and" applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately. In aeroplanes with independent pilot input on primary controls, each pilot input on primary controls needs to be recorded separately.

5. If signal available in digital form.

6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.

7. If signals readily available.

8. It is not intended that aeroplanes issued with an individual certificate of airworthiness before 1 January 2016 be modified to meet the measurement range, maximum sampling and recording interval, accuracy limits or recording resolution description detailed in this Part.

9. The number of parameters to be recorded shall depend on aeroplane complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of aeroplane complexity.";

(f) by the substitution in section 9 of Technical Standard 121.05.17 for the following Table:

9. Aircraft data recording systems

(1) **[Operators]** An operator of aircraft using aircraft data recording systems (ADRS) shall ensure the ADRS is capable of recording, as appropriate to the aeroplane, at least the essential (E) parameters in the following Table.

TABLE E1

PARAMETERS FOR AIRCRAFT DATA RECORDER SYSTEMS

Serial number	Parameter and Category	Minimum recording range	Maximum recording interval (seconds)	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading (magnetic or true) R*	±180 degrees	1	±2 degrees	0.5 degree	*If not available, record rates
2	Pitch attitude E*	±90 degrees	0.25	±2 degrees	0.5 degree	*If not available, record rates
3	Roll attitude E*	±180 degrees	0.25	±2 degrees	0.5 degree	*If not available, record rates
4	Yaw rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no heading available
5	Pitch rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no pitch attitude available

6	Roll rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no roll attitude available
7	Positioning system: latitude/longitude E	Latitude: ±90 degrees Longitude: ±180 degrees	2 (1 if available)	As installed (0.00015 degree recom-mended)	0.00005 degree	-
8	Positioning system: estimated error E*	Available range	2 (1 if available)	As installed	As installed	*If available
9	Positioning system: altitude E	-300m (-1 000ft) to maximum certificated altitude of aircraft +1 500m (5 000ft)	2 (1 if available)	As installed (±50ft (±15m) recom-mended)	5ft (1.5m)	-
10	Positioning system: time* E	24 hrs	1	±.5 second	0.1 second	*UTC time preferred where available
11	Positioning system: ground speed E	0 – 1 000kt	2 (1 if available)	As installed (±5kt recom-mended)	1kt	-

12	Positioning system: channel E	0 – 360 degrees	2 (1 if available)	As installed (±2 degrees recom-mended)	0.5 degree	-
13	Normal acceleration E	-3g to +6g	0.25 (0.125 if available)	As installed (±0.09g excluding a datum error of ±0.45g recom-mended)	0.004g	-
14	Longitudinal acceleration E	±1g	0.25 (0.125 if available)	As installed (±0.015g excluding a datum error of ±0.05g recom-mended)	0.004g	-
15	Lateral acceleration E	±1g	0.25 (0.125 if available)	As installed (±0.015g excluding a datum error of ±0.05g	0.004g	-

				recom-mended)		
16	External static pressure (or pressure altitude) R	34.4mb (3.44in-Hg) to 310.2mb (31.02in-Hg) or available sensor range	1	As installed (±1mb (0.1in-Hg) or ±100ft (±30m) to ±700ft (±210m) recom-mended)	0.1mb (0.01in-Hg) or 5ft (1.5m)	-
17	Outside air temperature (or total air temperature) R	-50° to +90°C or available sensor range	2	As installed (±2°C recom-mended)	1°C	-
18	Indicated air speed R	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recom-mended)	1kt (0.5kt recom-mended)	-
19	Engine RPM R	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	-
20	Engine oil pressure R	Full range	Each engine	As installed	2% of full range	-

			each second	(5% of full range recom-mended)		
21	Engine oil temperature R	Full range	Each engine each second	As installed (5% of full range recom-mended)	2% of full range	-
22	Fuel flow or pressure R	Full range	Each engine each second	As installed	2% of full range	-
23	Manifold pressure R	Full range	Each engine each second	As installed	0.2% of full range	-
24	Engine thrust/power/torque parameters required to determine propulsive thrust/ power* R	Full range	Each engine each second	As installed	0.2% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse

						thrust. A margin for possible overspeed shall be provided.
25	Engine gas generator speed (Ng) R	0 – 150%	Each engine each second	As installed	0.2% of full range	-
26	Free power turbine speed (Nf) R	0 – 150%	Each engine each second	As installed	0.2% of full range	-
27	Coolant temperature R	Full range	1	As installed (±5°C recom-mended)	1°C	-
28	Main voltage R	Full range	Each engine each second	As installed	1 Volt	-
29	Cylinder head temperature R	Full range	Each engine each second	As installed	2% of full range	-
30	Flaps position R	Full range or each	2	As installed	0.5 degree	-

		discrete position				
31	Primary flight control surface position R	Full range	0.25	As installed	0.2% of full range	-
32	Fuel quantity R	Full range	4	As installed	1% of full range	-
33	Exhaust gas temperature R	Full range	Each engine each second	As installed	2% of full range	-
34	Emergency voltage R	Full range	Each engine each second	As installed	1 Volt	-
35	Trim surface position R	Full range or each discrete position	1	As installed	0.3% of full range	-
36	Landing gear position R	Each discrete position*	1	Each gear every two seconds	-	*Where available, record up-and-locked and down-and-locked position
37	Novel/unique aircraft features R	As required	As required	As required	As required	-

(2) Documentation concerning parameter allocation, conversion equations, periodic calibration and other serviceability/maintenance information shall be maintained by the operator. The documentation needs to be sufficient to ensure that accident investigation authorities have the necessary information to read out the data in engineering units.

(3) The documentation referred to in paragraph (2) shall be in electronic format where possible and take account of industry standards.

Note – *Industry specification for documentation concerning flight recorder parameters may be found in the ARINC 647A, Flight Recorder Electronic Documentation, or equivalent document.*

Note: The following requirements shall be applicable with effect from 1 January 2023 and shall replace the requirements of Table E1 with the effect of 1 January 2023.

TABLE F1

Parameter Guidance Characteristics for Aircraft Data Recording Systems

No.	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading: a) Heading (Magnetic or True) b) Yaw rate	±180° ±300°/s	1 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Heading is preferred, if not available, yaw rate shall be recorded
2	Pitch: A) Pitch attitude	±90°	0.25	±2°	0.5°	*Pitch attitude is preferred, if not

	b) Pitch rate	±300°/s	0.25	±1% + drift of 360°/h	2°/s	available,pitch rate shall be recorded
3	Roll: (a)Roll attitude (b) Roll rate	 ±180° ±300°/s	 0.25 0.25	 ±2° ±1% + drift of 360°/h	 0.5° 2°/s	*Roll attitude is preferred, if not available, roll rate shall be recorded
4	Positioning system (a)Time (b)Latitude/Longitude (c) Altitude (d) Ground speed (e)Track (f) Estimate error	 24 hours Lattitude: ±90° Longitude : ±180° –300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (5 000 ft) 0-1 000 kt	 1 2 (if available) 2 (if available) 2 (if available) 2 (if available)	 ±0.5s As installed (0.00015° recommended) As installed (±15 m (±50 ft) recommended) As installed (±5 kt recommended) As installed (±2° recommended)	 0.1 0.00005° 1.5m (5 ft) 1 kt 0.5° As installed	UCT time preferred where available

		0-360° Available range	2 (if available)	As installed		Shall be recorded if readily available
5	Normal acceleration	–3 g to + 6g	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±0.045 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g(*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g(*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	

8	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb (31.02 in-Hg) or available sensor range	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or total air temperature)	–50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
10	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
11	Engine RPM (*)	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12	Engine oil pressure	Full range	Each engine	As installed (5% of full range	2% of full range	

			each second	recommended)		
13	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	
16	Engine thrust/power/ torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible

						overspeed shall be provided
17	Engine gas generator speed (Ng)	0–150%	Each engine each second	As installed	0.2% of full range	
18	Free power turbine speed (Nf)	0–150%	Each engine each second	As installed	0.2% of full range	
19	Coolant temperature (*)	Full range	1	As installed (±5°C recommended	1°C	
20	Main voltage	Full range	Each engine each second	As installed	1 Volt	
21	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range	
22	Fuel quantity	Full range	4	As installed	1% of full range	
23	Primary flight control surface position	Full range	0.25	As installed	0.2% of full range	
24				As installed		
25	Exhaust gas temperature	Full range	Each engine	As installed	2% of full range	

			each second			
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		*Where available, record up-and-locked and down-and-locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	

(g) the substitution in subsection 3 (3) of paragraph (b)(i) in Technical Standard 121.06.2 for the following paragraph:

"(b) Responsibilities

The PRA is responsible for safe aeroplane operations, in particular –

(i) is responsible for all maintenance and inspection personnel **[signing of Part D of the operations specifications]**;"

(h) the insertion in the Table of contents after the following heading:

"121.07.32 OPERATIONS WITH ELECTRONIC FLIGHT BAGS

121.07.33 SEATS, SEAT SAFETY BELTS, HARNESSES AND CHILD RESTRAINT DEVICES AND CARRIAGE OF INFANTS"

(i) the substitution in Technical Standard 121.07.32 section 1 of subsection (2), (3) and the insertion in section 3 after sub-section (14) of the following sub-sections:

(2) Installed EFBs may be incorporated during- **[the aeroplane type design, by a change to the type design or added by a supplemental type certificate.]**

(a) an aeroplane type design;

(b) by a change to the type design; or

(c) added by a STC.

(3) Portable EFBs are not considered to be part of the certified aeroplane configuration. They do not require airworthiness approval but do require an operational approval.

[Note: Refer to section 2 for additional information concerning portable EFBs]"

"3. Operational approval

(15) The EFB risk assessment to assess the risks associated with the use of each EFB function shall be done in accordance with Part 140 and be performed before the beginning of the approval process (if applicable) and its results shall be reviewed on a periodic basis.

(16) The EFB management system is responsible for hardware and software version and configuration management, maintenance of EFB security and integrity in accordance with documented policies and procedures and shall have an appropriately trained designate to be responsible for the system"."

(j) the insertion after Technical Standard 121.07.32 of the following Technical Standard:

"121.07. 33 Seats, seat safety belts, harnesses and child restraint devices and carriage of infants

(1) An owner or an operator of an aircraft shall not operate the aircraft unless such aircraft is equipped, as applicable, for the carriage of infants with-

(a) an air service operator shall ensure that an infant is only carried when properly secured in the arms or on the lap of an adult passenger, or with a child restraint system or in a sky cot.

(b) a sky cot may be used provided that it-

(i) is restrained so as to prevent it from moving under the maximum accelerations to be expected in flight;

(ii) is fitted with a restraining device so as to ensure that an infant shall not be thrown from such sky cot under the maximum accelerations to be expected in flight;

(iii) may not be used during critical phases of flight; and

(iv) shall be positioned in such a way that they do not prevent or hinder the movement of adjacent passengers or block exits.

(c) a child restraint system may be used provided that–

(i) infants shall not be carried behind a bulkhead unless a child restraint device is used during critical phases of flight and during turbulence.

(ii) an infant may be seated in a car-type infant seat, provided that the infant seat —

(aa) is secured to the aeroplane seat in accordance with the instructions provided with the child seat;

(bb) is designed to be secured to a passenger seat by means of a single lap strap and face the same direction as the passenger seat;

(cc) shell does not unreasonably extend beyond the forward position of the passenger seat cushion on which it rests;

(dd) is secured to the passenger seat at all times during flight, even when it is unoccupied by the child;

(ee) shall be removed from the aircraft in an emergency evacuation, and not the infant;

(ff) is positioned in such a way that it does not prevent or hinder the movement of adjacent passengers or block exits;

(gg) is not placed in an aisle seat, depending on cabin configuration;

(hh) is used in accordance with infant weight limitations specified for such device; and

(iii) is fitted with a single release harness, which secures the infant's lap, torso and shalers, but designed that the child can easily be secured in or removed from it.

(iv) shall not be located in the same row or row directly forward or aft of an overwing emergency exit; or in the same row as any other exit unless such exit and row are separated by a bulkhead.

(d) When an infant is carried in the arms or on the lap of an adult passenger –

(i) the seat belt, when required to be worn, shall be fastened around the passenger carrying or nursing the infant, but not around the infant; and

(ii) the name of the infant shall be bracketed on the passenger list with the name of the person carrying or nursing the infant"."

AMENDMENT OF TECHNICAL STANDARDS 127

10. Document SA-CATS 127 is hereby amended by

(a) the substitution for subsection (2)(a) in Technical Standard 127.05.14 of the following subsection:

"(2) Parameters

(a) The parameters for helicopters are –

(i) **[A]** a Type IVA FDR shall be capable of recording, as appropriate to the helicopter, at least the 48 parameters in the table in sub-paragraph (j);

(ii) **[A]** a Type IV FDR shall be capable of recording, as appropriate to the helicopter, at least the first 30 parameters in the table in sub-paragraph (j); **[and]**

(iii) **]A]** a Type V FDR shall be capable of recording, as appropriate to the helicopter, at least the first 15 parameters in the table in sub-paragraph (j); and

(iv) helicopter age and requirements are provided in Table A1.

Note: The following requirements shall apply with effect from 1 January 2023 and shall replace the requirements of subsection (2)(a) (i),(ii) and (iii).

TABLE A1		
Helicopter and requirements		
Weight of Aircraft	**Condition**	**Parameters**
All helicopters of with a MTOW of over 3 175kg.	Individual Certificate of Airworthiness first issued on or after 1 January 2016	An FDR shall record the first 48 parameters of the table listed in (2)(h)
All helicopters of Certified take –off mass of over 7000kg or having a passenger seating configuration of more than nineteen	Individual Certificate of Airworthiness first issued on or after 1 January 1989	An FDR shall record the first 30 parameters of the table listed in (2)(h)
All helicopters of a maximum certificated take-off mass of over 3 175 kg to 7 000 kg (3 175 kg – 7000 kg)	Individual Certificate of Airworthiness first issued on or after 1 January 1989	An FDR shall record the first 15 parameters of the table listed in (2)(h)
All turbine-engine helicopters of a maximum certificated take-off mass of over 2 250kg, up to and including 3 175 kg	The application for type certification was submitted to a contracting state on or after 1 January 2018	(a)An FDR shall record the first 48 parameters of the table listed in (2)(h) (b)A Class C AIR or AIRS which should record at least the flight path and speed parameters displayed to the pilot, as defined in Appendix 4 Table (2)(i) (c)An ADRS which shall record the first 7

		parameters listed in Table (2)(i)
All helicopters of a maximum certificated take-off mass of 3 175kg or less	The individual Certificate of Airworthiness is first issued on or after 1 January 2018	(a)An FDR shall record the first 48 parameters listed in Table (2)(h) (b)A Class C AIR or AIRS which should record at least the flight path and speed parameters displayed to the pilot, as defined in Appendix (2)(i) (c)An ADRS which shall record the first 7 parameters listed in Table (2)(i)
All helicopters of a maximum certificated take-off mass of over 3 175kg	Application for type certificate is submitted to a contracting state on or after 1 January 2023	FDR record shall record the at least the first 53 parameters listed in Table (2)(h)
Weight of Aircraft	**Condition**	**Parameters**
All helicopters of a maximum certificated take-off mass of over 3 175kg	Individual certificate of airworthiness is first issued on or after 1 January 2023	FDR record shall record the at least the first 53 parameters listed in Table (2)(h)

(b) the substitution in Technical Standard 127.05.14 for the renaming a Table in subsection (2)(h) and the insertion of a subsequent Tables:

TABLE B1

PARAMETERS FOR HELICOPTER FLIGHT DATA RECORDERS

Serial #	Parameter	Measurement range	Maximum sampling and recording interval	Accuracy limits (sensor input compared to FDR readout)	Recording resolution
1	Time (UTC when available, otherwise relative time	24 hours	4	±0.125% per hour	1s
2	Pressure altitude	–1 000ft (–300m) to maximum certificated altitude of aircraft +5 000ft (+1 500m)	1	±100ft to ±700ft (±30m to ±200m)	5ft (1.5m)
3	Indicated airspeed	As the installed pilot display measuring system	1	±3%	1kt
4	Heading	360°	1	±2°	0.5°
5	Normal acceleration	–3g to +6g	0.125	±0.09g excluding a datum error	0.004g

6	Pitch attitude	±75° or 100% of useable range whichever is greater	0.5	±2°	0.5°
7	Roll attitude	±180°	0.5	±2°	0.5°
8	Radio transmission keying	On-off (one discrete)	1	—	—
9	Power on each engine	Full range	1 (per engine)	±2%	0.1% of full range
10	Main rotor: Main rotor speed rotor brake	50–130% Discrete	0.51	±2%	0.3% of full range
11	Pilot input and/or control surface position – primary controls (collective pitch, longitudinal	Full range	0.5 (0.25 recommended)	±2% unless higher accuracy uniquely required	0.5% of operating range
12	Hydraulics, each system (low pressure and	Discrete	1	—	—
13	Outside air temperature	Sensor range	2	±2°C	0.3°C
14*	Autopilot/autothrottle/AFCS mode and engagement	A suitable combination of discretes	1	—	—
15*	Stability augmentation system	Discrete	1	—	—
Note – *The preceding 15 parameters satisfy the requirements for a Type V FDR.*					
16*	Main gearbox oil pressure	As installed	1	As installed	6.895kN/m2 (1psi)

17*	Main gearbox oil temperature	As installed	2	As installed	1°C
18	Yaw rate	±400°/second	0.25	±1.5% maximum range excluding datum error	±2°/s
19*	Sling load force	0 to 200% of certified load	0.5	f ±5% ±3% of maximum range	0.5% for maximum certified load
20	Longitudinal acceleration	±1g	0.25	±0.015g excluding a datum error of ±0.05 g	0.004g
21	Lateral acceleration	±1g	0.25	±0.015g excluding a datum error	0.004g
22*	Radio altitude	–20ft to 2 500ft (–6m to 750m)	1	±2f ft (±0.6m) or ±3% whichever is greater below 500ft (150m) and ±5% above	1ft (0.3m) below 500ft (150m), 1ft (0.3m) + 0.5% of full range above 500ft (150m)

				500ft (150m)	
23*	Vertical beam deviation	Signal range	1	±3%	0.3% of full range
24*	Horizontal beam deviation	Signal range	1	±3%	0.3% of full range
25	Marker beacon passage	Discrete	1	—	—
26	Warnings	Discrete(s)	1	—	—
27	Each navigation receiver frequency	Sufficient to determine selected frequency	4	As installed	—
28*	DME 1 and 2 distances	0–200NM (0-370km)	4	As installed	1 NM (1 852m)
29*	Navigation data (latitude/ longitude, ground speed, drift angle, wind speed, wind direction)	As installed	2	As installed	As installed
30*	Landing gear or gear selector	Discrete	4	—	—
Note – *The preceding 30 parameters satisfy the requirements for a Type IV FDR.*					
31*	Engine exhaust gas temperature (T4)	As installed	1	As installed	-
32*	Turbine inlet temperature (TIT/ITT)	As installed	1	As installed	-
33*	Fuel contents	As installed	4	As installed	-
34*	Altitude rate	As installed	1	As installed	-

35*	Ice detection	As installed	4	As installed	-
36*	Helicopter health and usage monitor	As installed	=	As installed	=
37	Engine control modes	Discrete	1	=	=
38*	Selected barometric setting (pilot and co-pilot)	As installed	64 (4 recommended)	As installed	0.1mb (0.0 in-Hg)
39*	Selected altitude (all pilot selectable	As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation	As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable operation)	As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine

					crew selection
45*	Selected decision height	As installed	4	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot and co-pilot)	Discrete(s)	4	—	—
47*	Multi-function/engine/alerts display format	Discrete(s)	4	—	—
48*	Event marker	Discrete	1	—	—
Note – *The preceding 48 parameters satisfy the requirements for a Type IVA FDR.*					

Note: The following requirements shall apply with effect from 1 January 2023 and shall replace the requirements of Table B1.

TABLE C1

PARAMETERS FOR HELICOPTERS FLIGHT DATA RECORDER TABLE

Serial #	Parameter	applicability	Measure range	Recording intervals	Accuracy limits	Recording resolution
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	±0.125% /h	1 s

2	Pressure altitude		–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed		As the installed pilot display measuring system	1	±3%	1 kt
4	Heading		360°	1	±2°	0.5°
5	Normal acceleration		–3 g to +6 g	0.125	±0.09 g excluding a datum error of ±0.045 g	0.004 g
6	Pitch attitude		±75° or 100% of useable range whichever is greater	0.5	±2°	0.5°
7	Roll attitude		±180°	0.5	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1	—	—
9	Power on each engine		Full range	1 (per engine)	±2%	0.1% of full range
10	Main rotor speed Rotor brake		50–130% Discrete	0.51	±2% —	0.3% of full range

11	Pilot input and/or control surface position — primary controls (collective pitch, longitudinal cyclic pitch, lateral cyclic pitch, tail rotor pedal)		Full range	0.5 (0.25 recommended)	±2% unless higher accuracy uniquely required	0.5% of operating range
12	Hydraulics, each system (low pressure and selection)		Discrete	1	—	—
13	Outside air temperature		Sensor range	2	±2°C	0.3°C
14*	Autopilot/ autothrottle/AFCS mode and engagement status		A suitable combination of discretes	1	—	—
15*	Stability augmentation system engagement		Discrete	1	—	—
16*	Main gearbox oil pressure		As installed	1	As installed	6.895 kN/m2 (1 psi)
17*	Main gearbox oil temperature		As installed	2	As installed	1°C
18	Yaw rate		±400° /second	0.25	±1.5% maximum range excluding	2°/s

					datum error of ±5%	
19*	Sling load force		0 to 200% of certified load	0.5	±3% of maximum range	0.5% for maximum certified load
20	Longitudinal acceleration		±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
21	Lateral acceleration		+-1g	0,25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
22*	Radio altitude		–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft), 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
23*	Vertical beam deviation		Signal range	1	±3%	0.3% of full range

24*	Horizontal beam deviation		Signal range	1	—	0.3% of full range
25	Marker beacon passage		Discrete	1	—	—
26	Warnings		Discrete(s)	1	—	—
27	Each navigation receiver frequency selection		Sufficient to determine selected frequency	4	As installed	—
28*	DME 1 and 2 distances		0–370 km (0–200 NM)	4	As installed	1 852 m (1 NM)
29*	Navigation data (latitude/longitude, ground speed, drift angle, wind speed, wind direction)		As installed	2	As installed	As installed
30*	Landing gear and gear selector position		Discrete	4	_	_
31*	Engine exhaust gas temperature (T4)		As installed	1	As installed	
32*	Turbine inlet temperature (TIT/ITT)		As installed	1	As installed	
33*	Fuel contents		As installed	4	As installed	
34*	Altitude rate		As installed	1	As installed	
35*	Ice detection		As installed	4	As installed	
36*	Helicopter health and usage monitor system		As installed	_	As installed	
37	Engine control modes		Discrete	1	—	_

38*	Selected barometric setting (pilot and co-pilot)		As installed	64 (4 recommended)	As installed	0.1 mb (0.01 in Hg)
39*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection

44*	Selected flight path (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
45*	Selected decision height		As installed	4	As installed	Sufficient to determine crew selection
46	EFIS display format (pilot and co-pilot)		Discrete(s)	4	—	—
47*	Multi-function/ engine/alerts display format		Discrete(s)	4	—	—
48*	Event marker		Discrete	1	—	—
49*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position) and (operational status)	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Discrete(s)	1	As installed	
50*	TCAS/ACAS (traffic alert and collision avoidance system)	Application for type certification	Discrete(s)	1	As installed	

	and (operational status)	is submitted to a Contracting State on or after 1 January 2023				
51*	Primary flight controls – pilot input forces	Application for type certification is submitted to a Contracting State on or after 1 January 2023	Full range	0.125 (0.0625 recommended)	± 3% unless higher accuracy is uniquely required	0.5% of operating range
52*	Computed centre of gravity	Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	64	As installed	1% of full range
53*	Helicopter computed weight	Application for type	As installed	64	As installed	1% of full range

		certification is submitted to a Contracting State on or after 1 January 2023				

Note: The following requirements shall apply with effect from 1 January 2023.

TABLE D1							
Aircraft date recording systems							
Parameters Guidance Characteristics for Aircraft Data Recording Systems							
N°	Parameter name	Parameter category	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading: a) Heading (Magnetic or True) b) Yaw rate		±180° ±300°/s	1 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Heading is preferred, if not available, yaw

							rate shall be recorde d
2	Pitch: A) Pitch attitude b) Pitch rate		±90° ±300°/ s	0.25 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Pitch attitude is preferre d, if not availabl e, pitch rate shall be recorde d
3	Roll: (a)Roll attitude (b) Roll rate		±180° ±300°/ s	0.25 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Roll attitude is preferre d, if not availabl e, roll rate shall be recorde d

4	Positioning system (a)Time (b)Latitude/Longitude (c) Altitude (d) Ground speed (e)Track (f) Estimate error		24 hours Lattitude: ±90° Longitude: ±180° –300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (5 000 ft) 0-1 000 kt 0-360°	1 2 (if available) 2 (if available) 2 (if available) 2 (if available) 2 (if available)	±0.5° As installed (0.00015° recommended) As installed (±15 m (±50 ft) recommended) As installed (±5 kt recommended) As installed	0.1° 0.00005° 1.5m(5 ft) 1 kt 0.5° As installed	UCT time preferred where available Shall be recorded if readily available

			Available range		(±2t recommended) As installed		
5	Normal acceleration		–3 g to + 6g	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±0.05 g recommended)	0.004 g	
6	Longitudinal acceleration		±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g	0.004 g	

					recommended)		
7	Lateral acceleration		±1 g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)		34.4 hPa (1.02 in-Hg) to 310.2 hPa (9.16 in-Hg) or available sensor range	1	As installed (±1 hPa (0.3 in-Hg) or ±30 m (±100 ft) to ±210 m (±700 ft) recommended)	0.1 hPa (0.03 in-Hg) or 1.5 m (5 ft)	
9	Outside air temperature (or		–50° to +90°C	2	As installed (±2°C	1°C	

	total air temperature)		or availa ble senso r range		recomm ended)		
10	Indicated air speed		As the install ed pilot displa y meas uring syste m or availa ble senso r range	1	As installed (±3% recomm ended)	1 kt (0.5 kt recomm ended)	
11	Main rotor speed (Nr)		50% to 130% or availa ble senso r range	0.5	As installed	0.3% of full range	

12	Engine RPM (*)		Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters
13	Engine oil pressure		Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
14	Engine oil temperature		Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
15	Fuel flow or pressure		Full range	Each engine each second	As installed	2% of full range	
16	Manifold pressure (*)		Full range	Each engine each second	As installed	0.2% of full range	*For piston-engined helicopters

17	Engine thrust/power/ torque parameters required to determine propulsive thrust/power*		Full range	Each engine each second	As installed	0.1% of full range	*Sufficient parameters e.g. EPR/N1 or torque/ Np as appropriate to the particular engine shall be recorded to determine power. A margin for possible overspeed should be provided. Only for turbine-engined

							helicopters.
18	Engine gas generator speed (Ng) (*)		0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
19	Free power turbine speed (Nf) (*)		0–150%	Each engine each second	As installed	0.2% of full range	*Only for turbine-engined helicopters
20	Collective pitch		Full range	0.5	As installed	0.1% of full range	
21	Coolant temperature (*)		Full range	1	As installed (±5°C recommended	1°C	*Only for piston-engined helicopters
22	Main voltage		Full range	Each engine each second	As installed	1 Volt	
23	Cylinder head temperature (*)		Full range	Each cylinder each second	As installed	2% of full range	*Only for piston-engined

							helicopters
24	Fuel quantity		Full range	4	As installed	1% of full range	
25	Exhaust gas temperature		Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage		Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position		Full range or each discrete position	1	As installed	0.3% of full range	
28	Landing gear position		Each discrete position*	Each gear every two seconds	As installed		*Where available, record up-and-locked and down-and-

							locked position
29	Novel/unique aircraft features		As required	As required	As required	As required	

(c) the insertion after Technical Standard 127.06.3 of the following Technical Standard:

"127.06.5 Safety inspections and audits

1. Classifications of findings or non-compliance

(1) Findings of non-compliance as follows:

(a) Level 1 Finding: A level 1 non-compliance or finding poses imminent danger, safety and/or security risk to persons in the aircraft or to persons or to property on the ground and shall necessitate the exercising of immediate discretionary enforcement powers vested in the inspectors, authorised officers and/or authorised persons in the interest of safeguarding aviation safety and security in terms of Section 115 and 116 of the Civil Aviation Act, 2009 (Act No. 13 of 2009). A level 1 finding is in all instances a safety concern and shall require remedial action acceptable to the Director within 24 hours by the approval holder.

(b) Level 2 Finding: A level 2 non-compliance or finding poses a serious safety and/or security risk to persons in the aircraft or to persons or to property on the ground and shall be resolved within a short time frame. It shall be required of the approval holder to develop action plans within agreed time frames and follow-up inspections or audits to verify rectification of the non-compliances. The corrective action plan shall be submitted to the Director and when acceptable the Director shall respond within 7 working days.

Note 1: A number of non-compliance findings that indicate a total system breakdown, may be escalated to a Level 2 or Level 1 finding.

Note 2: Previous findings, which have not been addressed (repetitive or continuous non compliance findings or blatant disregard for Authority findings), may be upgraded to a Level 2 or Level 1 finding.

Note 3: A level 2 or level 1 non-compliance on one part of the operation may not necessarily affect the whole operation.

(c) Level 3 **Finding:** A non-compliance or finding which shall not necessarily have an immediate direct impact on safety or security on its own. It is the responsibility of the approval holder to rectify and shall not necessitate a follow-up inspection. The approval holder is required to notify the Authority within a specified, when rectification has been effected. These findings are normally administrative in nature. Generally, a response containing corrective actions shall be received within 14 working days and no later.

(d) **Observation:** A practice or condition that indicates a trend that could lead to a future non-compliance. It is highly recommended that an operator shall respond to the observation.".

(d) the substitution in Technical Standard 127.07.19 for subsection (2) and (3) and the insertion in section 3 after subsection (14) of the following subsections:

"(2) Installed EFBs may be incorporated during **[the helicopter type design, by a supplemental type certificate.]** -

(a) an aeroplane type design,

(b) by a change to the type design, or

(c) if added by a STC.

(3) Portable EFBs are not considered to be part of the certified helicopter configuration. They do not require airworthiness approval but do require an operational approval.

[Note: Refer to section 2 for additional information concerning portable EFBs]

"3. Operational approval

(15) The EFB risk assessment to assess the risks associated with the use of each EFB function shall be done in accordance with Part 140 and be performed before the beginning of the approval process (if applicable) and its results shall be reviewed on a periodic basis.

(16) The EFB management system is responsible for hardware and software version and configuration management, maintenance of EFB security and integrity in accordance with documented policies and procedures and shall have an appropriately trained designate to be responsible for the system"."

(e) the insertion in the Table of contents after the following heading:

"127.07.28 Minimum equipment lists

127.07.29 Seats, seat safety belts, harnesses and child restraint devices and carriage of infants

127.07.33 Carry-on baggage";"

(f) the insertion after Technical Standard 127.07.28 of the following Technical Standard:

"127 07.29 Seats, seat safety belts, harnesses and child restraint devices and carriage of infants

(a) An owner or an operator of an aircraft shall not operate the aircraft unless such aircraft is equipped, as applicable, for the carriage of infants with.

(a) An air service operator shall ensure that an infant is only carried when properly secured in the arms or on the lap of an adult passenger, or with a child restraint system or in a sky cot.

(b) A sky cot may be used provided that it-

(i) is restrained so as to prevent it from moving under the maximum accelerations to be expected in flight;

(ii) is fitted with a restraining device so as to ensure that an infant shall not be thrown from such sky cot under the maximum accelerations to be expected in flight.

(iii) may not be used during critical phases of flight.

(iv) shall be positioned in such a way that they do not prevent or hinder the movement of adjacent passengers or block exits.

(c) a child restraint system may be used provided that–

(i) infants shall not be carried behind a bulkhead unless a child restraint device is used during critical phases of flight and during turbulence.

(ii) an infant may be seated in a car-type infant seat, provided that the infant`s seat—

(aa) is secured to the aeroplane seat in accordance with the instructions provided with the child seat;

(bb) is designed to be secured to a passenger seat by means of a single lap strap and face the same direction as the passenger seat;

(cc) does not unreasonably extend beyond the forward position of the passenger seat cushion on which it rests;

(dd) is secured to the passenger seat at all times during flight, even when it is unoccupied by the child;

(ee) shall be removed from an aircraft in an emergency evacuation, and not the infant's seat;

(ff) is positioned in such a way that it does not prevent or hinder the movement of adjacent passengers or block exits;

(gg) not placed in an aisle seat, depending on cabin configuration;

(hh) is used in accordance with infant weight limitations specified for such device;

(iii) is fitted with a single release harness, which secures the infant's lap, torso and shalers, but designed that the child can easily be secured in or removed from it; and

(iv) shall not be located in the same row or row directly forward or aft of an overwing emergency exit; or in the same row as any other exit unless such exit and row are separated by a bulkhead.

(d) when an infant is carried in the arms or on the lap of an adult passenger –

(i) the seat belt, when required to be worn, shall be fastened around the passenger carrying or nursing the infant, but not around the infant; and

(ii) the name of the infant shall be bracketed on the passenger list with the name of the person carrying or nursing the infant"."

AMENDMENT OF TECHNICAL STANDARDS 135

11. Document SA-CATS 135 is hereby amended by:

(a) the renaming of a Table and the insertion in section 8 of Technical Standard 135.05.09 for the following Table:

8. Aircraft data recording systems

TABLE A1

PARAMETERS FOR AIRCRAFT DATA RECORDER SYSTEMS

Serial number	Parameter and Category	Minimum recording range	Maximum recording interval (seconds)	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading (magnetic or true) R*	±180 degrees	1	±2 degrees	0.5 degree	*If not available, record rates
2	Pitch attitude E*	±90 degrees	0.25	±2 degrees	0.5 degree	*If not available, record rates
3	Roll attitude E*	±180 degrees	0.25	±2 degrees	0.5 degree	*If not available, record rates
4	Yaw rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no heading available

5	Pitch rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no pitch attitude available
6	Roll rate E*	±300 degrees	0.25	±1% + drift of 360°/hr	2 degrees	*Essential if no roll attitude available
7	Positioning system: latitude/ longitude E	Latitude:±90 degrees Longitude:±180 degrees	2 (1 if available)	As installed (0.00015 degree recom-mended)	0.00005 degree	
8	Positioning system: estimated error E*	Available range	2 (1 if available)	As installed	As installed	*If available
9	Positioning system: altitude E	-300m (-1 000ft) to maximum certificated altitude of aircraft +1 500m (5 000ft)	2 (1 if available)	As installed (±50ft (±15m) recom-mended)	5ft (1.5m)	
10	Positioning system : time* E	24 hrs	1	±.5 second	0.1 second	*UTC time preferred

						where available
11	Positioning system: ground speed E	0 – 1 000kt	2 (1 if available)	As installed (±5kt recom-mended)	1kt	
12	Positioning system : channel E	0–360 degrees	2 (1 if available)	As installed (±2 degrees recom-mended)	0.5 degree	
13	Normal acceleration E	-3g to +6g	0.25 (0.125 if available)	As installed (±0.09g excluding a datum error of ±0.45g recom-mended)	0.004g	
14	Longitudinal acceleration E	±1g	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recom-mended)	0.004g	

15	Lateral acceleration E	±1g	0.25 (0.125 if available)	As installed (±0.015g excluding a datum error of ±0.05g recom-mended)	0.004g	
16	External static pressure (or pressure altitude) R	34.4mb (3.44in-Hg) to 310.2mb (31.02in-Hg) or available sensor range	1	As installed (±1mb (0.1in-Hg) or ±100ft (±30m) to ±700ft (±210m) recom-mended)	0.1mb (0.01in-Hg) or 5ft (1.5m)	
17	Outside air temperature (or total air temperature) R	-50° to +90°C or available sensor range	2	As installed (±2°C recom-mended)	1°C	
18	Indicated air speed R	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recom-mended)	1kt (0.5kt recom-mended)	

19	Engine RPM R	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
20	Engine oil pressure R	Full range	Each engine each second	As installed (5% of full range recom-mended)	2% of full range	
21	Engine oil temperature R	Full range	Each engine each second	As installed (5% of full range recom-mended)	2% of full range	
22	Fuel flow or pressure R	Full range	Each engine each second	As installed	2% of full range	
23	Manifold pressure R	Full range	Each engine each second	As installed	0.2% of full range	
24	Engine thrust/power/ torque parameters required to determine propulsive	Full range	Each engine each second	As installed	0.2% of full range	*Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate

	thrust/power* R					to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed shall be provided.
25	Engine gas generator speed (Ng) R	0–150%	Each engine each second	As installed	0.2% of full range	
26	Free power turbine speed (Nf) R	0–150%	Each engine each second	As installed	0.2% of full range	
27	Coolant temperature R	Full range	1	As installed (±5°C recom-mended)	1°C	
28	Main voltage R	Full range	Each engine	As installed	1 Volt	

			each second			
29	Cylinder head temperature R	Full range	Each engine each second	As installed	2% of full range	
30	Flaps position R	Full range or each discrete position	2	As installed	0.5 degree	
31	Primary flight control surface position R	Full range	0.25	As installed	0.2% of full range	
32	Fuel quantity R	Full range	4	As installed	1% of full range	
33	Exhaust gas temperature R	Full range	Each engine each second	As installed	2% of full range	
34	Emergency voltage R	Full range	Each engine each second	As installed	1 Volt	
35	Trim surface position R	Full range or each discrete position	1	As installed	0.3% of full range	
36	Landing gear position R	Each discrete position*	1	Each gear every two seconds	-	*Where available, record up-

						and-locked and down-and-locked position
37	Novel/ unique aircraft features R	As required	As required	As required	As required	

***Note** :The following requirements shall be applicable with effect from 1 January 2023 and shall replace the requirements of table A1 with the effect of 1 January 2023.*

TABLE B1

PARAMETER GUIDANCE CHARACTERISTICS FOR AIRCRAFT DATA RECORDING SYSTEMS

N°	Parameter name	Minimum recording range	Maximum recording interval in seconds	Minimum recording accuracy	Minimum recording resolution	Remarks
1	Heading: a) Heading (Magnetic or True) b) Yaw rate	±180° ±300°/s	1 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Heading is preferred, if not available, yaw rate shall be recorded
2	Pitch: A) Pitch attitude b) Pitch rate	±90° ±300°/s	0.25 0.25	±2° ±1% + drift of 360°/h	0.5° 2°/s	*Pitch attitude is preferred, if not available,pitch rate shall be recorded

3	Roll: (a)Roll attitude (b) Roll rate	 ±180° ±300°/s	 0.25 0.25	 ±2° ±1% + drift of 360°/h	 0.5° 2°/s	*Roll attitude is preferred, if not available, roll rate shall be recorded
4	Positioning system (a)Time (b)Latitude/Longitude (c) Altitude (d) Ground speed (e)Track (f) Estimate error	 24 hours Lattitude: ±90° Longitude: ±180° –300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (5 000 ft) 0-1 000 kt 0-360°	 1 2 (if available) 2 (if available) 2 (if available) 2 (if available)	 ±0.5s As installed (0.00015° recommended) As installed (±15 m (±50 ft) recommended) As installed (±5 kt recommended) As installed (±2° recommended) As installed	 0.1 0.00005° 1.5m (5 ft) 1 kt 0.5° As installed	UCT time preferred where available Shall be recorded if

		Available range				readily available
5	Normal acceleration	–3 g to + 6g	0.25 (0.125 if available)	As installed (±0.09 g excluding a datum error of ±0.045 g recommended)	0.004 g	
6	Longitudinal acceleration	±1 g(*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
7	Lateral acceleration	±1 g(*)	0.25 (0.125 if available)	As installed (±0.015 g excluding a datum error of ±0.05 g recommended)	0.004 g	
8	External static pressure (or pressure altitude)	34.4 mb (3.44 in-Hg) to 310.2 mb	1	As installed (±1 mb (0.1 in-Hg) or ±30 m (±100 ft) to ±210 m	0.1 mb (0.01 in-Hg) or 1.5 m (5 ft)	

		(31.02 in-Hg) or available sensor range		(±700 ft) recommended)		
9	Outside air temperature (or total air temperature)	–50° to +90°C or available sensor range	2	As installed (±2°C recommended)	1°C	
	Indicated air speed	As the installed pilot display measuring system or available sensor range	1	As installed (±3% recommended)	1 kt (0.5 kt recommended)	
11	Engine RPM (*)	Full range including overspeed condition	Each engine each second	As installed	0.2% of full range	
12	Engine oil pressure	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	
13	Engine oil temperature	Full range	Each engine each second	As installed (5% of full range recommended)	2% of full range	

14	Fuel flow or pressure	Full range	Each engine each second	As installed	2% of full range	
15	Manifold pressure	Full range	Each engine each second	As installed	0.2% of full range	
16	Engine thrust/power/ torque parameters required to determine propulsive thrust/power*	Full range	Each engine each second	As installed	0.1% of full range	* Sufficient parameters e.g. EPR/N1 or torque/Np as appropriate to the particular engine shall be recorded to determine power in both normal and reverse thrust. A margin for possible overspeed shall be provided
17	Engine gas generator speed (Ng)	0–150%	Each engine each second	As installed	0.2% of full range	
18	Free power turbine speed (Nf)	0–150%	Each engine	As installed	0.2% of full range	

			each second			
19	Coolant temperature (*)	Full range	1	As installed (±5°C recommended	1°C	
20	Main voltage	Full range	Each engine each second	As installed	1 Volt	
21	Cylinder head temperature	Full range	Each cylinder each second	As installed	2% of full range	
22	Fuel quantity	Full range	4	As installed	1% of full range	
23	Primary flight control surface position	Full range	0.25	As installed	0.2% of full range	
24				As installed		
25	Exhaust gas temperature	Full range	Each engine each second	As installed	2% of full range	
26	Emergency voltage	Full range	Each engine each second	As installed	1 Volt	
27	Trim surface position	Full range or each discrete position	1	As installed	0.3% of full range	

28	Landing gear position	Each discrete position*	Each gear every two seconds	As installed		*Where available, record up-and-locked and down-and-locked position
29	Novel/unique aircraft features	As required	As required	As required	As required	
(						

(b) the renaming of Table in section 1 of Technical Standard 135.05.10 for the following Table:

"1. [Aeroplanes] An aeroplane for which flight data recorders are required

TABLE C1									
Aeroplane flight data recorder requirements									
Group	**Conditions See note 1.**	**Maximum Certificated Take-Off Mass (kg)**	**Propulsion System**	**FDR T.A.A.A.H See note 2.**	**FDR TYPE 1**	**FDR TYPE 1A**	**FDR TYPE II**	**Class C AIR or AIRS**	**ADRS**
1	Application for type certification submitted to Contracting	≤5700	Turbine	-	-		X	X	X

	State on or after 1 January 2016 **See note 3**								
2	Individual certificate of airworthiness first issued on or after 1 January 1989	> 27000	All	-	X				
3	Individual certificate of airworthiness first issued on or after 1 January 1989	> 5700 but ≤ 27000	All	-	-		X		
4	Individual certificate of airworthiness first issued on or after 1 January 1987 but before 1 January 1989 **Except those in Group 5**	>5700	Turbine	X	-				

5	Individual certificate of airworthiness first issued on or after 1 January 1987 but before 1 January 1989 whose types of which the prototype was certificated by the appropriate national authority after 30 September 1969	> 27000	Turbine	-	-		X		
6	Individual certificate of airworthiness first issued before 1 January 1987	>5700	Turbine	X	-				
7	Individual certificate of	>5700	All	-	-	X			

	airworthiness first issued after 1 January 2005								

Notes –

1. *For the purposes of this technical standard, any reference to the application for the type certification being submitted to a Contracting State on or after a specified date means the date an application is made for a new aircraft type, not the date of certification of particular aircraft variants or derivative models. Any reference to the individual certificate of airworthiness being issued first on or after a specified date means the first time a certificate of airworthiness is issued for a new individual aircraft serial number that has just come off the assembly line.*

2. *FDR T.A.A.A.H means a FDR that records time, altitude, airspeed, normal acceleration and heading.*

3. *The recording system may be any one of the three.*

[Section 4 substituted by SA-CATS 1/2017 w.e.f. 1 June 2017.]

(c) the insertion of a Table in Technical Standard 135.05.10 after Table C1 of the following Table:

AEROPLANE AGE AND REQUIREMENTS

Note: The following requirements shall be applicable with the effect from 1 January 2023 and shall replace the requirements of Table C1.

TABLE D1
AEROPLANE AGE AND REQUIREMENTS

The weight of the aircraft (take-off mass)		Age of Aircraft	Parameters to be recorded by FDR
1	5700kg or Less	All turbine engine aeroplanes for which the individual Certificate of airworthiness is first issued on or after 01 Jan 2016.	(a) At least the first 16 parameters in the table in subsection 5 (10) (b)A class C AIR or AIRS which shall record at least the flight path and speed parameters displayed to pilots as defined in notes below the table or (c) An ADRS which shall record at least the first 7 parameters listed in the table in subsection 5(11)
2	Over 27000kg	All aeroplanes for which the individual Certificate of airworthiness is first issued on or after 01 Jan 1989.	At least the first 32 parameters in the table in subsection 5 (10)
3	Over 5700kg up to and including 2700kg	All aeroplanes for which the individual Certificate of airworthiness is first issued on or after 01 Jan 1989.	At least the first 16 parameters in the table in subsection 5 (10)
4	5 700kg or less	All multi-engine turbine engine aeroplanes for which individual certificate of airworthiness first issued on or after 01 January 1990	At least the first 16 parameters in the table in subsection 5 (10)
5	Maximum 5 700kg	All multi-engine aircraft for which individual airworthiness certificate is first issued on or after 01	At least the first 16 parameters in the table in subsection 5 (10)

		January 1990	
6	Over 5700kg	All turbine-engined aeroplanes for which the individual certificate of airworthiness was first issued before 01 January 1989,with a maximum certificated take-off mass of over 5700 kg, except those mentioned in item no 7 in this table	At least the first 5 parameters in the table in subsection 5 (10)
7	Over 5700kg	All turbine engine aeroplanes, for which the individual certificate of airworthiness was first issued on or after 01 January 1987 but before 01 January 1989, except those mentioned in item no 7 in this table	At least the first 9 parameters in the table in subsection 5 (10)
8	Over 27000kg	Individual certificate of airworthiness first issued on or after 01 January 1987 but before 01 January 1989 types of which the prototype was certified by the appropriate authority after 30 September 1969	At least the first 16 parameters in the table in subsection 5 (10)

9	Over 27000kg	All turbine engine aeroplanes for which the individual certificate of airworthiness was first issued before 01 Jan 1987 but the prototype was certified by the appropriate authority after 30 September 1969	At least the first 05 parameters listed in the table in subsection 5(10) and meet the objectives of: (a) the attitude of the aeroplane in achieving its flight path; and (b) the basic forces acting upon the aeroplane resulting in the achieved flight path and the origin of such basic forces.
10	Over 5700kg	First individual airworthiness certificate issued on or after 01 January 2005	Record at least the first 78 parameters listed in the table in subsection 5(10)
11	Over 5700kg	All aeroplanes with a mass of over 5700kg Take Off Mass of which application for type certification is submitted to the contracting state on or after 1 January 2023	At least the first 82 parameters in the table in subsection 5(10)

Notes *If further FDR recording capacity is available, recording of the following additional information shall be considered: a) operational information from electronic display systems, such as electronic flight instrument systems (EFIS), electronic centralized aircraft monitor (ECAM) and engine indication and crew alerting system (EICAS). Use the following order of priority:*

1) parameters selected by the flight crew relating to the desired flight path, e.g. barometric pressure setting, selected altitude, selected airspeed, decision height, and autoflight system engagement and mode indications if not recorded from another source;

2) display system selection/status, e.g. SECTOR, PLAN, ROSE, NAV, WXR, COMPOSITE, COPY, ETC.;

3) warnings and alerts; and

4) the identity of displayed pages for emergency procedures and checklists; and b) retardation information including brake application for use in the investigation of landing overruns and rejected take-offs.

2. FDR parameters

[(5) The following parameters satisfy the requirements for flight path and speed –

(a) pressure altitude;

(b) indicated airspeed or calibrated airspeed;

(c) air-ground status and each landing gear air-ground sensor when practicable;

(d) total or outside air temperature;

(e) heading (primary flight crew reference);

(f) normal acceleration;

(g) lateral acceleration;

(h) longitudinal acceleration (body axis);

(i) time or relative time count;

(j) navigation data* (drift angle, wind speed, wind direction, latitude/longitude, groundspeed*); and

(k) radio altitude*.

(6) The following parameters satisfy the requirements for attitude –

(a) pitch attitude;

(b) roll attitude;

(c) yaw or sideslip angle*; and

(d) angle of attack*.

(7) The following parameters satisfy the requirements for engine power –

(a) engine thrust/power (propulsive thrust/power on each engine, cockpit thrust/power lever position);

(b) thrust reverse status*;

(c) engine thrust command*;

(d) engine thrust target*;

(e) engine bleed valve position*; and

(f) additional engine parameters* (EPR, N1, indicated vibration level, N2, EGT, TLA, fuel flow, fuel cut-off lever position, N3).

(8) The following parameters satisfy the requirements for configuration –

(a) pitch trim surface position;

(b) flaps* (trailing edge flap position, cockpit control selection);

(c) slats* (leading edge flap (slat) position, cockpit control selection);

(d) landing gear* (landing gear, gear selector position);

(e) yaw trim surface position*;

(f) roll trim surface position*;

(g) cockpit trim control input position pitch*;

(h) cockpit trim control input position roll*;

(i) cockpit trim control input position yaw*;

(j) ground spoiler and speed brake* (ground spoiler position, ground spoiler selection, speed brake position, speed brake selection);

(k) de-icing and/or anti-icing systems selection*;

(l) hydraulic pressure (each system)*;

(m) fuel quantity in CG trim tank*;

(n) AC electrical bus status*;

(o) DC electrical bus status*;

(p) APU bleed valve position*; and

(q) computed centre of gravity*.

(9) The following parameters satisfy the requirements for operation –

(a) warnings;

(b) primary flight control surface and primary flight control pilot input (pitch axis, roll axis, yaw axis);

(c) marker beacon passage;

(d) each navigation receiver frequency selection;

(e) manual radio transmission keying and CVR/FDR synchronisation reference;

(f) autopilot/autothrottle/AFCS mode and engagement status*;

(g) selected barometric setting* (pilot, first officer);

(h) selected altitude (all pilot selectable modes of operation)*;

(i) selected speed (all pilot selectable modes of operation)*;

(j) selected mach (all pilot selectable modes of operation)*;

(k) selected vertical speed (all pilot selectable modes of operation)*;

(l) selected heading (all pilot selectable modes of operation)*;

(m) selected flight path (all pilot selectable modes of operation)* (course/DSTRK, path angle);

(n) selected decision height*;

(o) EFIS display format* (pilot, first officer);

(p) multi-function/engine/alerts display format*;

(q) GPWS/TAWS/GCAS status* (selection of terrain display mode including pop-up display status, terrain alerts, both cautions and warnings and advisories, on/off switch position);

(r) low pressure warning* (hydraulic pressure, pneumatic pressure);

(s) computer failure*;

(t) loss of cabin pressure*;

(u) airborne collision avoidance system (ACAS)*;

(v) ice detection*;

(w) engine warning each engine vibration*;

(x) engine warning each engine over temperature*;

(y) engine warning each engine oil pressure low*;

(z) engine warning each engine over speed*;

(aa) wind shear warning*;

(bb) operational stall protection, stick shaker and pusher activation*;

(cc) all cockpit flight control input forces* (control wheel, control column, rudder pedal cockpit input forces);

(dd) vertical deviation* (ILS glide path, MLS elevation, GNSS approach path);

(ee) horizontal deviation* (ILS localizer, MLS azimuth, GNSS approach path);

(ff) DME 1 and 2 distances*;

(gg) primary navigation system reference* (GNSS, INS, VOR/DME, MLS, Loran C, ILS);

(hh) brakes* (left and right brake pressure, left and right brake pedal position);

(ii) date*;

(jj) event marker*;

(kk) head-up display in use*; and

(II) para-visual display on*.]

(d) the renaming of a Table in Technical Standard 135.05.10 subsection 2(10) of the following Table:

"(10) The measurement range, recording interval and accuracy of parameters on installed FDR equipment shall meet the specifications in the following Table:

TABLE E1

PARAMETERS FOR AEROPLANE FLIGHT DATA RECORDERS

Serial number	**Parameter**	**Measurement range**	**Maximum sampling and recording interval (seconds)**	**Accuracy limits (sensor input compared to FDR read-out)**	**Recording resolution (Note 1)**
1	Time (UTC when available, otherwise relative time count or GPS time sync)	24 hours	4	± 0.125% per hour	1 second
2	Pressure altitude	–1 000ft (–300m) to maximum certificated altitude of aircraft +5000ft (+1 500m)	1	± 100ft to ±700ft (±30m to ± 200m)	5ft (1.5m)

3	Indicated airspeed or calibrated airspeed	50kt to max Vso (Note 2) Vso to 1.2 VD (Note 3)	1	± 5% ± 3%	1kt (0.5kt recommended
4	Heading (primary flight crew reference)	360°	1	± 2°	0.5°
5	Normal acceleration (Note 4)	–3g to +6g	0.125	±1% of maximum range excluding datum error of ± 5%	0.004g
6	Pitch attitude	±75° or usable range whichever is greater	1 (0.25 Note 1)	± 2°	0.5°
7	Roll attitude	± 180°	1 (0.25 Note 1)	± 2°	0.5°
8	Radio transmission keying	On-off (one discrete)	1	-	-
9	Power on each engine (Note 5)	Full range	1 (per engine)	± 2°	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control section	Full range on each discrete position	2	± 5% or as pilot's indicator	0.5% of full range or the resolution required to

					operate the aircraft
11*	Leading edge flap and cockpit control section	Full range on each discrete position	2	± 5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
12*	Thrust reverser position	Stowed, in transit, and reverse	1 (per engine)	-	-
13*	Ground spoiler/ speed brake selection (selection and position)	Full range on each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature	Sensor range	2	± 2°C	0.3° C
15*	Autopilot/auto throttle/AFCS mode and engagement status	A suitable combination of discretes	1	-	-
16	Longitudinal acceleration (Note 4)	±1g	0.25	±0.015g excluding a datum error of ±0.05g	0.004g
Note – *The preceding 16 parameters satisfy the requirements for a Type II FDR*					
17	Lateral acceleration (Note 4)	±1g	0.25	±0.015g excluding a datum error of ±0.05g	0.004g

18	Pilot input and/or control surface position – primary controls (pitch, roll, yaw) (Notes 6 and 7)	Full range	1 (0.25 Note 1)	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position	Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude	– 20ft to 2 500ft (–6m to 750m)	1	±2ft (±0.6m) or ±3% whichever is greater below 500ft (150m) and ±5% above 500ft (150m)	1ft (0.3m) below 500ft (150m); 1ft (0.3m)/0.5% of full range above 500ft (150m)
21*	Vertical beam deviation (ILS/GPS/ GLS glide path, MLS elevation, IRNAV/ IAN vertical deviation)	Signal range	1	±3%	0.3% of full range
22*	Horizontal beam deviation (ILS/GPS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)	Signal range	1	±3%	0.3% of full range
23	Marker beacon passage	Discrete	1	-	-

24	Master warning	Discrete	1	-	-
25	Each NAV receiver frequency selection (Note 8)	Full range	4	As installed	-
26*	DME 1 and 2 distance (includes distance to runway threshold (GLS) and distance to missed approach point (IRNAV/IAN)) (Notes 8 and 9)	0 – 200NM (0 – 370km)	4	As installed	1NM (1852m)
27	Air/ground status	Discrete	1	-	-
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status and terrain alerts, both cautions and warnings, and advisories and on/off switch position)	Discrete	1	-	-
29*	Angle of attack	Full range	0.5	As installed	0.3% of full range
30*	Hydraulics, each system (low pressure)	Discrete	2	-	0.5% of full range
31*	Navigation data (latitude/longitude, ground speed and drift angle) (Note 10)	As installed	1	As installed	-

32*	Landing gear or gear selector position	Discrete	4	As installed	-
Note – *The preceding 32 parameters satisfy the requirements for a Type I FDR*					
33*	Groundspeed	As installed	1	Data shall be obtained from the most accurate system	1kt
34	Brakes (left and right brake pressure, left and right brake pedal position)	(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N1, indicated vibration level, N2, EGT, fuel flow, fuel cut-off lever position, N3)	As installed	Each engine each second	As installed	2% of full range
36*	ACAS (airborne collision avoidance system)	Discretes	1	As installed	-
37*	Windshear warning	Discrete	1	As installed	-
38*	Selected barometric setting (pilot, co-pilot)	As installed	64	As installed	0.1mb (0.01in-Hg)
39*	Selected altitude (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection

41*	Selected Mach (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)	As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation) (course/DSTRK, path angle, final approach path (IRNAV/IAN))	-	1	As installed	-
45*	Selected decision height	As installed	64	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot, co-pilot)	Discrete(s)	4	As installed	-
47*	Multi-function/ engine/alerts display format	Discrete(s)	4	As installed	-
48*	AC electrical bus status	Discrete(s)	4	As installed	-
49*	DC electrical bus status	Discrete(s)	4	As installed	-
50*	Engine bleed valve position	Discrete(s)	4	As installed	-
51*	APU bleed valve position	Discrete(s)	4	As installed	-

52*	Computer failure	Discrete(s)	4	As installed	-
53*	Engine thrust command	As installed	2	As installed	-
54*	Engine thrust target	As installed	4	As installed	2% of full range
55*	Computed centre of gravity	As installed	64	As installed	1% of full range
56*	Fuel quantity in CG trim tank	As installed	64	As installed	1% of full range
57*	Head up display in use	As installed	4	As installed	-
58*	Para visual display on/off	As installed	1	As installed	-
59*	Operational stall protection, stick shaker and pusher activation	As installed	1	As installed	-
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)	As installed	4	As installed	-
61*	Ice detection	As installed	4	As installed	-
62*	Engine warning each engine vibration	As installed	1	As installed	-
63*	Engine warning each engine over temperature	As installed	1	As installed	-
64*	Engine warning each engine oil pressure low	As installed	1	As installed	-
65*	Engine warning each engine over speed	As installed	1	As installed	-

66*	Yaw trim surface position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll trim surface position	Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle	Full range	1	±5%	0.5
69*	De-icing and/or anti-icing systems selection	Discrete(s)	4	±5%	-
70*	Hydraulic pressure (each system)	Full range	2	±5%	100psi
71*	Loss of cabin pressure	Discrete	1	±5%	-
72*	Cockpit trim control input position – Pitch	Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position – Roll	Full range	1	±5%	0.2% of full range or as installed
74*	Cockpit trim control input position – Yaw	Full range	1	±5%	0.2% of full range or as installed
75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)	Full range (±311N (±70lbf), ± 378N (±85lbf), ± 734N (±165lbf))	1	±5%	0.2% of full range or as installed

76*	Event marker	Discrete	1	-	-
77*	Date	365 days	64	-	-
78*	ANP or EPE or EPU	As installed	4	As installed	-
Note – *The preceding 78 parameters satisfy the requirements for a Type IA FDR*					

(d) the insertion in Technical Standard 135.05.10 after Table E1 in subsection 5(10) for the following Table

Note: The following requirements shall be applicable with effect from 1 January 2023 and shall replace the requirements of Table E1 above with the effect of 1 January 2023.

TABLE F1						
PARAMETERS FOR AEROPLANE FLIGHT DATA RECORDERS						
Serial number	**Parameter**	**Applicability**	**Measurement range**	**Maximum sampling and recording interval (seconds)**	**Accuracy limits (sensor input compared to FDR read-out)**	**Recording resolution**
1	Time (UTC when available, otherwise relative time count or GNSS time sync)		24 hours	4	±0.125%/h	1s

2	Pressure-altitude		–300 m (–1 000 ft) to maximum certificated altitude of aircraft +1 500 m (+5 000 ft)	1	±30 m to ±200 m (±100 ft to ±700 ft)	1.5 m (5 ft)
3	Indicated airspeed or calibrated airspeed		95 km/h (50 kt) to max V_{so} *(note 1)* V_{so} to 1.2 V_D *(note 2)*	1	±5% ±3%	1 kt (0.5 kt recommended)
4	Heading (primary flight crew reference)		360°	1	±2°	0.5°
5	Normal acceleration *Note 8*	Application for type certification is submitted to a Contracting State before 1 January 2016 Application for type certification is submitted to a	–3 g to +6 g –3 g to +6 g	0.125 0.0625	±1% of maximum range excluding datum error of ±5% ±1% of maximum range excluding datum	0.004 g 0.004 g

		Contracting State on or after 1 January 2016			error of ±5%	
6	Pitch attitude		±75° or usable range whichever is greater	0.25	±2°	0.5°
7	Roll attitude		±180°	0.25	±2°	0.5°
8	Radio transmission keying		On-off (one discrete)	1		
9	Power on each engine *Note 3*		Full range	1 (per engine)	±2%	0.2% of full range or the resolution required to operate the aircraft
10*	Trailing edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to operate the aircraft
11*	Leading edge flap and cockpit control selection		Full range or each discrete position	2	±5% or as pilot's indicator	0.5% of full range or the resolution required to

						operate the aircraft
12*	Thrust reverser position		Stowed, in transit, &reverse		1 (per engine)	
13*	Ground spoiler/speed brake selection (selection and position)		Full range or each discrete position	1	±2% unless higher accuracy uniquely required	0.2% of full range
14	Outside air temperature		Sensor range	2	±2°C	0.3°C
15*	Autopilot/auto throttle/AFCS mode and engagement status		A suitable combination of discretes	1		
16	Longitudinal acceleration *Note 8*	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004 g
		Application for type certification submitted to a	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g

		Contracting State on or after 1 January 2016				
17	Lateral acceleration *Note 8*	Application for type certification submitted to a Contracting State before 1 January 2016	±1 g	0.25	±0.015 g excluding a datum error of ±0.05 g	0.004
		Application for type certification submitted to a Contracting State on or after 1 January 2016	±1 g	0.0625	±0.015 g excluding a datum error of ±0.05 g	0.004 g
18	Pilot input and/or control surface position-primary controls (pitch, roll, yaw) *notes 4&8*	Application for type certification submitted to a Contracting State before	Full range	0.25	±2° unless higher accuracy uniquely required	0.2% of full range or as installed

		1 January 2016				
		Application for type certification submitted to a Contracting State on or after 1 January 2016	Full range	0.125	±2° unless higher accuracy uniquely required	0.2% of full range or as installed
19	Pitch trim position		Full range	1	±3% unless higher accuracy uniquely required	0.3% of full range or as installed
20*	Radio altitude		–6 m to 750 m (–20 ft to 2 500 ft)	1	±0.6 m (±2 ft) or ±3% whichever is greater below 150 m (500 ft) and ±5% above 150 m (500 ft)	0.3 m (1 ft) below 150 m (500 ft) 0.3 m (1 ft) + 0.5% of full range above 150 m (500 ft)
21*	Vertical beam deviation (ILS/GNSS/GLS		Signal range	1	±3%	0.3% of full range

	glide path, MLS elevation, IRNAV/IAN vertical deviation)					
22*	Horizontal beam deviation (ILS/GNSS/GLS localizer, MLS azimuth, IRNAV/IAN lateral deviation)		Signal range	1	±3%	0.3% of full range
23	Marker beacon passage		Discrete	1		
24	Master warning		Discrete	1		
25	Each NAV receiver frequency Selection *note 5*		Full range	4	As installed	
26*	DME 1 and 2 distance (includes Distance to runway threshold (GLS) and Distance to missed approach point (IRNAV/IAN)) *notes 5 &6*		0 – 370 km (0 – 200 NM)	4	As installed	1 852 m (1 NM)

27	Air/ground status		Discrete	1		
28*	GPWS/TAWS/GCAS status (selection of terrain display mode including pop-up display status) and (terrain alerts, both cautions and warnings, and advisories) and (on/off switch position)		Discrete	1		
29*	Angle of attack		Full range	0.5	As installed	0.3 % of full range
30*	Hydraulics, each system (low pressure)		Discrete	2		0.5% of full range
31*	Navigation data (latitude/longitude, ground speed, and drift angle) *note 7*		As installed	1	As installed	
32*	Landing gear and gear selector position		Discrete	4	As installed	
33*	Groundspeed		As installed	1	Data shall be obtained from the	1 kt

					most accurate system	
34	Brakes (left and right brake pressure, left and right brake pedal position)		(Maximum metered brake range, discretes or full range)	1	±5%	2% of full range
35*	Additional engine parameters (EPR, N_1, indicated vibration level, N_2, EGT, fuel flow, fuel cut-off lever position, N_3, engine fuel metering valve position)	Engine fuel metering valve position: Application for type certification is submitted to a Contracting State on or after 1 January 2023	As installed	Each engine each second	As installed	2% of full range
36*	TCAS/ACAS (traffic alert and collision avoidance system)		Discretes	1	As installed	
37*	Wind shear warning		Discrete	1	As installed	
38*	Selected barometric		As installed	64	As installed	0.1 mb (0.01 in-Hg)

	setting (pilot, co-pilot)					
39*	Selected altitude (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
40*	Selected speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
41*	Selected Mach (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
42*	Selected vertical speed (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
43*	Selected heading (all pilot selectable modes of operation)		As installed	1	As installed	Sufficient to determine crew selection
44*	Selected flight path (all pilot selectable modes of operation)			1	As installed	

	(course/DSTRK, path angle, final approach path (IRNAV/IAN))					
45*	Selected decision height		As installed	64	As installed	Sufficient to determine crew selection
46*	EFIS display format (pilot, co-pilot)		Discrete(s)	4	As installed	
47*	Multi-function/engine/ alerts display format		Discrete(s)	4	As installed	
48*	AC electrical bus status		Discrete(s)	4	As installed	
49*	DC electrical bus status		Discrete(s)	4	As installed	
50*	Engine bleed valve position		Discrete(s)	4	As installed	
51*	APU bleed valve position		Discrete(s)	4	As installed	
52*	Computer failure		Discrete(s)	4	As installed	
53*	Engine thrust command		As installed	2	As installed	
54*	Engine thrust target		As installed	4	As installed	2% of full range
55*	Computed centre of gravity		As installed	64	As installed	1% of full range

56*	Fuel quantity in CG trim tank		As installed	64	As installed	1% of full range
57*	Head up display in use		As installed	4	As installed	
58*	Para visual display on/off		As installed	1	As installed	
59*	Operational stall protection, stick shaker and pusher activation		As installed	1	As installed	
60*	Primary navigation system reference (GNSS, INS, VOR/DME, MLS, Loran C, localizer glideslope)		As installed	4	As installed	
61*	Ice detection		As installed	4	As installed	
62*	Engine warning each engine vibration		As installed	1	As installed	
63*	Engine warning each engine over temperature		As installed	1	As installed	
64*	Engine warning each engine oil pressure low		As installed	1	As installed	

65*	Engine warning each engine over speed		As installed	1	As installed	
66*	Yaw trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
67*	Roll trim surface position		Full range	2	±3% unless higher accuracy uniquely required	0.3% of full range
68*	Yaw or sideslip angle		Full range	1	±5%	0.5°
69*	De-icing and/or anti-icing systems selection		Discrete(s)	4		
70*	Hydraulic pressure (each system)		Full range	2	±5%	100 psi
71*	Loss of cabin pressure		Discrete	1		
72*	Cockpit trim control input position, Pitch		Full range	1	±5%	0.2% of full range or as installed
73*	Cockpit trim control input position, Roll		Full range	1	±5%	0.2% of full range or as installed

74*	Cockpit trim control input position, Yaw		Full range	1	±5%	0.2% of full range or as installed
75*	All cockpit flight control input forces (control wheel, control column, rudder pedal)		Full range (±311 N (±70 lbf), ± 378 N (±85 lbf), ± 734 N (±165 lbf))	1	±5%	0.2% of full range or as installed
76*	Event marker		Discrete	1		
77*	Date		365 days	64		
78*	ANP or EPE or EPU		As installed	4	As installed	
79*	Cabin pressure altitude	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed (0 ft to 40 000 ft recommended)	1	As installed	100 ft
80*	Aeroplane computed weight	Application for type certification submitted to a Contracting State on or after 1	As installed	64	As installed	1% of full range

		January 2023				
81*	Flight director command	Application for type certification submitted to a Contracting State on or after 1 January 2023	Full range	1	± 2°	0.5°
82*	Vertical speed	Application for type certification submitted to a Contracting State on or after 1 January 2023	As installed	0.25	As installed (32 ft/min recommended)	16 ft/min

Notes.—

1. V_{so} stalling speed or minimum steady flight speed in the landing configuration is in Section "Abbreviations and Symbols".

2. V_D design diving speed.

3. Record sufficient inputs to determine power.

4. For aeroplanes with control systems in which movement of a control surface shall back drive the pilot's control, "or" applies. For aeroplanes with control systems in which movement of a control surface shall not back drive the pilot's control, "and" applies. In aeroplanes with split surfaces, a suitable combination of inputs is acceptable in lieu of recording each surface separately. In

aeroplanes with independent pilot input on primary controls, each pilot input on primary controls needs to be recorded separately.

5. If signal available in digital form.

6. Recording of latitude and longitude from INS or other navigation system is a preferred alternative.

7. If signals readily available.

8. It is not intended that aeroplanes issued with an individual certificate of airworthiness before 1 January 2016 be modified to meet the measurement range, maximum sampling and recording interval, accuracy limits or recording resolution description detailed in this Part.

9. The number of parameters to be recorded shall depend on aeroplane complexity. The parameters without an asterisk (*) are mandatory parameters which shall be recorded regardless of aeroplane complexity.".

(e) the substitution in section 1 of Technical Standard 135.05.11 of a Table for the following Table:

1. [Aeroplanes] An aeroplane for which voice or aural recorders are required]

TABLE

TABLE G1						
Aeroplane voice or aural recorders requirements						
Group See note 1.	**Conditions See note 2.**	**Maximum Certificated Take-Off Mass (kg)**	**Propulsion System**	**Recording retained for the last 30 minutes of operation**	**Recording retained for the last 2 hours of operation**	**Recording retained for at least the last 25 hours of operation**

1	Application for type certification submitted to Contracting State on or after 1 January 2016 and required to be operated by more than one pilot	> 2250 but ≤ 5700	Turbine	-	X	-
2	Individual certificate of airworthiness first issued on or after 1 January 2003	> 5700	All	-	X	-
3	Individual certificate of airworthiness first issued on or after 1 January 1987	> 5700	All	-	X	-
4	Individual certificate of airworthiness first issued	>5700>* 27000 *more or equal to	Turbine	-	X	-

	before 1 January 1987 whose types of which the prototype was certificated by the appropriate national authority after 30 September 1969					
5	individual certificate of airworthiness is first issued on or after 1 January 2021	> 27000	All	-	-	X

(f) the substitution of subsection (3)(b)(i) in Technical Standard 135.06.2 for the following subsection:

"(b) Responsibilities

The PRA is responsible for safe aeroplane operations, in particular –

"(i) is responsible for all maintenance and inspection personnel **[signing of Part D of the operations specifications]"**;"

(g) by the insertion after Technical Standard 135.06.3 for the following Technical Standard:

135.06.5 Safety and Security Inspections and Audit

(1) Findings of non-compliance as follows:

(a) Level 1 Finding: A level 1 non-compliance or finding poses imminent danger, safety and/or security risk to persons in the aircraft or to persons or to property on the ground and shall necessitate the exercising of immediate discretionary enforcement powers vested in the inspectors, authorised officers and/or authorised persons in the interest of safeguarding aviation safety and security in terms of Section 115 and 116 of the Civil Aviation Act, 2009 (Act No. 13 of 2009). A level 1 finding is in all instances a safety concern and shall require remedial action acceptable to the Director within 24 hours by the approval holder.

(b) Level 2 Finding: A level 2 non-compliance or finding poses a serious safety and/or security risk to persons in the aircraft or to persons or to property on the ground and shall be resolved within a short time frame. It shall be required of the approval holder to develop action plans within agreed time frames and follow-up inspections or audits to verify rectification of the non-compliances. The corrective action plan shall be submitted to the Director and when acceptable the Director shall respond within 7 working days.

Note 1: A number of non-compliance findings that indicate a total system breakdown, may be escalated to a Level 2 or Level 1 finding.

Note 2: Previous findings, which have not been addressed (repetitive or continuous non compliance findings or blatant disregard for Authority findings), may be upgraded to a Level 2 or Level 1 finding.

Note 3: A level 2 or level 1 non-compliance on one part of the operation may not necessarily affect the whole operation.

(c) Level 3 **Finding:** A non-compliance or finding which shall not necessarily have an immediate direct impact on safety or security on its own. It is the responsibility of the approval holder to rectify and shall not necessitate a follow-up inspection. The approval holder is required to notify the Authority within a specified, when rectification has been effected. These findings are

normally administrative in nature. Generally, a response containing corrective actions shall be received within 14 working days and no later.

(h) by the substitution of section 6 in Technical Standard 135. 07.13. for the following section:

"6. Flight tracking

(1) An operator shall establish procedures, approved by the Director, for the retention of aircraft tracking data to assist SAR in determining the last known position of the aircraft.

(2) An aeroplane of an MCM of over 5700 kg for which the individual certificate of airworthiness is first issued on or after 1 January 2021, shall autonomously transmit information from which a position can be determined at least once every minute, when in distress.

(3) Notwithstanding the provisions of subsection (1), the Director may, based on the results of an approved risk assessment process implemented by an operator, allow for variations to the automated reporting intervals.

(4) The risk assessment process shall demonstrate how the risks to the operation resulting from the allowable variations can be managed and shall include at least the following –

(i) capability of the operator's operational control systems and processes, including those for contacting ATS units;

(ii) overall capability of the aeroplane and its systems;

(iii) available means to determine the position of, and communicate with, the aeroplane;

(iv) frequency and duration of gaps in automated reporting;

(v) human factors consequences resulting from changes to flight crew procedures; and

(vi) specific mitigation measures and contingency procedures.

***Note** - More detailed information and guidance on flight tracking and autonomous transmission of information on position reporting is contained in the guidance material on flight tracking"."*

(i) by the substitution of subsection (4) in Technical Standard 135.07.28 for the following

subsection:

"(4) The categories referred to in **[paragraph]** subsection (3) **[above]** are established on the basis of 1.3 times the stall speed of the aeroplanes in the landing configuration at maximum certificated landing mass and are as follows –

(a) Category A – less than 91 knots indicated airspeed;

(b) Category B – 91 knots indicated airspeed or more, but less than **[135 knots]** 121 knots indicated airspeed;

(c) Category C – **[135 knots]** 121 knots indicated airspeed or more, but less than 141 knots indicated airspeed;

(d) Category D – 141 knots indicated airspeed or more, but less than 166 knots indicated airspeed; and

(e) Category E – 166 knots indicated airspeed or more, but less than 211 knots indicated airspeed.

Note – Procedures being in force, the Air Traffic Service **[will]** shall report to the Director details of all aeroplanes attempting an approach, the RVR visibility at the time, and the outcome of the approach attempt. This information will be used by the **[CAA]** Authority in investigation of approaches attempted outside of the operator's equipment"."

(j) the substitution in section 1 of Technical Standard 135.07.30 for subsection (2) and (3) and the insertion in section 3 after subsection (14) of the following subsections:

"1. Introduction

"(2) Installed EFBs may be incorporated during **[the aeroplane type design, by a change to the type design or added by a supplemental type certificate.]** -

(a) an aeroplane type design;

(b) by a change to the type design; or

(c) if added by a STC.

(3) Portable EFBs are not considered to be part of the certified aeroplane configuration. They do not require airworthiness approval but do require an operational approval.

[Note: Refer to section 2 for additional information concerning portable EFBs]"

"3. Operational approval

(15) The EFB risk assessment to assess the risks associated with the use of each EFB function shall be done in accordance with Part 140 and be performed before the beginning of the approval process (if applicable) and its results shall be reviewed on a periodic basis.

(16) The EFB management system is responsible for hardware and software version and configuration management, maintenance of EFB security and integrity in accordance with documented policies and procedures and shall have an appropriately trained designate to be responsible for the system"."

(k) the insertion in the Table of contents of the following heading:

"135.07.36 Briefing of passengers

135.07.37 Safety features card

135.07.38 Seats, seat safety belts, harnesses and child restraint devices and carriage of infants";"

(l) the insertion after Technical Standard 135.07.37 of the following Technical Standard:

"135.07.38 Seats, seat safety belts, harnesses and child restraint devices and carriage of infants

(1) An owner or an operator of an aircraft shall not operate the aircraft unless such aircraft is equipped, as applicable, for the carriage of infants with.

(a) An air service operator shall ensure that an infant is only carried when properly secured in the arms or on the lap of an adult passenger, or with a child restraint system or in a sky cot.

(b) A sky cot may be used provided that it-

(i) is restrained so as to prevent it from moving under the maximum accelerations to be expected in flight;

(ii) is fitted with a restraining device so as to ensure that the infant shall not be thrown from such sky cot under the maximum accelerations to be expected in flight.

(iii) may not be used during critical phases of flight.

(iv) shall be positioned in such a way that they do not prevent or hinder the movement of adjacent passengers or block exits.

(c) a child restraint system may be used provided that–

(i) infants shall not be carried behind a bulkhead unless a child restraint device is used during critical phases of flight and during turbulence.

(ii) an infant may be seated in a car-type infant seat, provided that an infant`s seat

(aa) is secured to the aeroplane seat in accordance with the instructions provided with the child seat;

(bb) is designed to be secured to a passenger seat by means of a single lap strap and face the same direction as the passenger seat;

(*cc*) does not unreasonably extend beyond the forward position of the passenger seat cushion on which it rests;

(dd) is secured to the passenger seat at all times during flight, even when it is unoccupied by the child;

(*ee*) shall be removed from the aircraft in an emergency evacuation, and not the infant;

(*ff*) is positioned in such a way that it does not prevent or hinder the movement of adjacent passengers or block exits;

(*gg*) is not placed in an aisle seat, depending on cabin configuration;

(hh) is used in accordance with infant weight limitations specified for such device;

(iii) is fitted with a single release harness, which secures the infant's lap, torso and shalers, but designed that the child can easily be secured in or removed from it; and

(iv) shall not be in the same row or row directly forward or aft of an overwing emergency exit; or in the same row as any other exit unless such exit and row are separated by a bulkhead.

(d) when an infant is carried in the arms or on the lap of an adult passenger –

(i) the seat belt, when required to be worn, shall be fastened around the passenger carrying or nursing the infant, but not around the infant; and

(ii) the name of the infant shall be bracketed on the passenger list with the name of the person carrying or nursing the infant"."

AMENDMENT OF TECHNICAL STANDARD 139

12. Document SA CATS 139 is hereby amended by-

(a) the substitution under definitions for the definition of "instrument runway" of the following definition:

"instrument runway" means one of the following types of runways intended for the operation of aircraft using instrument approach procedures such as –

(a) non-precision approach runway - an instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight-in approach;

(b) precision approach runway, category I - an instrument runway served by ILS or MLS and visual aids intended for operations with a decision height not lower than 60m (200 ft.) and either a visibility not less than 800m or a runway visual range not less than 550m;

(c) precision approach runway, category II - an instrument runway served by ILS or MLS and visual aids intended for operations with a decision height lower than 60m (200 ft.) but not lower than 30m (100 ft.) and a runway visual range not less than 300m;

(d) Precision approach runway, category III" - a runway served by visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation served by ILS or MLS with a decision height lower than 30m (100 ft.), or no decision height and a runway visual range less than 300 m or no runway visual range limitations.";

(b) the insertion after the definition of "runway strip" of the following definition:

""**runway surface condition"** means a description of the condition of the runway surface used in the runway condition report which establishes the basis for the determination of the runway condition code for aeroplane performance purposes;";

(c) the insertion after Technical Standard 139.02.10 subsection 1(7) paragraph (c) of the following paragraph:

"(c) the surface of a runway turn pad shall be so constructed or resurfaced as to provide surface friction characteristics at least equal to that of the adjoining runway"."

(d) the substitution in Technical Standard 139.02.10 subsection (8) for paragraphs (e) and (f) and the insertion after paragraph (g) of the following paragraphs:

"(e) **[No fixed object, other than visual aids required for air navigation purposes and satisfying the relevant frangibility requirements shall be permitted on within –**

(i) 77.5m of the runway centre line of a precision approach runway category I, II or III where the code number is 4 and the code letter is F; or

(ii) 60m of the runway centre line of a precision approach runway category I, II or III where the code number is 3 or 4; or

(iii) **45m of the runway centre line of a precision approach runway category I where the code number is 1 or 2.]** A fixed object, other than visual aids required for air navigation or those required for aircraft safety purposes of which shall be sited on the runway strip and satisfying the relevant frangibility requirements, shall not be permitted on any part of a runway strip of a precision approach runway delineated by the lower edges of the inner transitional surfaces.

(f) **[Mobile]** A mobile object shall not be permitted on those parts of the runway strip as prescribed in paragraph (a) during the use of the runway for landing or take-off.

(g) The surface of that portion of a strip that abuts a runway, shoulder or stopway shall be flush with the surface of the runway, shoulder or stopway.

"(h) An equipment or installation required for air navigation or for aircraft safety purposes shall be located on or near a strip of a precision approach runway category I, II or III and which:

(i) is situated within 240 m from the end of the strip and within:

(aa) 60 m of the extended runway centre line where the code number is 3 or 4; or

(bb) 45 m of the extended runway centre line where the code number is 1 or 2; or

(ii) penetrates the inner approach surface, the inner transitional surface or the balked landing surface, shall be frangible and mounted as low as possible.";

(e) the substitution in Technical Standard 139.02.10(10) for paragraph (a) of the following paragraph:

"(a) Where applicable, the clearway shall –

(i) be at the end of the take-off run available;

(ii) not have a length exceeding half the length of the take-off run available;

(iii) extend laterally to a distance of at least 75m on each side of the extended centre line of **[the]** an instrument runway and half of the width of the runway strip for a non-instrument runway;";

(f) the insertion in Technical Standard 139.02.10(13) after paragraph (d) of the following paragraph:

"(e) the surface of a paved taxiway shall be so constructed or resurfaced as to provide suitable surface friction characteristics and properties required on a taxiway that assure safe operation of an aircraft.";

(g) the substitution in Technical Standard 139.02.10(17) for paragraph (f) of the following paragraph:

"(f) The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the centre line of a runway shall be in accordance with table 8 and, in the case of a precision approach runway, such that a holding aircraft or vehicle shall not interfere with the operation of radio navigation aids or penetrate the inner transitional surface.";

(h) the renumbering in Technical Standard 139.02.10 (46) after paragraph (a) for the existing subparagraph (iii) to become paragraph (b) as follows:

"(a) A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway shall be used in runway visual range conditions of less than 550m, except where –

(i) appropriate aids and procedures are available to assist in preventing inadvertent incursions of traffic onto the runway; or

(ii) operational procedures exist to limit, in runway visual range conditions of less than 550m, the number of—

(aa) aircraft on the manoeuvring area to 1 at a time; and

(bb) vehicles on the manoeuvring area to the essential minimum.

[(iii) where] (b) Where there is more than 1 stop bar associated with a taxiway or runway intersection, only one shall be illuminated at any provided time.";

(i) the substitution in Technical Standard 139.02.10 (48) for paragraph (a) and the insertion after paragraph (a) of the following paragraphs:

"(a) **[Runway guard lights shall be provided at each intersection of a taxiway with a runway intended for use in-]** Runway guard lights shall be provided at each taxiway/runway intersection associated with a runway intended for use in-

(i) runway visual range conditions of less than 550m where a stop bar is not installed; and

(j) runway visual range conditions between 550m and 1200m where the traffic density is heavy"."

"(b) Where more than one runway-holding positions exist at a runway or taxiway intersection, only the set of runway guard lights associated with the operational runway-holding position shall be illuminated.

(c) Runway guard lights, Configuration A, shall be located at each side of the taxiway on the holding side of the runway-holding position marking.

(d) Runway guard lights, Configuration B, shall be located across the taxiway on the holding side of the runway-holding position marking.

(e) The light beam shall be unidirectional and shall show yellow in the direction of approach to aligned to the runway-holding position.";

(j) the substitution in Technical Standard 139.02.10 for subsection (50) of the following subsection:

"(a) Signs shall be provided to convey a mandatory instruction, information on a specific location or destination on a movement area or to provide other information to meet the requirements of a surface movement guidance and control system.

(b) When designating taxiways, the use of the letter I, O or X shall not be used.";

(k) the insertion in Technical Standard 139.02.10 subsection (51) after paragraph (a) of the following paragraphs:

"(b) A no-entry bar shall be located across the taxiway at the end of an exit only taxiway, where it is desired to prevent traffic from entering the taxiway in the wrong direction.

(c) A no-entry bar shall be co-located with a no-entry sign and/or a no-entry marking.

(d) Taxiway centre line lights installed beyond the no-entry bar, looking in the direction of the runway, shall not be visible when viewed from the taxiway.";

(l) the insertion in Technical Standard 139.02.23 subsection 8 (2) after subparagraph (d) for the following subparagraphs and the insertion after Table A1 of the of the following Table:

"(e) The surface of a runway shall be tested for friction in accordance with Table A2.

(f) After determining the landings [A] and the mass [B], the column with the higher value shall be used to select the appropriate frequency in column [C].

Table A2: Frequency of runway surface friction testing.

Daily turbo-jet aircraft landings for runway end [A]	Annual aircraft mass for runway end (million kg) [B]	Minimum friction survey frequency [C]
less than 15	less than 447	once per year
16 to 30	448 to 838	once every 6 months
31 to 90	839 to 2 404	once every 3 months
91 to 150	2 405 to 3 969	once every month
151 to 210	3 970 to 5 535	once every 2 weeks
greater than 210	greater than 5 535	once every week

(m) the insertion in Technical Standard 139.02.23 after section 12 of the following section:

"**13. Runway Assessment**

(1) The RWYCC shall be reported for each third of the runway assessed.

(2) The assessment process shall include:

(i) assessing and reporting the condition of the movement area;

(ii) providing the assessed information in the correct format; and

(iii) reporting significant changes without delay.

(3) The information to be reported shall be compliant with the RCR which consists of:

(i) aeroplane performance calculation section; and

(ii) situational awareness section.

(4) The information shall be included in an information string in the following order:

(i) Aeroplane performance calculation section:

(aa) Aerodrome location indicator;

(bb) Date and time of assessment;

(cc) Lower runway designation number;

(dd) RWYCC for each runway third;

(ee) Per cent coverage contaminant for each runway third;

(ff) Depth of loose contaminant for each runway third;

(gg) Condition description for each runway third; and

(hh) Width of runway to which the RWYCCs apply if less than published width.

(ii) Situational awareness section:

(aa) Reduced runway length;

(bb) Drifting snow on the runway;

(cc) Loose sand on the runway;

(dd) Chemical treatment on the runway;

(ee) Snowbanks on the runway;

(ff) Snowbanks on the taxiway;

(gg) Snowbanks adjacent to the runway;

(hh) Taxiway conditions;

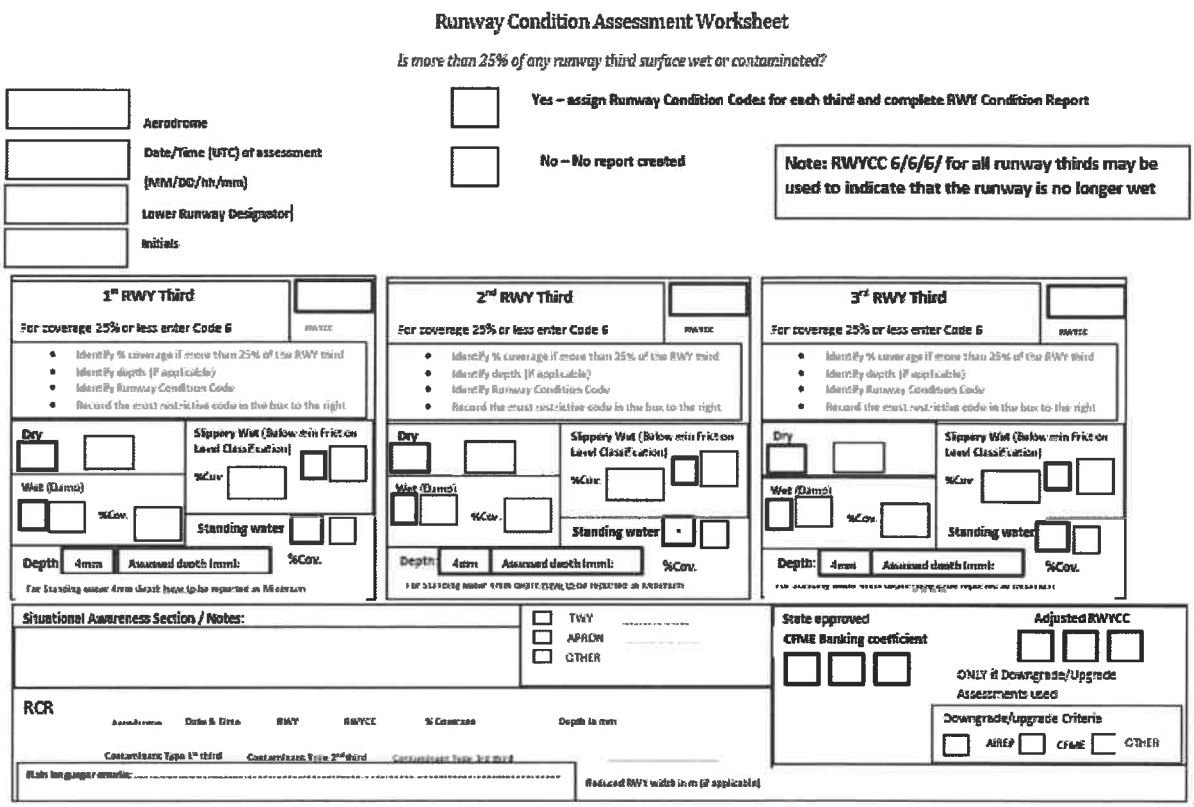
(iii) Apron conditions;

(iv) State-approved, and published use of measured friction coefficient; and

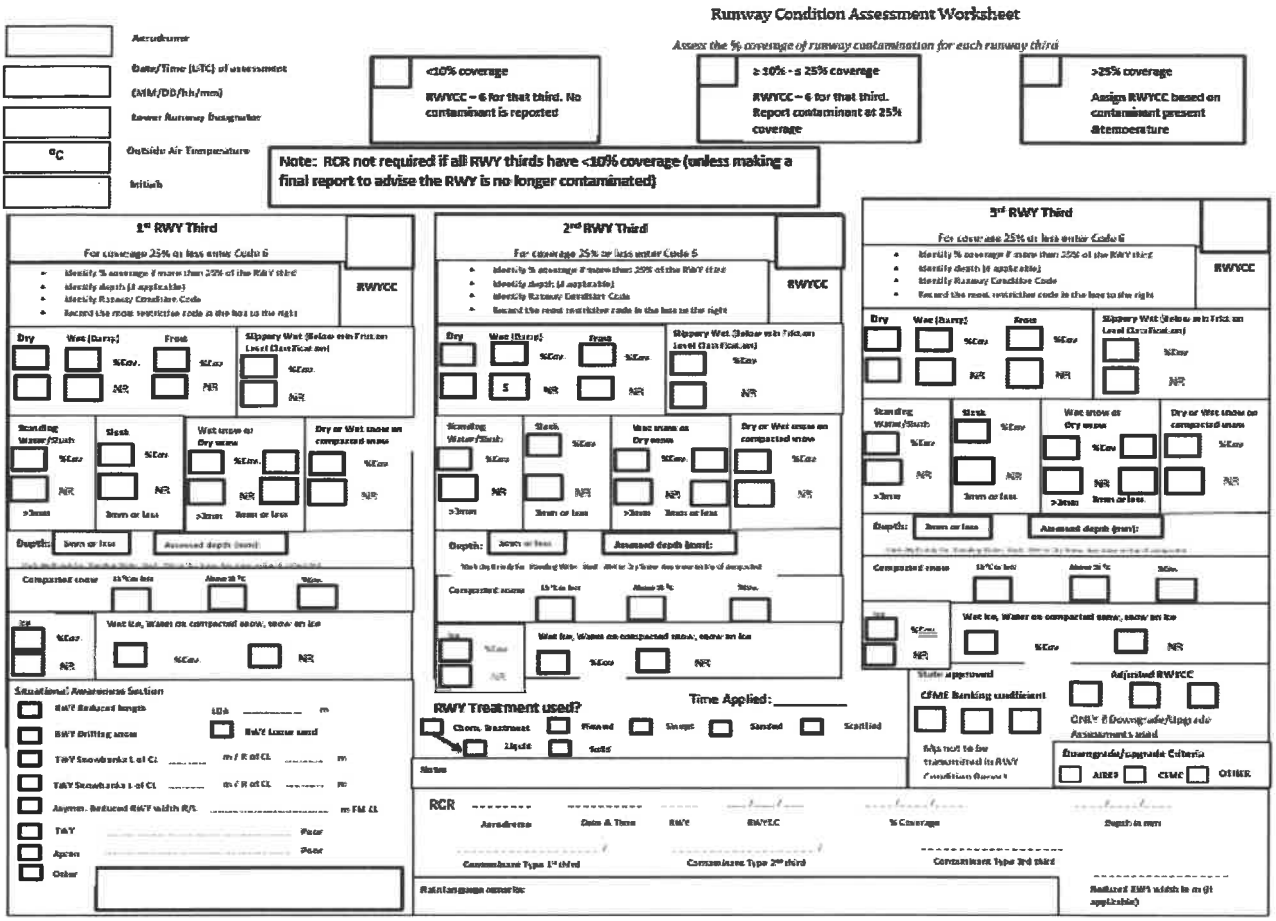
(v) Plain language remarks.

(5) The Runway Condition Assessment worksheet shall be completed to determine the final runway condition report:

Runway Condition Assessment Worksheet



Runway Condition Assessment Worksheet for Runways with snow



(5) Reporting, in compliance with the runway condition report, shall commence when a significant change in runway surface condition occurs due to water, snow, slush, ice or frost.

(6) Reporting of the runway surface condition shall continue to reflect significant changes until the runway is no longer contaminated. When this situation occurs, the aerodrome shall issue a runway condition report that states the runway is wet or dry as appropriate.

(7) The training syllabus shall include initial and periodic recurrent training in the following areas:

(a) aerodrome familiarisation, including aerodrome markings, signs and lighting;

(b) aerodrome procedures as described in the aerodrome manual;

(c) aerodrome emergency plan;

(d) NOTAM initiation procedures;

(e) successful completion of ACI- ICAO Global Reporting Format Online course.

(f) aerodrome driving rules;

(g) air traffic control procedures on the movement area;

(h) radiotelephone operating procedures;

(i) phraseology used in aerodrome control, including the ICAO spelling alphabet;

(j) aerodrome inspection procedures and techniques;

(k) type of runway contaminants and reporting;

(l) assessment and reporting of runway surface friction characteristics;

(m) awareness of uncertainties related to runway surface friction characteristics; and

(n) low visibility procedures.".

(o) by the insertion after Technical Standard 139.03.29 of the following Technical Standard:

"139.06.1 Applicability

1. This Subpart does not apply to aerodromes-

(a) with a runway not exceeding 300m in length;

(b) used for an emergency operations;

(c) used for aerial work as defined in Part 1;

(d) used for hot air balloon operations;

(e) used as para-glider and hang-glider launch and landing sites; and

(f) used in exceptional cases as determined by the Director"."

AMENDMENT TO SA-CATS 141

13. Document SA-CATS 141 is hereby substituted for the following Document SA-CATS:

"SA-CATS 141

AVIATION TRAINING ORGANISATIONS

CONTENTS

141.01.2 CERTIFICATION OF AN ATO

1. Syllabus and curriculum

(1) The syllabus and curriculum referred to in CAR 141.01.2 shall be -

(a) a list of the topics contained in reference material that shall be studied in a course; and

(b) the lessons and academic content taught in a specific course or programme. Lessons shall include the knowledge and skills students are expected to learn, which includes the learning standards or learning objectives they are expected to learn ; the units and lessons that teachers teach; the assignments and projects given to students; the books, materials, videos, presentations, and readings used in a course; and the tests, assessments, and other methods used to evaluate student learning.

Application for initial ATO certificate and five phase certification process

There are five phases involved in the certification process of aviation training organisation

PHASES

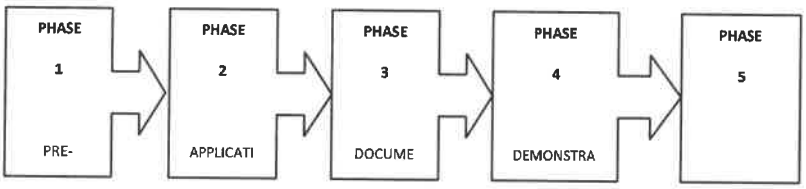


Figure 1.1 Phases 1 and 2: Pre-application and Application Phases

2. **General direction and guidance**

(1) This standard provides direction and guidance during Phase 1 and Phase 2 when applying for and obtaining an ATO Certificate in order to conduct aviation training under Part 141. This process, if followed, shall lead to successful compliance with Part 141.

(2) Under no circumstances shall an applicant be certificated, until the Director is satisfied that the prospective certificate holder is capable of fulfilling the required responsibilities, and shall comply with Part 141 in an appropriate and continuing manner.

(3) Related regulations -

(a) Civil Aviation Act, Parts 21; 61, 62, 63, 64, 65, 66, 70, 91, 94, 96,101, 140, and 141.

(4) Related reading material -

(a) The Authority publishes AIC from time to time. The AIC`s provide complete information on the Authority publications and how they may be obtained. The Authority website may be accessed for more information at www.sacaa.co.za

(5) Background -

(a) The Authority recognises the responsibility of an ATO to provide aviation training with the highest degree of safety possible in the public interest. The certification process is designed to ensure that a prospective ATO holder understands and can fulfil this duty.

(b) Once satisfactorily completed, the certification process shall ensure that an operator is able to comply with the Civil Aviation Act, Regulations and the applicable international standards pertaining to the operation of aircraft as published in relevant Annexes and Documents to the ICAO.

(6) Certification of ATO

An applicant requesting certification to provide aviation training under the CAR shall be requested to be certificated as an ATO. The certification process described in this guidance material is for an applicant seeking an ATO under Part 141.

3. **Initial inquiries or request**

(1) Initial Inquiries.

Initial inquiries about certification or requests for application may come in various formats from individuals or in the form of meetings with the Authority personnel. Request from

applicants may come from inexperienced and poorly prepared individuals, from well-prepared and financially sound organisations, or from organisations and individuals ranging between these extremes.

(2) Applicant Orientation.

Upon initial contact, an inspector or authorised person shall provide an applicant with the ATO proposed schedule of events form and an ATO prospective application statement of intent. In addition, an inspector or authorised person shall assist in responding to general questions on the ATO process.

(3) Preliminary Discussion.

(a) An assigned inspector or authorised person shall briefly explain the requirements of the Authority for the certification process. An inspector or an authorised person shall request an applicant to schedule an appointment for further discussions, allowing enough time for an applicant to thoroughly review and understand the requirements of TGM for ATO Certification and the ATO proposed schedule of events.

(b) An inspector or authorised person shall guide an applicant on how to plan for the certification process using the ATO proposed schedule of events.

(c) An applicant shall submit key management personnel qualifications and the completed resumes to the pre-application meeting.

(d) The need for a business plan indicating a detailed financial plan shall be explained.

NOTE: The authority certification inspector or authorised person shall review the qualifications of an applicant's management personnel. A resume shall be submitted for each required management position, and the resumes shall contain the basic information necessary to determine regulatory compliance. The depth of review shall be only to determine that there are no obvious omissions or significant discrepancies. An example of a significant discrepancy may be that the regulation requires an individual to hold an ATPL Certificate, but the resume shows that the individual holds a CPL . A detailed review of the management qualifications and effectiveness shall be accomplished during the document compliance and the demonstration and inspection phases.

4. **Authority ATO prospective pre-application statement of intent (PASI)**

(1) Purpose of a PASI.

The completed PASI denotes an intent by an applicant to continue the certification process. It also allows the Authority to plan activities and prepare to commit resources.

(2) Business and financial plan.

(a) An applicant shall submit a business plan containing a detailed financial plan for consideration by the Authority. The financial section of the business plan shall determine business viability. The financial section shall comprise three financial projections or statements and a brief explanation/analysis of these three statements-

(i) the income statement;

(ii) the cash flow projection; and

(iii) the balance sheets.

(3) An applicant shall gather the financial data including all expenses.

(4) Business expenses shall cover at the following two cost categories -

(a) start-up expenses, that may include-

(i) business registration fees;

(ii) business licensing and permits;

(iii) starting inventory;

(iv) rent deposits;

(v) down payments on property;

(vi) down payments on equipment;

(vii) utility setup fees; and

(viii) operating expenses, that may include -

(aa) salaries;

(bb) rent or mortgage payments;

(cc) telecommunication expenses;

(dd) utilities;

(ee) raw materials;

(ff) storage;

(gg) distribution;

(hh) promotion;

(ii) loan payments;

(jj) office supplies; and

(kk) maintenance.

(5) The Income Statement

Show the revenues, expenses, and profit for a particular period indicating a snapshot of the business that shows whether the business is profitable.

(6) The Cash Flow Projection

(a) The cash flow projection shall shows how cash is expected to flow in and out of the business and shall show how much capital investment the business idea needs. The cash flow projection shows the cash that is anticipated to be generated or expended over a chosen period in the future and is required as part of the business plan. Cash flow projections for each month over one year shall be included in the financial section of the business plan and shall include -

(i) cash revenues;

(ii) cash disbursements; and

(iii) the reconciliation of cash revenues to cash disbursements.

(b) The cash flow statement shall show the flow of cash in and out of the business, describing the cash flow that has occurred in the past.

(7) The Balance Sheet

(a) An applicant shall create a pro forma balance sheet that summarises the information in the income statement and cash flow projections. The financial data about the business shall be categorised as-

(i) assets;

(ii) liabilities; and

(iii) equity.

(8) Student finances

(a) An applicant shall include a plan on how student finances are to be managed or controlled to ensure that deposits held and credits remaining in a student account are reimbursed to a student on completion of training or if a student decides to terminate or move to a different ATO.

(9) Processing the PASI.

The Authority uses the PASI to evaluate the complexity of the proposed operation and to determine whether trained and experienced inspectors are available to certificate an applicant. The POPS is used by the Authority to record the pre-certification number assigned to an applicant. A pre-certification, number is assigned to an applicant for the purpose of tracking the progress of the ATO certification project.

(10) Authority Review of the PASI.

(a) Upon receipt of a signed PASI, the Authority shall review the form to ensure that there is sufficient information to further process the pre-application. The Authority shall ascertain that the proposed operation is consistent with the CAR, 2011 Part 141 under which an applicant shall be required to operate.

(b) If the PASI is unacceptable, the Authority shall notify an applicant, either by email or by letter, the reasons for its unacceptability. A copy of the rejected PASI and the reasons for its unacceptability shall be retained in the Authority office files.

(c) When the PASI is acceptable, the Authority shall transfer the information to the form prospective ATO Pre-Assessment Statement (POPS). The Authority shall process the POPS within 10 working days of receipt.

5. **Authority form prospective ATO's POPS**

(1) Authority review of POPS: commencing the certification process:

(a) the Authority shall ensure that office staffing is consistent with the aviation environment;

(b) the POPS is used by the Authority to assess Authority's office workload and forecast staffing and training needs; and

(c) the assessment currently also determines the capability of the Authority to conduct the certification project.

6. **Assignment of the certification team**

(1) Selection of Team Members.

(a) When a pre-certification number is established, the Authority Manager: Training shall select a team for the certification project. The team shall consist of at least a training inspector or testing standards officer. Generally, these inspectors shall be the Authority inspectors that shall be assigned to an applicant once the certification process is completed.

7. **Designation of certification project manager (PM)**

(1) The Authority Manager Training shall designate one member of the certification team to serve as the Project Manager (PM).

(2) The person designated as PM shall have completed appropriate training and shall have previous experience in the certification of an air operator or ATO under the CAR. It is desirable that a person with extensive inspector experience be designated as the PM; although, depending on the situation, other inspectors may be acceptable.

8. **Responsibilities of PM and the certification team**

(1) Responsibilities of the PM;

(a) the PM and other certification team members shall conduct themselves in a professional and responsive manner when interacting with an applicant;

(b) the PM shall serve as the primary spokesperson for the Authority throughout the certification process. Consequently, the PM shall thoroughly co-ordinate all certification matters with all other specialists assigned to the certification project;

(c) the PM shall be responsible for ensuring that all certification job functions are completed;

(d) correspondence, both to and from an applicant, shall be co-ordinated with the PM;

(e) the PM shall notify the Authority Manager regarding the information that may significantly affect or delay the certification project;

(f) the PM shall ensure that individuals involved with the certification project, and the Authority Manager: Training, are kept fully informed of the status of the certification; and

(g) the schedule of events and certification job aids shall be used as guides for the conduct of these status meetings.

(2) Responsibilities of the Certification Team Members:

(a) each team member shall respond to requests for assistance made by the PM and keep the PM informed of the status of the certification; and

(b) any discrepancy that may delay the certification effort shall be brought immediately to the attention of the PM.

(3) Responsibilities of an Authority Manager: Training.

(a) The Authority Manager: Training shall keep the Director informed of the certification process or of those aspects that may attract any other challenge may seek the attention of the Director.

(4) Responsibilities of an applicant.

(a) An applicant shall submit the required documents with the formal application, and successfully complete all programmes required for certification.

9. **Pre-application meeting**

(1) General.

(a) In preparation for the meeting the assigned inspector shall remind an applicant that its key management personnel is required to attend the pre-application meeting and shall be prepared to discuss in general terms, specific aspects of an applicant's proposed operation.

(b) An inspector or authorised person shall discuss the certification process in depth. Emphasis shall be placed on the expectations of the Authority from the applicant, what an applicant shall expect from the Authority and any sequence of events.

NOTE: At the end of the meeting, an inspector or an authorised person shall provide an applicant an Application Information Package.

(2) Application Information Package.

(a) The pre-application meeting between the PM, other certification team members, and the applicant sets the tone for the rest of the certification process. Therefore, it is important that the PM be thoroughly prepared to conduct the meeting.

(b) The PM shall review the POPS and assemble an application information package to be given to an applicant. The application information package shall consist of at least the following-

(i) application for aviation training organisation approval; and

(ii) any forms or guidance material that shall assist the applicant in approval process.

(3) Briefing of an applicant.

(a) At the pre-application meeting, an applicant and any key personnel attending the meeting shall be briefed in as much detail as necessary to ensure that they understand the certification process using the certification job aid and the schedule of events format as guides to facilitate the discussion and to ensure that all elements of the certification process are covered.

(b) An applicant shall be encouraged to ask questions about any area of the process not clearly understood.

(4) Verifying Information on the POPS.

(a) The first item for discussion shall be verification of the information on the POPS, such as the type of operation, types of aircraft, geographic areas of operation, and location of facilities.

(b) When changes to this information occur, an applicant shall annotate the changes on the POPS. If the changes significantly affect the anticipated scope and type of training, a copy of the revised POPS shall be submitted to the Director.

(5) Informing an applicant of pertinent regulations.

(a) It is essential that an applicant understands which regulations are applicable to the proposed operation.

(b) An applicant shall be advised to acquire and become familiar with the CARs and other AIC's and Notices pertinent to the proposed operation.

(c) An applicant and his or her personnel shall be made aware of their responsibilities during the certification process. It is to their benefit to submit required items as soon as they become available and to notify the Authority immediately of any problems or changes in the proposed operation.

10. **Instructions to an applicant on the formal application**

(1) Requirements of formal application.

(a) It is essential during the pre-application meeting that an applicant has a clear understanding of the form, content, and documents required for the formal application.

(b) An applicant shall be informed that the formal application shall be submitted to the assigned Authority office and, after initial review, notification of its acceptance or rejection shall be provided by letter within 10 working days.

(c) An applicant shall be encouraged to submit the formal application as far in advance as possible of the intended starting date.

NOTE: The inspector shall inform an applicant that while inspectors are required to furnish informal guidance and advice during the preparation of required documents and manuals, the production of acceptable documents and manuals is solely the responsibility of an applicant.

(2) Formal application letter or form.

(i) An inspector shall inform an applicant that formal application shall be on the appropriate Part 141 form.

11. **Application attachments**

(1) Schedule of events.

(a) An applicant needs to understand that the schedule of events is a key document to be presented with the formal application.

(b) The schedule of events is a list of items, activities, programmes, aircraft and facility acquisitions that an applicant shall accomplish or make ready for Authority inspection before certification.

(c) The schedule of events shall include an applicant's best estimate of the date the item, activity, programme, aircraft, or facility acquisitions shall be accomplished or ready for inspection.

(d) An applicant shall be informed that the schedule of events shall be constructed in a logical and sequential manner.

(e) The schedule of events shall also provide for a reasonable amount of time for the Authority to review and accept or approve each item or event, before scheduling other items or events that are dependent on such acceptance or approval.

(f) An applicant shall be informed that failure to accomplish an item or event in a satisfactory or timely manner in accordance with the schedule of events could result in a delay in certification.

(g) An applicant shall be advised that if deficiencies are detected during the review of manuals and other documents, they shall be returned for amendment or correction. Such action may also cause additional delays in the certification process.

(h) An applicant shall be encouraged to use this format; however, other formats may be acceptable if they provide information necessary for the certification team to ensure the applicant is proceeding in an appropriate manner.

12. **TPM**

(1) This attachment to the formal application may be in the form of one or more manuals or volumes. These manuals shall contain information about an applicant's organisation, general policies, duties, and responsibilities of personnel, operational control policy, and procedures. In practice, these manuals are often known as the TPM.

(2) An applicant shall ensure that the manuals are in accordance with at least the following sections by complying with the CAR as applicable to an applicant's operation -

(i) Part 141, ATO;

(ii) SA-CATS 141; and

(iii) Part 140, SMS.

(3) Information to be contained in the training and procedures manual is detailed further in Document SA-CATS 141 for aircrew, aircraft maintenance and cabin crew training.

13. **Conclusion of pre-application meeting**

(1) The inspector shall ensure that an applicant understands that the formal application, with the previously described attachments, shall be complete and acceptable or the entire formal application shall be rejected.

(2) Applicant is adequately prepared.

(a) At the close of the pre-application meeting, an inspector shall determine whether an applicant is prepared to proceed with the certification process.

(b) If it appears an applicant understands the requirements of a formal application and shall proceed to that phase, an inspector shall encourage an applicant to informally co-ordinate required documents, as they are developed, with the certification team before formal submission.

(3) Applicant is not prepared.

(a) If it is evident that an applicant is not adequately prepared to proceed with the certification process, an inspector shall advise an applicant of the reasons for concern.

(b) When it is apparent an applicant shall not be able to prepare an adequate formal application, an inspector shall advise an applicant to request another pre-application meeting after more complete preparation on an applicant's part.

(c) It is appropriate for the inspector to recommend to an applicant one or more of the following actions -

(i) a more thorough review of the applicable regulations;

(ii) changes in proposed key management personnel;

(iii) retain the services of a professional aviation consultant; or

(iv) cease efforts to become an Authority certificated ATO.

14. **Termination of the pre-application process**

(1) If at any time during the pre-application phase an applicant formally terminates all efforts toward certification, or the Authority determines that an applicant may not proceed with the certification process, the POPS shall be returned to an applicant.

(2) The Authority shall notify an applicant in writing that this action terminates the pre-application process and that an applicant shall submit a new POPS to initiate the certification process again.

(3) If an applicant submit another application, a new pre-certification number shall be assigned.

15. **Explanation of supporting documentation**

(1) An inspector or authorised person shall print out or forward as digital data, to an operator all checklists, forms and standard letters as they are required prior to each procedure to be followed.

Note: These documents are registered according to Authority Quality Assurance procedures as ISO registered documents that may be accessed as data on the Z-drive of the Authority network. As these documents may change, the examples of documents referred to or contained within the guidance material are for referencing purposes only to ensure that Inspectors are using the most current and effective data.

16. **Alternative approval process of a foreign ATO**

(1) Foreign ATO approval

(a) The process for a foreign ATO approval is based on a phased gate approach with a defined set of criteria.

(b) The process provides assurance that the foreign ATO approval is fully compliant with national regulations while leveraging to the maximum extent possible an existing approval (baseline Authority approval).

(c) The concept of the alternative approval process and phased gate approach are illustrated in Figures 16-1 and 16-2, respectively.

(2) Process phases and gates

(a) In principle, the process phases mirror the normal phases required for a full approval and provide a streamlined set of requirements limited to those areas of the national requirements which differ from the baseline Authority approval.

(b) There are five phases, similar to the phases used to issue an air operator certificate, which an applicant has to follow in this process to obtain a foreign-based ATO approval -

(i) In the pre-application phase, the training organisation requests the alternative approval process and the Authority determines if its national regulations shall support this process.

(ii) the application phase includes a gap analysis regarding the approval of a training organisation between the baseline Authority regulation and the national regulation, conducted by the training organisation, that identifies any significant differences, which shall be addressed to ensure compliance with the national regulations;

(iii) the application evaluation phase determines if the eligibility requirements are met; this phase is a complete review of the application;

(iv) the demonstration and validation phase requires the Authority to complete the validation (or inspection) of the different components of the approval, and extends to the training programme and FSTD equipment;

(v) the certification phase is the final step and results in the issuance of the required certification; and

(vi) required approvals to include the training and procedures manual, the FSTD qualification and the approval for the use of the FSTD.

(3) Phase 1: pre-application

(a) This phase starts when an ATO wishes to provide training for an individual or operator under a foreign ATO approval.

(b) The training shall first establish if the foreign ATO approval can be achieved through the alternative approval process by leveraging an existing ATO approval, preferably that of the State where the training organisation is located. However, an ATO approval by another State shall be equally acceptable. In either case, that State's Authority becomes the baseline CAA. The training organisation shall be capable of complying with all the procedures and guidelines associated with the alternative approval process and also satisfy the ATO requirements of the Authority.

(c) Once it has been determined that the training organisation may use the alternative approval process, the Authority shall coordinate with the baseline Authority to explore collaboration.

(d) Upon request from the training organisation, the Authority contacts the baseline Authority to establish if the baseline CAA shall collaborate and support the ATO approval. When collaboration is established between the baseline Authority and the Authority, the training organisation shall be required to provide a regulatory gap analysis between the Authority and baseline CAA's ATO requirements.

(e) The areas to be reviewed shall include all the areas required for ATO approval to include organisation, training programmes and training delivery, training and procedures manual, personnel, facilities, records, quality system and SMS if required.

(4) Gate 1: Criteria

(a) The Authority contacts the baseline Authority to determine the level of support, if any, which may be extended by the baseline CAA, and this may be through a memorandum of understanding or other suitable arrangements.

(b) An important element with the use of the alternative approval process is the option for the Authority and baseline CAA to reach an agreement to collaborate on the overall oversight of the training organisation operations.

(c) The additional tasks imposed on the baseline CAA are minimal and, for the most part, the additional tasks shall be limited to administrative actions.

(d) The Authority notifies the foreign ATO of the acceptance or denial to proceed with the alternative approval process.

(5) Phase 2: Application

(a) The application process for each State may vary and the training organisation shall consult with the Authority to establish the specific procedures to be followed to meet the regulatory requirement for ATO approval. In principle, the application using the

alternative approval process mirrors that of a normal ATO application with the exception that the Authority accepts the baseline CAA approvals and limits its level of involvement to those areas that are identified in an applicant's gap analysis and submitted as a supplement to the application.

(b) An applicant shall, to the extent possible, demonstrate through a compliance matrix how all the foreign ATO requirements are met.

(6) Gate 2: Criteria

(a) An applicant completes the gap analysis: the training organisation establishes if there are gaps between the Authority regulations and the baseline CAA regulations regarding the requirements for ATO approval.

(b) The gap analysis is completed to the extent that shall allow an applicant to perform Annex 1 and relevant Annex 6 training activities (multi-crew pilot (MPL), type rating, etc.) as appropriate.

(c) An applicant submits an application which includes a full analysis of how compliance with the Authority's ATO requirements are met through the recognition of the baseline approval with an additional supplement as applicable. The application shall be complete, such as the baseline CAA approval documentation and a supplement as applicable.

(d) The Authority and the baseline CAA finalise the memorandum of understanding or other suitable arrangement, as applicable, based on the output from the gap analysis.

(7) Phase 3: Application evaluation

(a) This phase differs from the normal ATO approval process in that the evaluation is accomplished by the Authority without going on-site, through a desktop assessment of the application and acceptance that the baseline CAA approval allows that a significant portion of the application evaluation is already met. This phase provides for the ability to maximize the recognition of the work completed by the baseline

CAA and gives the Authority the opportunity to better utilise its resources and complete the approval process in an effective and efficient manner.

(b) For a training organisation, this phase supports better utilisation of its own resources and provides efficiencies by leveraging its existing approvals. Accordingly, to ensure a successful application, training organisations.

(c) Phase 3 evaluation process shall follow Phase 2 a methodical and comprehensive process to complete the application, which shall include submission of the following-

(i) a compliance matrix showing how a training organisation complies with the regulatory requirements of the Authority and the regulatory requirements of the baseline CAA (based on the gap analysis already carried out);

(ii) a document containing any supplemental conditions and a rationale explaining how the training organisation meets the national requirements regarding the approval of a training organisation which differ from the requirements of the baseline CAA;

(iii) the training and procedures manual, or equivalent;

(iv) the QMS manual, or equivalent;

(v) the SMS manual, or equivalent, if applicable;

(vi) the training programme course syllabus relating to the programmes required under the scope of the approval being applied for;

(vii) the list of instructors and evaluators, together with supporting documentation; and

(viii) the FSTD qualification certificates.

(8) Gate 3: Key elements

(a) The Authority receives the completed application and initiates the evaluation in accordance with the guidance provided in this manual.

(b) If the evaluation is satisfactory, the Authority shall consider establishing a set of terms (memorandum of understanding or equivalent) with the baseline Authority with regard to providing a collaborative role in support of the ATO approval.

(c) Consideration or guidance regarding training record, graduation certificate and other applicable forms.

(9) Phase 4: Demonstration and validation with, if applicable, inspection

(a) This phase is the demonstration and validation, and is a combination of a desktop validation and, if applicable, an on-site inspection.

(b) In view of the use of the alternative process to approve a foreign ATO, this phase provides the opportunity for the Authority to determine the extent of required on-site inspection, if any.

(c) Authority's are encouraged to limit the on-site inspection to those areas that are identified in the gap analysis and would require an inspection so as to leverage work already accomplished by the baseline CAA.

(10) Gate 4: Key elements

(a) Desktop evaluation and validation of the ATO application: this may be conducted through a multi-media demonstration or presentation of how requirements are met.

(b) Supplemental requirements are compliant: this includes training programme elements (with focus on the specific Authority requirements), as applicable:

(i) (optional) FSTD evaluation limited to user approval;

(ii) instructor qualifications meet requirements;

(iii) managerial personnel;

(iv) record keeping;

(v) exemptions and deviations, if any;

(vi) designation of evaluators (at discretion); and

(vii) (optional) on-site audit or inspection limited to those areas that necessitate an on-site visit.

(11) Phase 5: Certification

(a) When the alternative process is applied, the baseline Authority shall focus on the key elements that comprise its oversight of the ATO, such as organisation, training

programme(s), courseware, instructors and evaluators, FSTD equipment, record keeping, quality assurance (QA) and, if applicable, SMS.

(b) The Authority shall establish appropriate procedures to ensure continued validity of the ATO approval.

(c) certificate obtained through the alternative approval process. These procedures may include establishing -

(i) obligations for an foreign ATO to report surveillance-relevant information, such as reporting enforcement activities taken by the baseline CAA which may affect the approval certificate; and

(ii) a process for taking appropriate measures in relation to baseline CAA enforcement activities, such as limitation, suspension or revocation of the baseline CAA approval certificate, and for taking appropriate follow-up action.

(d) The Authority shall also establish the process for the continuing approval of the training programme, instructors, evaluators and FSTDs. The Authority shall consider a process that allows for the approval to be maintained as long as the baseline CAA approval is current.

(12) Gate 5: Key elements

(a) The Authority completes its internal process for the approval of an ATO through the alternative approval process.

(b) The Authority issues the applicable ATO approval document(s) which identifies the scope of the approval.

(c) The Authority notifies the baseline CAA of the successful completion of the approval process.

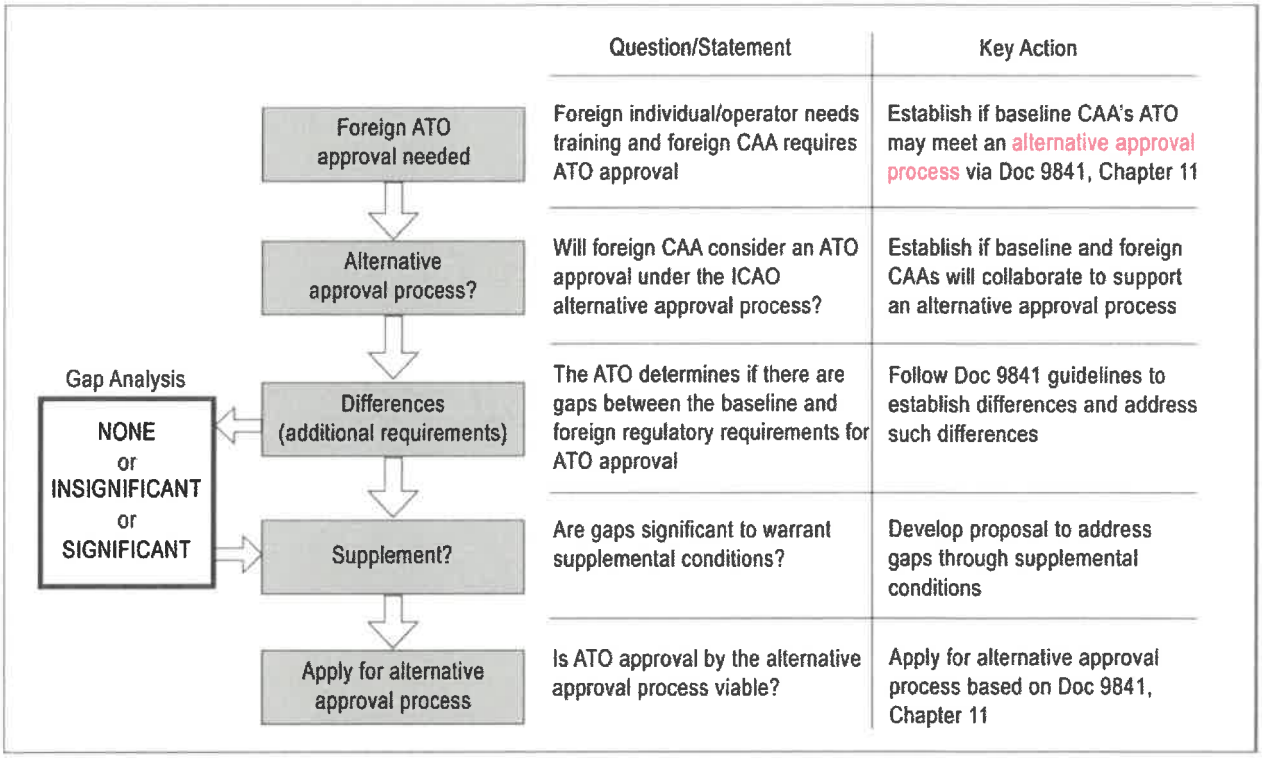


Figure 16.1 Concept overview of the alternative approval process

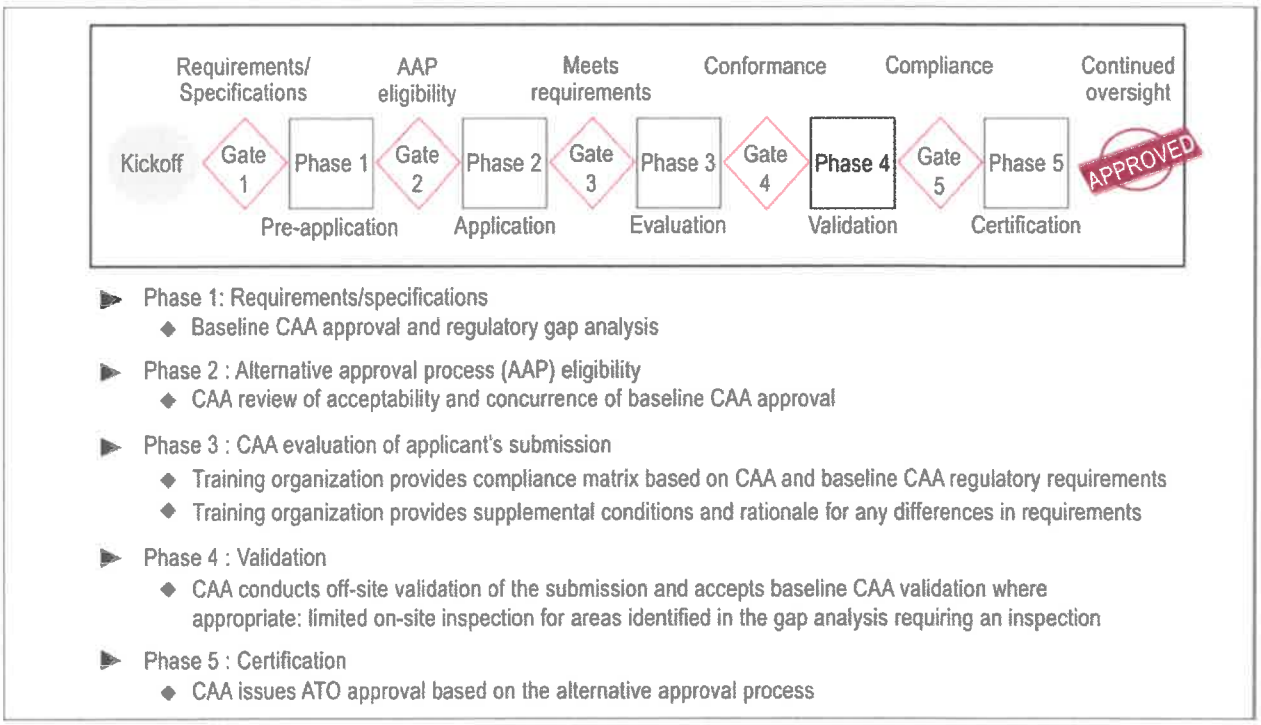


Figure 16.2 ATO alternative approval process phase gates

(13) Recognition/approval of the training programmes

(a) The Authority is encouraged to recognise the baseline CAA training curriculum and courseware with reasonable supplemental or additional requirements of the Authority. Gaps identified between the Authority's requirements .

(b) the baseline CAA's approved training curriculum shall be appropriately addressed.

(c) The Authority shall not require that changes be made to the training programme that forms the approval basis, unless there are significant differences between the Authority's requirements and the baseline Authority's requirements.

(14) Process for recognising instructors and evaluators

(a) Instructor and evaluator qualifications granted under the baseline Authority's regulatory requirements are encouraged to be recognised with reasonable supplemental or additional requirements of the Authority. The Authority shall consider authorising the instructor or evaluator based on the baseline Authority qualifications together with additional training on the Authority regulations, training programme and administrative procedures. An instructor and evaluator authorisation issued by the Authority shall be limited to training and evaluation at the ATO. The Authority shall provide the necessary evaluator designations to conduct assessments on its behalf.

(15) Process for recognising a FSTD qualification

(a) FSTD qualification

(i) States shall consider recognising and accepting a device qualification that is already granted by the baseline CAA, or by another State, where the qualified device already meets the relevant criteria of the manual of criteria for the qualification of FSTD (Doc 9625) or an equivalent regulatory standard that already is aligned with the criteria of Doc 9625; with minimal supplemental requirements, if any.

(b) Use of an FSTD in an approved training programme

(i) In order to receive training credit for the use of an FSTD, the device shall be part of the training organisation's or operator's approved curriculum and be qualified.

(ii) The FSTD shall also be evaluated for each manoeuvre, procedure or crew member function to be trained, and approved for the operator's use.

(iii) When an operator requests the use of a training centre's FSTDs, the Authority continues to be responsible for determining that the operator's application conforms to the appropriate regulations, policies, and procedures.

"141.01.8 Safety inspections and audits

1. **Classifications of findings/non-compliance**

1.1 Level 1 Finding

A level 1 non-compliance or finding poses imminent danger, safety and security risk to persons in an aircraft or to persons or to property on the ground and shall necessitate the exercising of immediate discretionary enforcement powers vested in the inspectors, authorised officers and/or authorised persons in the interest of safeguarding aviation safety and security in terms of Section 115 and 116 of the Civil Aviation Act, 2009 (Act No.13 of 2009). A level 1 finding is in all instances a safety concern and shall require remedial action acceptable by the Director within 24 hours by an approval holder.

1.2. Level 2 Finding

A level 2 non-compliance or finding poses a serious safety and security risk to persons in an aircraft or to persons or to property on the ground and shall be resolved within a short time frame. It shall be required of an approval holder to develop action plans within agreed time frames and follow-up inspections or audits to verify rectification of the non-compliances. A response containing a corrective action plan shall be accepted by the Director within 7 days.

Note 1: *Previous findings, which have not been addressed (repetitive/ continuous non-compliance findings or blatant disregard for the Authority findings), may be upgraded to a Level 2 or Level 1 finding.*

Note : *A level 2 or level 1 non-compliance on one part of the operation may not necessarily affect the whole operation.*

1.3. Level 3 Finding:

A non-compliance or finding which shall not necessarily have an immediate direct impact on safety or security on its own. It is the responsibility of the approval holder to rectify and shall not

necessitate a follow-up inspection. An approval holder is required to notify the Authority within a specified time frame, when rectification has been effected. These findings are normally administrative in nature. Generally, a response containing corrective actions shall be received within 14 working days.

1.4. **Observation:**

A practice or condition that indicates a trend that may lead to a future non-compliance, it is highly recommended that an operator shall respond to the observation"."

141.01.15 FACILITIES, EQUIPMENT AND MATERIAL

1. Training Devices
   (1) As an alternative to the use of actual aircraft and safety and emergency equipment, the ATO may use representative training devices approved by the Director for the purpose of training.
   (2) The representative training devices referred to in subsection (1) include -
      (a) safety and emergency equipment;
      (b) cabin training devices;
      (c) emergency exit trainers; and
      (d) facilities used for firefighting and water survival training.
   (3) The safety and emergency equipment used on an aircraft shall be available during training, according to the applicable training session.
   (4) The equipment that is removed from operation, or other representative training equipment considered acceptable by the Director, may be used for training purposes.

141.01.18 QUALITY ASSURANCE AND QUALITY SYSTEM

1. **Quality policy and strategy**

(1) An ATO shall describe how the organisation formulates, deploys and reviews its policy and strategy and turns them into plans and actions applicable to all levels of the organisation.

(2) A formal written quality policy statement shall be prepared, establishing a commitment by the accountable manager of the organisation to achieving and maintaining the highest possible standards in quality.

(3) The quality policy shall reflect the achievement and continued compliance with all applicable CAR and any additional standards specified by an ATO.

(4) The accountable executive of the organisation shall have the overall responsibility for the standard in quality including the frequency, format and structure of the internal management review and analysis activities and may delegate the responsibility for the tasks to a quality manager.

2. Quality assurance

(1) The term quality assurance (QA) is frequently misunderstood to mean the testing and checking of products and services.

(2) An ATO that only do checking and testing activities is applying 'quality control' measures, which are designed to identify product and service defects, but not necessarily prevent them. For example, an ATO that administers exams at the end of the training syllabus, only to discover that a large proportion of its students failed to meet the required standard has only identified a deficiency in expected results. The implication shall be that there may be a problem with the training programme, or the instructor, or even the student selection criteria.

(3) Quality control, by itself, provides limited value without the suite of complementary activities that comprise QA.

(4) QA, on the other hand, attempts to improve and stabilise the training process to identify and avoid, or at least minimise, issues that lead to problems in the first place. It continuously verifies that standards are adhered to throughout the training process by introducing various checkpoints and controls. It further introduces a system of audits to

ensure that documented policies, processes, and procedures are consistently followed. It is the 'assurance' part of quality management.

(5) A quality assurance plan for an ATO shall encompass well-designed and documented policies, processes and procedures necessary to –

(a) monitor training services and process controls;

(b) monitor assessment and testing methods;

(c) monitor personnel qualifications and training;

(d) monitor training devices and equipment qualification, calibration and functionality, as applicable;

(e) conduct internal and external audits;

(f) develop, implement, and monitor corrective and preventive actions and associated reporting systems; and

(g) utilise appropriate statistical analysis to identify and respond appropriately to trends.

(6) An effective QA plan shall aid significantly in the ATO's compliance with requirements, its conformity with the standards and the adequacy of its training activities.

(7) To take the ATO's performance to a higher level requires a structure that ensures that the combined QA effort of the employees reaches its full potential.

Note: Annex 1 only requires ATOs to establish and implement QA policies, processes, and procedures acceptable to the Licensing Authority granting the approval, which ensures that training and instructional practices comply with all relevant requirements.

(8) QA plans by themselves are subject to breakdowns in human performance and therefore are in need of robust organisational structures that underpin the QA efforts of individuals. It is for this reason that ATOs and States shall embrace the quality system governance model described in this technical standard.

3. Quality system

(1) A quality system is the aggregate of all the organisation's activities, plans, policies, processes, procedures, resources, incentives, and infrastructure working in unison towards a total quality management approach. It requires an organisational construct

complete with policies, processes, procedures, and resources that underpins a commitment to achieve excellence in product and service delivery through the implementation of best practices in quality management.

(2) An ATO that supports its QA plan with a well-designed, implemented and maintained quality system structure shall be able to easily and repeatedly achieve results that exceed both the requirements of the applicable national regulations and the expectations of the ATO's clients.

(3) The basic attributes of an effective quality system shall include, but are not necessarily limited to -

(a) a managerial structure that facilitates and encourages clear and unencumbered access to the decision makers;

(b) an overarching company commitment to achieve excellence in training service delivery rather than meeting minimum requirements;

(c) quality policies, processes, and procedures that are well-designed, consistently applied and subject to formalised review and refinement processes;

(d) an employee training plan that instils and promotes best practices in quality management efforts; and

(e) an organisational risk profile and corresponding risk management plan, which together provide a comprehensive list of hazards that are tied to an ATO's activities and establish mitigating measures to effectively manage those risks, which threaten the achievement of desired standards of performance; and a strategic review of policies and procedures, which measures the organisation's current assumptions, objectives and plans by applying a relevance test matched to evolving trends in the industry or changes occurring within the ATO.

4. Organisational risk profile

(1) An organisational risk profile is an inventory of identified hazards and threats that present risks, which are likely to prevent conformity with the required standards of performance. This threat to quality list is normally derived at by first establishing a directory of those activities that routinely take place in order to deliver and administer a training programme. Once complete, the activity directory is then expanded to identify the hazards and threats

associated with each individual activity. Some examples of routine activities that shall be examined during this process are -

(a) selection and training of staff;

(b) training programme development, validation, and review;

(c) development and maintenance of training courseware;

(d) administrative staff duties in support of the training programme; instructors and evaluators, and students;

(e) delivery of training;

(f) record keeping;

(g) assessment and examination processes; and

(h) client and Authority feedback.

(2) The risks identified through this exercise shall not be limited to just those which currently exist but shall also include those potential risks that may arise from a change to existing circumstances or conditions.

5. Risk management plan

(1) A risk management plan is designed to mitigate the identified risks, real or potential, which were derived from the organisational risk profile exercise. The plan's objective is not to eliminate risk so much as it is to effectively manage risk by putting in place risk controlling measures.

(2) A well developed and implemented risk management plan shall substantially aid in accurately scoping out the depth and frequency of planned QA related activities.

(3) The plan shall be subject to the management review process outlined in this standard.

(4) The current risk management plan shall be readily accessible to all employees so that it can be accurately followed and open to comment for improvement.

6. Coherence matrix

(1) A coherence matrix, sometimes known as a correspondence matrix, is a very powerful addition to the ATO's compliance efforts. It is a detailed tabulated document that lists all

the applicable regulatory requirements imposed on an ATO. Beside each listed provision there shall be at least two descriptive elements that identify -

(a) the existing process(es) that is (are) designed to ensure continuous compliance with that specific regulatory rule or standard; and

(b) the individual managerial position responsible for the effective implementation of each process

(2) The coherence matrix shall indicate the next intended and most recently completed audits designed to validate the functionality of each of the identified process. Any recent audit findings shall be listed in the matrix or referred to as being documented in a separate 'register of findings'.

(3) The coherence matrix is developed and managed by the quality manager and is subject to the management review process.

(4) The current coherence matrix shall be readily accessible to all employees so that it can be accurately followed and open to comment for improvement.

7. Corrective and preventive action reports

(1) Quality assurance plans shall include a well-structured reporting system to ensure that suggestions by ATO personnel for both corrective and preventive actions are recorded and promptly addressed. This is a necessary component of QA.

(2) After an analysis of the reports submitted, the reporting system shall specify who is required to rectify a discrepancy and non-conformity in each particular case and the procedure to be followed if corrective action is not completed within an appropriate timescale. Just as important, the reporting system shall identify who is required to investigate and act upon any report identifying measures that could prevent a non-conformity from occurring.

(3) Corrective and preventive action reports shall be able to be submitted anonymously, if individuals so choose, to maximise the opportunity for open and effective reporting.

Note: Since corrective and preventive action reports, in this instance, represent suggestions for improvement in conformity levels and deal with quality issues, this reporting system and its processes shall be managed by the quality manager.

8. Quality-related documentation

(1) Relevant documentation includes part(s) of the training and procedures manual, which may be included in a separate quality manual.

(2) In addition, the relevant documentation shall include the following -

(a) quality policy and strategy;

(b) glossary;

(c) organisational risk profile;

(d) risk management plan;

(e) coherence matrix;

(f) corrective and preventive action procedures and reporting system;

(g) specified training standards;

(h) description of the organisation;

(i) assignment of duties and responsibilities, and

(j) training procedures related to the quality system to ensure regulatory compliance.

(3) The QA audit programme documentation shall reflect -

(a) the schedule of the monitoring process; audit procedures;

(b) reporting procedures;

(c) follow-up and corrective action procedures;

(d) the recording system; and

(e) document control.

9. Quality assurance audit programme

(1) The QA audit programme shall include all planned and systematic actions necessary to provide confidence that every training activity is conducted in accordance with all applicable requirements, standards, and procedures.

10. Quality inspection

(1) The primary purpose of a quality inspection is to review a document or observe a particular event, action, etc., to verify whether established training procedures and

requirements are followed during the conduct of the inspection and whether the required standard is achieved.

(2) Examples of typical subject areas for quality inspections are -

(a) actual training sessions;

(b) maintenance, if applicable;

(c) technical standards; and

(d) training standards.

11. Quality audits

(1) An audit is a systematic and independent comparison between the way in which training is being conducted and the way in which it shall be conducted according to the published training procedures.

(2) Audits shall include at least the following quality procedures and processes -

(a) a description of the scope of the audit, which shall be explained to the audited personnel;

(b) planning and preparation;

(c) gathering and recording evidence; and

(d) analysis of the evidence.

(3) The various techniques that make up an effective audit are:

(a) a review of published documents;

(b) interviews or discussions with personnel;

(c) the examination of an adequate sample of records;

(d) the witnessing of the activities which make up the training; and

(e) the preservation of documents and the recording of observations.

12. Auditor

(1) An ATO shall decide, depending on the complexity of the organisation and the training being conducted, whether to make use of a dedicated audit team or a single auditor. In any event, the auditor or audit team shall have relevant training and/or operational experience.

(2) The responsibilities of the auditors shall be clearly defined in the relevant documentation.

13. Auditor's independence

(1) An auditor shall not have any day-to-day involvement in the operation or maintenance activity that is to be audited.

(2) An ATO may, in addition to using the services of full-time dedicated personnel belonging to a separate quality department, undertake the monitoring of specific areas or activities using part-time auditors. An ATO whose structure and size does not justify the establishment of full-time auditors may undertake the audit function using part-time personnel from within its own organisation or from an external source under the terms of an agreement acceptable to the Authority.

(3) In all cases an ATO shall develop suitable procedures to ensure that persons directly responsible for the activities to be audited are not selected as part of the auditing team. Where external auditors are used, it is essential that any external specialist has some familiarity with the type of activity conducted by an ATO.

(4) The QA audit programme of an ATO shall identify the persons within the organisation who have the experience, responsibility, and authority to -

(a) identify and record concerns or findings, and the evidence necessary to substantiate such concerns or findings;

(b) initiate or recommend solutions to concerns or findings through designated reporting channels;

(c) verify the implementation of solutions within specific and reasonable timescales; and

(d) report directly to the quality manager.

14. Audit scheduling

(1) A QA audit programme shall include a defined audit schedule and a periodic review cycle. The schedule shall be flexible and allow unscheduled audits when negative trends are identified. The quality manager shall schedule follow-up audits when necessary, to verify that a corrective action resulting from a finding was carried out and that it is effective.

(2) An ATO shall establish a schedule of audits to be completed during a specific calendar period. This schedule shall be influenced by the organisational risk profile and be reflected in both the risk management plan and the coherence matrix documents. As a minimum,

all aspects of the training shall be reviewed within a period of 12 months in accordance with the audit programme.

(3) When an ATO defines the audit schedule, it shall consider significant changes to the management, organisation, training, or technologies, as well as changes to the standards and requirements.

15. Monitoring and corrective action

(1) The aim of monitoring within the quality system is primarily to investigate and consider its effectiveness and thereby ensure that defined policy and training standards are continuously complied with. Monitoring and corrective action functions fall under the responsibilities of the quality manager. Monitoring activity is based upon -

(a) quality inspections;

(b) quality audits; and

(c) corrective and preventive action reports, and subsequent follow-up.

(2) Any non-conformity identified because of monitoring shall be communicated by the quality manager to the manager responsible for taking corrective action or, if appropriate, to the head of training or, when circumstances warrant, to the accountable executive. Such non-conformity shall be recorded, for the purpose of further investigation, to determine the cause and to enable the recommendation of an appropriate corrective action.

(3) The QA audit programme shall include procedures to ensure that corrective and preventive actions are developed in response to findings. Personnel implementing these procedures shall monitor such actions to ensure that they have been completed and verify their effectiveness. Organisational responsibility and accountability for the implementation of a corrective action resides with the department where the finding was identified. The accountable executive shall have the ultimate responsibility for ensuring, through the quality manager, that the corrective action has re-established conformity with the standard required by an ATO and any additional requirements established by the Authority or an ATO.

(4) As part of its quality system, an ATO shall identify internal and external customers and monitor their satisfaction by measurement and analysis of feedback.

16. Continuous improvement process

(1) The quality manager shall be responsible for the review and continuous improvement of the established quality system's policies, processes, and procedures. The following tools, on which the quality manager relies, are essential to the on-going continuous improvement process -

(a) Organisational compliance risk profile;

(b) Compliance risk management plan;

(c) coherence matrix;

(d) corrective and preventive action reports; and

(e) inspection and audit reports.

(2) The tools and processes are interrelated and help define the continuous improvement efforts of the organisation. For example, any corrective or preventive action report may identify a deficiency or an opportunity for improvement. As outlined in this standard, the quality manager shall then be required to ensure the identified issue was addressed and effectively implemented. The same shall be true, if the discovery of an issue was identified during an inspection or audit.

(3) The effective implementation of change and the subsequent validation that the change did indeed result in the desired outcome is critical to the continuous improvement process. Simply introducing a well-meaning suggestion for improvement into the organisation without carefully managing that change may have undesirable consequences. It is therefore incumbent upon the quality manager to responsibly introduce, monitor, and validate improvement efforts.

(4) A simplistic but effective process to use in managing continuous improvement is known as the plan-do-check-act, or PDCA, approach.

(5) Plan. Map out the implementation of the recommended change, identifying at least:

(a) those people who shall be affected by the change;

(b) the required qualify control measures necessary to mitigate risk; and

(c) the desired outcome and its intended consequences.

(6) Execute the implementation plan once all affected groups have accepted the proposal and understand their role in ensuring its success.

(7) Apply sufficient quality control stage checks throughout the implementation phase to ensure any unintended deviations in the execution are identified and addressed without delay.

(8) Analyse the results and take appropriate action as necessary.

The following illustration depicts this continuous improvement process cycle:

17. Management review and analysis

(1) Management shall accomplish a comprehensive, systematic and documented review and analysis of the quality system, training policies and procedures, and shall consider -

(a) the results of quality inspections, audits and any other indicators;

(b) the overall effectiveness of the management organisation in achieving stated objectives; and

(c) the correction of trends, and prevention, where applicable, of future non-conformities.

(2) Conclusions and recommendations made because of the review and analysis shall be submitted in writing to the responsible manager for action.

(3) The responsible manager shall be an individual who has the authority to resolve relevant issues and act.

(4) The head of training shall decide upon the frequency, format and structure of meetings for internal review and analysis, in coordination with the accountable executive, if different, as the accountable executive has the overall responsibility for the quality system including the frequency, format and structure of the internal management review and analysis activities.

18. Recording

(1) Accurate, complete, and readily accessible records documenting the result of the QA audit programme shall be maintained by an ATO. Records are essential data to enable an ATO to analyse and determine the root causes of non-conformity so that areas of non-compliance can be identified and subsequently addressed.

(2) Records shall be retained at least for the period that may be mandated by national requirements. In the absence of such requirements, a period of three years is recommended. The relevant records include:

(a) audit schedules;

(b) quality inspection and audit reports;

(c) responses to findings;

(d) corrective and preventive action reports;

(e) follow-up and closure reports; and

(f) a management review and analysis reports.

19. QA responsibility for satellite ATOs

(1) An ATO may decide to subcontract certain activities to external organisations subject to the approval of the Authority.

(2) The ultimate responsibility for the training provided by the satellite ATO always remains with an ATO. A written agreement shall exist between an ATO and the satellite ATO clearly defining the training services to be provided and the level of quality to be assured.

The satellite ATO's activities relevant to the agreement shall be included in the ATO's QA audit programme.

(3) An ATO shall ensure that the satellite ATO has the necessary authorisation/approval when required and commands the resources and competence to undertake the task.

20. QA training

(1) Appropriate and thorough training is essential to optimise quality in every organisation. To achieve the appropriate outcomes of such training, an ATO shall ensure that all staff members understand the objectives as laid out in the quality manual to a level relevant to their duties, including the -

(a) concept of QA and associated systems;

(b) quality management;

(c) quality manual;

(d) inspections and audit techniques; and

(e) reporting and recording.

(2) Time and resources shall be allocated to provide appropriate levels of QA training to every employee.

(3) QA courses are available from the various national or international standards institutions, and an ATO shall consider whether to offer such courses to those likely to be involved in the management or supervision of QA processes. Organisations with qualified staff shall consider the possibility of providing in-house training.

141.01.20 DUTY PERIOD LIMITATIONS

1. General provisions

(1) The prime objective of the scheme of flight time and duty limitations is to ensure that flight instructors are adequately rested at the beginning of each flight duty period for aircrew.

(2) An ATO shall take account of inter-related planning constraints on –

(a) individual duty and rest periods;

(b) the length of cycles of duty and the associated periods of rest; and

(c) cumulative duty hours within specific periods.

(3) Duties shall be scheduled within the limits of the ATO's scheme. To allow for unforeseeable delays a PIC may, within prescribed conditions, use his or her discretion to exceed the limits on the day. Nevertheless, flight schedules shall be realistic, and the planning of duties shall be designed to avoid as far as possible exceeding the flight time and duty limits.

(4) Other general considerations in the sensible planning of duties are –

(a) the need to construct consecutive work patterns which shall avoid as far as possible such undesirable rostering practices as alternating day/night duties and the positioning of flight instructors in a manner likely to result in a serious disruption of established sleep/work patterns;

(b) the need, particularly where flights are carried out on a programmed basis, to allow a reasonable period for the pre-flight notification of duty to flight instructors, other than those on standby duty; and

(c) the need to plan time off and to ensure that flight instructors are notified of their allocation well in advance.

(5) A cabin designated instructor, including briefing and debriefing, shall not conduct more than 8 hours of theoretical or practical training, or combination of such training, for cabin crew or flight deck crew as applicable, in a 24-hour period. Therefore, no duplicate training duties shall be allocated to the cabin designated examiner.

(6) A cabin designated instructor shall not conduct theoretical or practical training, or combination of such training, for more than 6 consecutive days without having a minimum of 1 day off duty of any form prior to conducting training again.

(7) A cabin designated instructor shall be required to have at least 2 consecutive days off in any 14-day period.

(8) A cabin designated examiner, including briefing and debriefing, shall not conduct more than 8 hours of practical drill assessments, for cabin crew or flight deck crew, as

applicable, in a 24-hour period. Therefore, no duplicate training duties shall be allocated to the cabin designated examiner.

(9) A cabin designated examiner shall not conduct practical drill assessments for more than 6 consecutive days without having a minimum of 1 calendar day off duty of any form prior to conducting assessments again.

(10) A cabin designated examiner shall be required to have at least 2 consecutive days off in any 14-day period.

(11) A candidate cabin designated instructor, including briefing and debriefing, shall not observe, co-facilitate, or train under supervision more than 8 hours of theoretical or practical training, or combination of such training, for cabin crew or flight deck as applicable, in a 24-hour period. Therefore, no duplicate training duties shall be allocated to the cabin designated examiner.

(12) A candidate cabin designated instructor shall not observe, co-facilitate, or train under supervision for more than 6 consecutive days without having a minimum of 1 day off duty of any form prior to the continuation of the developmental programme.

(13) A candidate cabin designated instructor shall be required to have at least 2 consecutive days off in any 14-day period.

(14) A candidate cabin designated examiner, including briefing and debriefing, shall not observe, co-assess, or assess under supervision more than 8 hours of practical drills, for cabin crew or flight deck crew, as applicable, in a 24-hour period. Therefore, no duplicate training duties shall be allocated to the cabin designated examiner.

(15) A candidate cabin designated examiner shall not observe, co-assess, or assess under supervision for more than 6 consecutive days without having a minimum of 1 calendar day off duty of any form prior to the continuation of the developmental programme.

(16) A candidate cabin designated examiner shall be required to have at least 2 consecutive days off in any 14-day period.

(17) A designated first aid instructor, including briefing and debriefing, shall not conduct more than 8 hours of theoretical or practical training, or combination of such training, for cabin

crew or flight deck crew as applicable, in a 24-hour period. Therefore, no duplicate training duties shall be allocated to the cabin designated examiner.

(18) A designated first aid instructor shall not conduct theoretical or practical training, or combination of such training, for more than 6 consecutive days without having a minimum of 1 calendar day off duty of any form prior to conducting training again.

(19) A designated first aid instructor shall be required to have at least 2 consecutive days off in any 14-day period.

(20) A designated first aid examiner, including briefing and debriefing, shall not conduct more than 8 hours of practical drill assessments, for cabin crew or flight deck crew, as applicable, in a 24-hour period. Therefore, no duplicate training duties shall be allocated to the cabin designated examiner.

(21) A designated first aid examiner shall not conduct practical drill assessments for more than 6 consecutive days without having a minimum of 1 day off duty of any form prior to conducting assessments again.

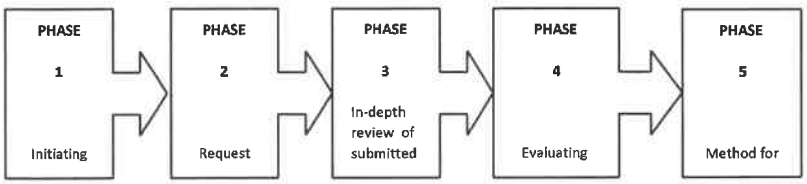
(22) A dangerous goods instructor, including briefing, debriefing and examinations, shall not conduct more than 8 hours of theoretical or practical training, or combination of such training, in a 24-hour period. Therefore, no duplicate training duties shall be allocated to the cabin designated examiner.

(23) A dangerous goods instructor shall not conduct theoretical or practical training, or combination of such training, for more than 6 consecutive days without having a minimum of 1 day off duty of any form prior to conducting training again.

141.01.21 APPROVAL OF TRAINING COURSES WHERE A SYLLABUS IS NOT PROVIDED

There are five phases involved in the process of approving a training programme

PHASES



1. Purpose

(1) This Technical Standards provided guidance on the approval process for a training programme for an air operator or an ATO. It also provides guidance on the contents and structure of the training and checking programme.

2. General

(1) An air operator or an ATO is required to provide adequate ground and flight training facilities and properly qualified instructors as determined by the Authority. In addition to having sufficient depth of knowledge in the aeronautical and technical areas of the curriculum for which he or she is to instruct or check, an instructor shall have training on the fundamentals of instructing, including -

(a) the learning process;

(b) elements of effective teaching;

(c) student evaluation and testing;

(d) course development;

(e) lesson planning;

(f) classroom training techniques;

(g) assessment of student performance in the subject on which instruction is given; and

(h) analysis and correction of student errors.

(2) Training curriculum approvals follow the five-phase general process for approval or acceptance described in this standard. The approval process applies to each air operator

or an ATO requesting approval of a new curriculum as with initial air operator and an ATO certification, or a revision to a currently approved curriculum.

(3) Inherent in the approval process is the Authority's responsibility to deny approval of any training which does not meet regulatory requirements, or which has been found to be deficient. Training curricula which have been granted approval and later found either to conflict with regulatory requirements or to be ineffective shall be appropriately modified by the air operator or aviation training organisation, or the approval shall be withdrawn.

Phase One - initiating the approval process

(1) The training approval process may be initiated by either an air operator or an ATO or the Authority as follows:

(a) An air operator or aviation training organisation initiated – an air operator or an ATO informs the Authority that it is planning to establish a new training curriculum or to change an existing curriculum; or

(b) Authority initiated – The Authority informs an air operator or an ATO that revisions to his training programme are required based on recently acquired information relative to training techniques, aviation technology, aircraft operational history, air operator performance, or regulatory changes.

(2) When a proposal is initiated by an air operator or an ATO, it shall submit the following basic information -

(a) type of operation;

(b) type of equipment to be operated;

(c) geographic areas of operation;

(d) proposed training schedules;

(e) proposed commencement date of training;

(f) proposed commencement date of commercial operations;

(g) proposed contract training, if any;

(h) type of simulator or training device to be used, if any; and

(i) facilities to be used.

3. Phase Two - requests for initial approval

(1) Phase two begins when an air operator or an ATO submits its training proposal to the Authority in writing, for initial approval. An air operator or an ATO is required to submit to the Authority an outline of each curriculum or curriculum segment and any additional relevant supporting information requested by the Authority. These documents shall be accompanied by a letter requesting approval of the training curriculum. Two copies of each curriculum or curriculum segment outline shall be forwarded along with the letter of request to the Authority.

(2) An air operator or an ATO shall submit its own specific curriculum segment outlines appropriate to the type of aircraft and kinds of operations. These outlines may differ from one air operator or an ATO to another and from one category of training to another in terms of format, detail, and presentation. Each curriculum shall be easy to revise and shall contain a method for controlling revisions, such as a revision numbering system. Curricula for different duty positions may be combined in one document provided the positions are specifically identified and any differences in instruction are specified for each duty position. Each curriculum and curriculum segment outline shall include the following information -

(a) air operator or aviation training organisation name;

(b) type of aircraft (If applicable);

(c) duty position (If applicable);

(d) title of curriculum and curriculum segment including the category of training;

(e) consecutive page numbers;

(f) list of effective pages,

(g) page revision control dates and revision numbers;

(3) Each curriculum and curriculum segment shall also include the following items -

(a) prerequisites prescribed by the Regulations or required by the air operator or an ATO for enrolment in the curriculum;

(b) statements of objectives of the entire curriculum and a statement of the objective of each curriculum segment;

(c) a list of each training device, mock-up, system trainer, procedures trainer, simulator, and other training aids which require Authority approval (The curriculum may contain

references to other documents in which the approved devices, simulators, and aids, are listed);

(d) descriptions or pictorial displays of normal, abnormal, and emergency manoeuvres and procedures which are intended for use in the curriculum, when appropriate (These descriptions or pictorial displays, when grouped together, are commonly referred to as the flight manoeuvres and procedures document). An air operator may choose to present detailed descriptions and pictorial displays of flight manoeuvres and procedures in other manuals. For example, the flight manoeuvres and procedures document may be described in an aircraft-operating manual. However, as a required part of the training curriculum, it shall either be submitted as part of the curriculum or be appropriately referenced in the curriculum;

(e) an outline of each training module within each curriculum segment (Each module shall contain sufficient detail to ensure that the main features of the principal elements or events shall be addressed during instruction);

(f) training hours, which shall be applied to each curriculum segment and the total curriculum;

(g) the checking and qualification requirements for the respective crew position and flight operations officer for all elements of training, including line checks for crew members and familiarisation flights for flight operations officers, determine successful course completion.

(4) Additional Relevant Supporting Information

(a) When applying for an air operator or an ATO certificate, an applicant shall submit any additional relevant supporting information requested by the Authority. This additional information is necessary for determining whether the proposed training programme is feasible and adequately supported. It is information that would be difficult to include in a curriculum outline format.

(b) The type and amount of supporting information needed shall vary depending on the type of training, aircraft types, or equipment to be operated and kinds of operations.

The following is the list of types of relevant supporting information but shall not be limited or all-inclusive -

(i) a description of facilities if the Authority is unfamiliar with the facilities, or if the facilities are not readily available for examination;

(ii) a list of ground and flight instructors and their qualifications. This information is particularly important if the air operator intends to use contracted instructors;

(iii) a detailed description of each flight simulator and training device as appropriate. This description shall provide sufficiently detailed information to enable the Authority to determine whether the training and checking to be conducted is appropriate for the level of the flight simulator or training device to be used;

(iv) a detailed description of minimum student qualifications and enrolment prerequisites is appropriate when such prerequisites are not described in detail in the curriculum. Examples of these prerequisites which may need to be detailed as supporting information include: type of license, aircraft type qualifications, previous training programmes, minimum flight hours, experience with other commercial air transport air operators, and recency of experience. This description may be useful to the Authority when determining whether the proposed amount of detail outlined in training modules and the proposed training hours are adequate;

(v) copies of training forms and records to be used for recording student progress and the completion of training may be required. This ensures that an air operator has planned for the CAR record-keeping requirements. This type of supporting information shall be required of applicants for an air operator or an ATO certificate. It may also be required of air operators or an ATO with any significant revision to existing training programmes. These forms, records, or worksheets shall be designed so that attendance and course completion information is recorded and retrievable for verifying regulatory compliance; and

(vi) supporting information may include samples of courseware, such as training modules/lesson plans and instructor guides. Descriptions of other types of courseware, such as home study, computer-based instruction, and Line Oriented Flight Training (LOFT) scenarios, shall be in enough detail to provide

an understanding of how the training shall be administered and of the proposed instructional delivery method. This information shall describe the instructor/student interaction and indicate methods for measuring student learning.

(5) Initial review of requests for approval in phase two the Authority shall review the submitted training curriculum and supporting information for completeness, general content, and overall quality. If the submission is determined to be incomplete or obviously unacceptable, the approval process is terminated, and the Authority shall return the documents with a written explanation of the deficiencies. The documents shall be immediately returned, so that an air operator or an ATO shall not erroneously assume the Authority is continuing the process to the next phase. The approval process can be resumed when the revised training curriculum or curriculum segment is resubmitted.

4. Phase Three - in-depth review of submitted curricula

(1) Phase three is initiated when the Authority begins a detailed analysis and evaluation of a training curriculum or curriculum segment. The purpose of this phase is to determine the acceptability of training curricula for initial approval. The Authority shall review the submission against the following –

(a) regulatory requirements;

(b) complexity of the specific aircraft;

(c) complexity of the type of operation;

(d) amount of detail that needs to be covered;

(e) the experience and knowledge level of the students; and

(f) efficiency and sophistication of an air operator or an ATO's entire training programme (including items such as instructor proficiency, training aids, facilities, courseware, and an air operator or an ATO experience with the aircraft)

(2) This phase ends either with the initial approval or the rejection of all or part of the training curriculum.

(3) If after completing these evaluations, the Authority determines that the curriculum or curriculum segment is satisfactory and adequately supported and that the training hours are realistic, initial approval would be granted with an appropriate expiration date.

(4) During the period of initial approval, an air operator or an ATO would be testing and refining their programme to ensure that the detailed requirements for the final approval are met. However, if there are significant revisions to the programme an air operator or an ATO shall need to re-apply to the Authority for approval. Final approval shall only be granted after the Authority has successfully evaluated the training in the demonstration and inspection phase.

5. Phase Four - evaluating initially approved training curricula

(1) Phase four begins when an air operator or an ATO starts training under the initially approved curriculum during the demonstration and inspection phase. This phase shall provide an air operator or an ATO with adequate time to test the programme and the flexibility to adjust the programme during evaluation by the Authority. An air operator or an ATO shall provide ongoing schedules of all training and checking to be accomplished under an initially approved training curriculum.

(2) Sometimes proposed revisions may be transmitted to the Authority just before the initial approval expiration date. If the change is significant, the Authority may need to establish a different expiration date for the curriculum segment, or for the revised portions, to allow adequate time for a proper evaluation.

(3) During phase four, the air operator or an ATO shall be required to demonstrate the ability to effectively train crewmembers and flight operations officers. There are four main elements that shall be evaluated when assessing the overall effectiveness of training programmes. These four elements are –

(a) curriculum segment outlines;

(b) courseware;

(c) instructional delivery methods and training environment; and

(d) testing and checking;

(e) curriculum segment outlines;

(f) courseware;

(g) instructional delivery methods and training environment; and

(h) testing and checking.

(4) Each deficiency identified during the evaluation of training conducted under an initially approved curriculum shall be discussed with an air operator or an ATO. If the deficiencies are significant, they shall be documented and kept on file. Each significant deficiency identified shall be immediately corrected. If an organisation does not take corrective action within a mutually acceptable timeframe, the Authority shall advise an air operator in writing that initial approval is withdrawn.

6. Phase Five - method for granting final approval

(1) Phase Five involves the granting of final approval of an air operator or an ATO training curriculum. Based on the results of the evaluation, the Authority shall determine whether to grant or deny final approval of a training.

141.01.25 COMPETENCY-BASED TRAINING AND ASSESSMENT

1. Guidance for Competency-based training methodologies and the general provisions for competency-based training is documented in Appendix E to ICAO Document 9841 Third Edition of 2018 and is still under development and shall form part of this CATS-Document.

141.02.4 PERSONNEL

1. Personnel requirements

(1) The duties and responsibilities of the personnel specified in regulation 141.02.4 including matters for which they have responsibility to deal directly with the Director on behalf of the organisation.

(2) Accountable manager

(a) The individual who has corporate authority for ensuring that all training commitments can be financed and carried out to the standard required by the Authority, and any additional requirements defined by an ATO.

Note.— The accountable executive/manager is normally the head of training and may delegate to another person within the organisation the day-to-day management functions but not the overall approval management responsibility. In complex corporate structures, the accountable executive/manager may be responsible for several different ATOs, each with its own head of training.

(b) Qualifications

(i) The Accountable Manager shall not have had any conviction or administrative sanction under the Act or these Regulations which, in the view of the Director, was sufficiently serious to render such person not fit and proper to exercise the responsibilities of such position.

(c) Duties and responsibilities

(i) An Accountable Manager or Executive shall employ the management personnel required by Part 141 on a full-time basis to ensure proper control and supervision of its personnel and operation.

(ii) The application forms for the required managerial positions shall be reviewed to ensure the minimum qualifications are met. The assessment process may involve the use of quizzes or interviews to establish the suitability of each nominee. Where a nominee is known within Authority, the Director may accept such nominee without the need for further assessment.

(iii) An Accountable Manager or Executive may use whatever title deemed necessary for its managers and may assign some of the responsibilities for a given position to another person or persons or the responsibilities of more than one position to one person; however, all the responsibilities noted in section 3 shall be assigned to a nominated manager and such assignment clearly identified in the operations manual. Furthermore, every person assigned any responsibility associated with a required position shall also meet the qualification requirements associated with the responsibilities assigned.

(iv) An Accountable Manager or Executive shall develop a method of ensuring that, in the absence of a responsible manager for any reason, all the responsibilities of that manager are assigned to another individual. Such individual shall meet

the qualifications required for the responsibilities assigned except that the knowledge requirements may be demonstrated to the Accountable Manager or Executive rather than the Director. Any assignment issued for a period greater than 90 days shall be acceptable to the Director.

(v) The Accountable Manager or Executive shall have –

(aa) final authority and accountability for all human resources;

(bb) final authority and accountability for major financial decisions;

(cc) direct responsibility and accountability for the conduct of the company's affairs; and

(dd) responsibility and ultimate accountability for all safety and security issues.

2. Head of training

(1) The individual responsible for the organisation's activities, policies, practices and procedures while ensuring the continued maintenance of the training organisation's approval status.

Note.— The head of training could be Accountable Manager/Executive; however, in complex corporate structures it may be possible that the accountable executive is located at company headquarters and oversees the operation of several different ATOs or Air Operation

(2) The head of training shall have overall responsibility for ensuring satisfactory integration of flying training, flight simulation training and theoretical knowledge instruction and for supervising the progress of individual students. The Head of Training shall have had extensive experience in training as a flight instructor for professional pilot licences and possess a sound managerial capability.

3. Chief flight instructor (CFI)

(1) The CFI shall be responsible for the supervision of flight and FSTD instructor and for the standardisation of flight instruction and synthetic flight instruction. The CFI shall -

(a) hold the highest professional pilot licence related to the flying training courses conducted;

(b) hold the rating(s) related to the flying training courses conducted;

(c) hold a flight instructor rating for at least one of the types of aircraft used on the course; and

(d) have completed 1,000 hours PIC flight time of which a minimum of 500 hours shall be on flying instructional duties related to the flying courses conducted, of which 200 hours may be instrument ground time.

4. Quality Manager (QM)

(1) The individual whose primary role has authority for ensuring quality system by monitoring activities in the field of training, that the standards as established by the ATO and any additional requirements of the Authority are being carried out properly and is the aggregate of all the organisation's activities, plans, policies, processes, procedures, resources, incentives and infrastructure working in unison towards a total quality management approach.

(2) The quality manager shall –

(a) report directly to the head of training; and

(b) have unencumbered access to all parts of an ATO.

Note: When the head of training is not the accountable manager, reporting mechanisms shall be instituted to ensure that the accountable executive is aware of all issues impacting the quality of the training services being provided by the affected ATO.

(3) as a minimum, have –

(a) grade 12 school level or equivalent;

(b) certificate/s or diploma in quality management; and

(c) at least 5 years' experience in implementation and maintenance of quality management systems in the related field.

(4) The Quality Manager is responsible for ensuring that the ATO's quality assurance programme is properly established, implemented and maintained.

(5) An ATO that supports its QA plan with a well-designed, implemented and maintained quality system structure shall be able to easily and repeatedly achieve

results that exceed both the requirements of the applicable regulations and the expectations of an ATO's clients.

(6) The basic attributes of an effective quality system shall include, but are not necessarily limited to -

(a) a managerial structure that facilitates and encourages clear and unencumbered access to the decision makers;

(b) an overarching company commitment to achieving excellence in the delivery of training services, rather than meeting minimum requirements;

(c) quality policies, processes and procedures that are well-designed, consistently applied, and subject to formalised review and refinement processes;

(d) an employee training plan that instils and promotes best practices in quality management efforts;

(e) an organisational risk profile and corresponding risk management plan, which together provide a comprehensive list of hazards that are tied to an ATO's activities and establish mitigating measures to effectively manage those risks which threaten the achievement of desired standards of performance; and

(f) a strategic review of policies and procedures which measures the organisation's current assumptions, objectives and plans by applying a relevance test matched to evolving trends in the industry or changes occurring within an ATO.

(7) The monitoring of compliance with, and the adequacy of, the procedures required to ensure safe operational practices and airworthy aircraft;

(8) The quality manager shall be responsible for ensuring that personnel training related to the quality system is conducted.

(9) The monitoring of activity in an ATO, to ensure that the standards required by the Director, and any additional requirements defined by an operator, are being met; and

(10) Any additional tasks that may be assigned with respect to the financial and non-operational efficiency aspects of the company Safety Manager.

4. Safety Manager

(1) An ATO shall identify an appropriate manager who, irrespective of other functions, shall have ultimate responsibility and accountability for the implementation and maintenance of the SMS.

(2) A Safety Manger shall, as a minimum, have the following skills, qualifications, and experience -

(a) full-time experience in aviation safety in the capacity of an aviation safety investigator, safety/quality manager or safety risk manager;

(b) sound knowledge of the organisation's operations, procedures, and activities;

(c) broad aviation technical knowledge;

(d) an extensive knowledge of SMS and have completed appropriate SMS training;

(e) an understanding of risk management principles and techniques to support the SMS;

(f) experience implementing and managing an SMS;

(g) experience and qualifications in aviation accident/incident investigation and human factors;

(h) experience and qualifications in conducting safety/quality audits and inspections;

(i) sound knowledge of aviation regulatory frameworks, including ICAO Standards and Recommended Practices and relevant CAR;

(j) the ability to communicate at all levels both inside and outside the company;

(k) the ability to be firm in conviction, promote a just and fair culture and yet advance an open and non-punitive atmosphere for reporting;

(l) the ability and confidence to communicate directly to the accountable executive as an advisor and confidante;

(m) well-developed communication skills and demonstrated interpersonal skills of a high order, with the ability to liaise with a variety of individuals and organisational representatives, including those from differing cultural backgrounds; and

(n) Computer literacy and superior analytical skills.

5. The Safety Manager is responsible for the operator's SMS

(1) The establishment and maintenance of a reporting system to ensure the timely collection of information related to potential hazards, incidents and accidents that may adversely affect safety.

(2) The identification of latent hazards and carry out risk management analyses of those hazards.

(3) The investigation, analysis, and identification of the root cause of all hazards or the contributing factors of incidents and accidents identified under the SMS to ensure the operator has adequate mitigation in place.

(4) The establishment and maintenance of a safety data system, either by electronic or by other means, to monitor and analyse trends in hazards, incidents and accidents.

(5) The maintenance of a continuous monitoring system that evaluates the results of corrective actions with respect to hazards, incidents, and accidents;

(6) The monitoring of the concerns of the aviation industry in respect of safety and their perceived effect on an operator.

(7) The co-ordination of the organisation's aviation safety programme and all related safety matters.

(8) Co-operation with an ATO about safety training of personnel, as applicable.

(9) The supervision and coordination regarding matters related to safety in co-operation that relates to emergency facilities and equipment handling;

(10) the investigation of all incidents and accidents involving the organisation equipment and property, including fire and emergency procedures;

(11) The actioning and distribution of accident, incident, and other occurrence reports;

(12) The co-ordination with security personnel to ensure a coordinated approach.

(13) The development and maintenance of a mandatory occurrence reporting scheme.

(14) The establishment of an emergency plan in the event of an accident, which includes the actions to be followed by relevant personnel.

(15) In concert with the person responsible for quality, the maintenance of a quality assurance programme within the organisation.

(16) The realisation of other duties which include –

(a) promulgation of safety bulletins to all staff within the organisation;

(b) conducting meetings with all relevant personnel regarding; safety matters;

(c) maintenance of safety equipment;

(d) safety audits; and

(e) occupational health and safety.

(17) An organisation chart showing lines of responsibility of the personnel specified in regulation 141.02.4.

(18) Details of those locations where members or personnel of the organisation are to exercise functions or powers delegated by the Director.

(19) A summary of the resources at and the scope of training to be conducted at each location listed under subparagraph 3.

(20) Details of the organisation's procedure for recording which of its members and personnel hold authorisations granted by the organisation or delegations of the applicable Authority functions or powers, or both, including the extent and scope of those authorisations and delegations.

(21) Details of the procedures required by:

(a) regulation 141.02.4 regarding the competence of personnel; and

(b) regulation 141.02.3 regarding quality control of the organisation.

7. Flight instructor

(1) Flight instructor shall hold:

(a) a pilot licence and rating(s) in accordance with the regulations related to the flying training courses they are approved to conduct;

(b) an instructor rating or authorisation in accordance with the regulations, relevant to the part of the course being conducted such as flight instructor, flight instrument rating instructor, instructor for additional class or type rating(s), instructor for flight simulation training, as appropriate; and

(c) an instructor for flight simulation training shall hold the authorisation in accordance with the regulations related to the flight simulation training courses they are appointed to conduct.

7. Instructor for flight engineer licences and rating training

(1) Instructors for flight engineer licences and rating training shall hold

(a) the licence and the rating(s) in accordance with the regulations related to the flight engineer licence and rating training courses they are appointed to conduct; and

(b) an instructor rating in accordance with the regulations, relevant to the part of the course being conducted.

(2) A Chief Ground Instructor shall be responsible for the supervision of all ground instructors and for the standardisation of all theoretical knowledge instruction; and shall have a practical background in aviation.

(3) A Ground instructor shall be responsible for conducting ground training in subject areas required for a licence or rating.

(4) The TPM shall contain statements detailing how the list of aircraft and instructors shall be controlled and recorded and shall keep or record the signed acknowledgement of these duties in the personnel files of the individuals assigned such duties.

(5) An ATO shall keep a record of all instructors conducting training and shall submit to the Authority, a copy of the listed instructors whenever a change to the record is made. The record shall contain the following-

(a) all relevant personal details;

(b) qualifications (copies of licenses, medicals, course certificates etc;

(c) a signed duties assignment sheet;

(d) a list of other duties; and

(e) any other applicable information.

141.03.1 TRAINING FACILITIES FOR AN ATO CONDUCTING FLIGHT CREW TRAINING

1. The facilities shall include -

(1) Flight operations facilities -

(a) an operations room;

(b) a flight planning room;

(c) adequate briefing rooms; and

(d) offices for the instructors.

(2) Knowledge instruction facilities, including -

(a) classroom accommodation;

(b) suitable demonstration equipment;

(c) an RT training and testing facility;

(d) a library; and

(e) offices for instructors.

141.04.1 TRAINING AND PROCEDURES MANUAL

1. The training and procedures manual for use at an ATO conducting approved training courses shall include the following:

(1) Part 1

(a) General

(i) preamble relating to the use and applicability of the manual;

(ii) table of contents;

(iii) amendment, revision and distribution of the manual -

(aa) procedures for amendment;

(bb) amendment record page;

(cc) distribution list; and

(dd) list of effective pages.

(iv) glossary of definitions and significant terms, including a list of acronyms and/or abbreviations;

(v) description of the structure and layout of the manual, including -

(vi) the various parts, sections, as well as their contents and use; and

(vii) the paragraph numbering system.

(viii) Description of the scope of training authorised under the organisation's terms of approval.

(ix) Organisation chart of the ATO's management organisation, and the name of the post holders.

(x) Qualifications, responsibilities and succession of command of management and key operational personnel, including but not limited to -

(aa) an accountable manager;

(bb) a chief instructor;

(cc) a responsible person aircraft, as applicable;

(dd) a safety officer, as applicable;

(ee) a quality manager; and

(ff) an adequate number of ground and flight instructors relevant to the courses provided; and

(gg) examiners, evaluators, and auditors.

(xi) Policies dealing with -

(aa) the training organisation's objectives, including ethics and values;

(bb) the selection of ATO personnel and the maintenance of their qualifications;

(cc) the training programme design and development, including the need for programme validation and review, as well as the outsourcing of training programme development to third-party providers;

(dd) the evaluation, selection, and maintenance of training material and devices;

(ee) the maintenance of the training facilities and equipment;

(ff) developing and maintaining a quality system governance model; and

(gg) developing and maintaining a culture focused on safety in the workplace, including, when applicable, implementing a safety management system governance model.

(xii) Description of the facilities and equipment available, including -

(aa) general use facilities, including offices, stores and archives, library or reference areas;

(bb) the number and size of classrooms, including installed equipment; and

(cc) the type and number of training devices, including their location if other than at the main training site.

(xiii) Staff training -

(aa) identification of persons or positions responsible for the maintenance of performance standards and for ensuring the competency of personnel;

(bb) details of the procedures to validate the qualifications and determine the competency of instructional personnel;

(cc) details of the initial and recurrent training programmes for all personnel as required by Part 141; and

(dd) procedures for proficiency checks and upgrade training.

(xiv) Client training programmes

(aa) The client training programmes cover each individual training programme conducted by the training organisation for its customers. The training programmes consist of a training plan, a practical training curriculum and a theoretical knowledge curriculum, if applicable, as described in subparagraph (xv) .

(xv) Training plan

(aa) The aim of the course in the form of a statement of what a student is expected to be able to do as a result of the training, the level of performance, and the training constraints to be observed.

(bb) Pre-entry requirements, including -

(A) minimum age;

(B) education or qualification requirements;

(C) medical requirements; and

(D) linguistic requirements.

(cc) Credits for previous knowledge, experience or other qualifications, which shall be obtained from the Authority before the training commences.

(dd) Training curricula, including the -

(A) theoretical training (knowledge);

(B) practical training (skills);

(C) training in the domain of human factors (attitudes);

(D) assessment and examinations; and

(E) monitoring of the training process, including the assessment and examination activities.

(xvi) Training policies in terms of -

(aa) restrictions regarding the duration of training periods for students and instructors; and

(bb) if applicable, minimum rest periods.

(xvii) Policy for the conduct of student evaluation, including the -

(aa) procedures for authorisation for tests;

(bb) procedures for remediation training before retest and knowledge test re write procedures;

(cc) test reports and records;

(dd) procedures for skill progress checks and skill tests;

(ee) procedures for knowledge progress tests and knowledge tests, including procedures for knowledge test preparation, type of questions and assessments, and standards required for a pass; and

(ff) procedures for question analysis and review and for issuing replacement exams applicable to knowledge.

(xviii) Policy regarding training effectiveness, including -

(aa) liaison procedures between training departments;

(bb) requirements for reporting and documentation;

(cc) internal feedback system for detecting training deficiencies;

(dd) completion standards at various stages of training to ensure standardisation;

(ee) individual student responsibilities;

(ff) procedures to correct unsatisfactory progress;

(gg) procedures for changing instructors;

(hh) maximum number of instructor changes per student; and

(ii) procedures for suspending a student from training.

(b) Curricula for non-competency-based training programmes

(i) Practical training curriculum

(aa) A statement of how the course shall be divided into phases, indicating how the phases shall be arranged to ensure completion in the most suitable learning sequence and that exercises are repeated at the proper frequency.

(bb) The curriculum hours for each phase and for groups of lessons within each phase and when progress tests are to be conducted.

(cc) A statement of the standard of proficiency required before progressing from one phase of training to the next. It includes minimum experience requirements and satisfactory exercise completion before undertaking the next phase.

(dd) Requirements for instructional methods, particularly with respect to adherence to curriculum and training specifications.

(ee) Instruction for the conduct and documentation of all progress checks.

(ff) Instruction, where applicable, provided to all examining staff regarding the conduct of examinations and tests.

(c) Theoretical knowledge curriculum

(i) The curriculum for theoretical knowledge instruction shall be structured generally however, with a training specification and objective for each subject.

(d) Records

(i) Policy and procedures regarding -

(aa) attendance records;

(bb) student training records;

(cc) staff training and qualification records;

(dd) person responsible for checking records and student personal logs;

(ee) nature and frequency of record checks;

(ff) standardisation of record entries;

(gg) personal log entries; and

(hh) security of records and documents.

(e) SMS if applicable

(i) The requirement to adopt SMS practices is intended to be restricted to only those training entities whose activities directly impact upon the safe operation of an aircraft. If the requirement apply to an ATO, the training and procedures manual, shall address an ATO's SMS with reference to a separate manual or include the SMS practices within the training and procedures manual.

(f) Quality assurance

(i) Provide a brief description of the quality assurance practices, as required by with reference to a separate quality manual or include the QA practices within the training and procedures manual.

(g) Appendices

(i) As required -

(aa) sample progress test forms;

(bb) sample logs, test reports and records; and

(cc) a copy of the approved training organisation's approval document.

2. Part II – Additional content for flight training organisations utilising an aircraft

(1) Flight training – general

(a) Qualifications, responsibilities, and succession of command of management and key operational personnel including but not limited to -

(i) chief flight instructor; and

(ii) chief ground instructor.

(b) Policies and procedures dealing with -

(i) approval of flights;

(ii) responsibilities of the pilot-in-command;

(iii) flight planning procedures – general;

(iv) carriage of passengers;

(v) operational control system;

(vi) reporting of safety hazards, incidents and accidents;

(vii) duty periods and flight time limitations for flying staff members and students; and

(viii) minimum rest periods for flying staff members and students.

(c) Description of the facilities and equipment available including -

(i) flight simulation training devices and training aircraft;

(ii) maintenance facilities and apron parking areas for training aircraft;

(iii) computer-based classroom(s); and

(iv) dispatch control and briefing areas.

(d) Aircraft operating information

(i) Certification and operating limitations.

(ii) Aircraft handling, including -

(aa) performance limitations;

(ab) use of checklists;

(ac) standard operating procedures; and

(ad) aircraft maintenance procedures.

(iii) Instructions for aircraft loading and securing of load.

(iv) Fueling procedures.

(v) Emergency procedures.

(e) Routes

(i) Performance criteria, such as take-off, en route, landing, etc.

(ii) Flight planning procedures including -

(aa) fuel and oil requirements;

(ab) minimum safe altitudes;

(ac) planning for contingencies such as emergency or diversion scenarios; and

(ad) navigation equipment.

(iii) Weather minima for all instructional training flights during day, night, VFR and IFR operations.

(iv) Weather minima for all student training flights at various stages of training.

(v) Training routes and practice areas.

(f) Flight training plan

(i) Training curricula including, as applicable, the -

(aa) flying curriculum (single-engine);

(ab) flying curriculum (multi-engine);

(ac) theoretical knowledge curriculum; and

(ad) flight simulation training curriculum.

(g) The general arrangements of daily and weekly programmes for flying training, ground training and flight simulation training.

(h) Training policies in terms of -

(i) weather constraints;

(ii) maximum student training times for flight, theoretical knowledge and flight simulation training, per day/week/month;

(iii) restrictions in respect of training periods for students;

(iv) duration of training flights at various stages;

(v) maximum individual student flying hours in any day or night period;

(vi) maximum number of individual student training flights in any day or night period; and

(vii) minimum rest periods between training periods.

141.05.4 PERSONNEL

1. The duties and qualifications of the personnel of an ATO conducting maintenance training are as listed-

(1) Head of Training. The Head of Training shall have overall responsibility for ensuring satisfactory integration of theoretical knowledge instruction and practical training and for supervising the progress of individual students. The Head of Training shall have had extensive experience in training as an instructor for AME licensing and possess a sound managerial capability.

(2) Instructors.

(a) Each ATO shall provide the number of instructors holding appropriate licences and ratings, issued under Part 66, that the Authority determines it necessary to provide adequate instruction and supervision of the students.

(b) An ATO may provide specialised instructors, who are not licensed but who are approved in accordance with Part 66, to teach mathematics, physics, basic electricity, basic hydraulics, drawing, and similar subjects.

141.05.5 FACILITIES REQUIRED FOR MAINTENANCE TRAINING

1. An applicant for, and holder of an ATO certificate

(1) An applicant for a holder of an ATO certificate shall have facilities, as follows -

(a) an enclosed classroom;

(b) suitable facilities arranged to assure proper separation from the working space, for parts, tools, materials and similar articles;

(c) suitable area for application of finishing materials, including paint spraying;

(d) suitable areas equipped with wash tank and degreasing equipment with air pressure or other adequate cleaning equipment;

(e) suitable facilities for running engines;

(f) suitable area with adequate equipment, including benches, tables, and test equipment, to disassemble, service and inspect;

(g) ignition systems, electrical equipment and appliances;

(h) carburetors and fuel systems;

(i) hydraulic and vacuum systems for aircraft, aircraft engines, and their appliances.

(j) suitable space with adequate equipment, including tables, benches, stands and jacks for disassembling, inspecting and rigging aircraft; and

(k) suitable space with adequate equipment for disassembling, inspecting, assembling, troubleshooting and timing engines.

(2) An applicant for, or holder of an ATO certificate with approved maintenance courses shall have and maintain the following instructional equipment as is appropriate to the rating sought -

(a) various kinds of airframe structures, airframe systems and components, powerplants and powerplant system and components including propellers of a quantity and type suitable to complete the practical projects required by its approved training programme; and

(b) at least one aircraft of a type acceptable to the Director;

(3) An applicant for, or holder of an ATO certificate with maintenance courses shall have airframes, powerplants, propellers, appliances, and components thereof, to be used for instruction and from which a student shall gain practical working experience and shall ensure that the airframes, powerplants, propellers, appliances and components are sufficiently diversified so as to show the different methods of construction, assembly, inspection and operation when installed in an aircraft for use.

(4) An applicant for an ATO certificate with maintenance courses, or an applicant seeking an additional maintenance course, shall have at least the facilities, equipment, and materials appropriate to the rating sought.

(5) An applicant for, or holder of, an ATO certificate with maintenance courses shall maintain, on the premises and under the full control of the ATO, an adequate supply of material, special tools and shop equipment used in constructing and maintaining aircraft as is appropriate to the approved training programme of the ATO, to assure that each student shall be properly instructed.

(6) A holder of an ATO certificate may not make a substantial change in facilities, equipment or material that have been approved for a particular training programme, unless that change is approved by the Director in advance.

141.05.6 TRAINING AND PROCEDURES MANUAL

1. The Training and Procedures Manual for use at an ATO conducting approved training courses shall include the following:

(1) Part 1

(a) General

(i) Preamble relating to the use and applicability of the manual.

(b) Table of contents.

(c) Amendment, revision and distribution of the manual -

(i) procedures for amendment;

(ii) amendment record page;

(iii) distribution list; and

(iv) list of effective pages.

(d) Glossary of definitions and significant terms, including a list of acronyms and abbreviations.

(e) Description of the structure and layout of the manual, including -

(1) the various parts, sections, as well as their contents and use; and

(2) the paragraph numbering system.

(f) Description of the scope of training authorised under the organisation's terms of approval.

(g) Organisation (chart of the ATO's management organisation), and the name of the post holders.

(h) Qualifications, responsibilities and succession of command of management and key operational personnel, including but not limited to -

(i) an accountable manager;

(ii) a head of training;

(iii) a safety officer, as applicable;

(iv) a quality manager;

(v) an adequate number of instructors relevant to the courses provided; and

(vi) examiners, evaluators, and auditors.

(i) Policies dealing with -

(i) the training organisation's objectives, including ethics and values;

(ii) the selection of ATO personnel and the maintenance of their qualifications;

(iii) the training programme design and development, including the need for programme validation and review, as well as the outsourcing of training programme development to third-party providers;

(iv) the evaluation, selection, and maintenance of training material and devices;

(v) the maintenance of the training facilities and equipment;

(vi) developing and maintaining a quality system governance model; and

(vii) developing and maintaining a culture focused on safety in the workplace, including, when applicable, implementing a safety management system governance model.

(j) Description of the facilities and equipment available, including -

(i) general use facilities, including offices, stores and archives, library or reference areas;

(ii) the number and size of classrooms, including installed equipment; and

(iii) the type and number of training devices, including their location if other than at the main training site.

2. Staff training

(1) Identification of persons or positions responsible for the maintenance of performance standards and for ensuring the competency of personnel.

(2) Details of the procedures to validate the qualifications and determine the competency of instructional personnel.

(3) Details of the initial and recurrent training programmes for all personnel, including awareness training with respect to their responsibilities within the ATO's system governance processes.

(4) Procedures for proficiency checks and upgrade training.

3. Client training programmes

(1) The client training programmes cover each individual training programme conducted by the training organisation for its customers. The training programmes consist of a training plan, a practical training syllabus and a theoretical knowledge syllabus, if applicable.

(a) Training plan

The aim of the course in the form of a statement of what the student is expected to be able to do because of the training, the level of performance, and the training constraints to be observed.

(i) Pre-entry requirements, including:

(aa) minimum age;

(bb) education or qualification requirements;

(cc) medical requirements; and

(dd) linguistic requirements.

(ii) Credits for previous knowledge, experience, or other qualifications, which shall be obtained from the Authority before the training commences.

(iii) Training curricula, including the -

(aa) theoretical training (knowledge);

(bb) practical training (skills);

(cc) training in the domain of human factors (attitudes);

(dd) assessment and examinations; and

(ee) monitoring of the training process, including the assessment and examination activities.

(iv) Training policies in terms of -

(aa) restrictions regarding the duration of training periods for students and instructors; and

(bb) if applicable, minimum rest periods.

(v) Policy for the conduct of student evaluation, including the -

(aa) procedures for authorisation for tests;

(bb) procedures for remediation training before retest and knowledge test re write procedures;

(cc) test reports and records;

(dd) procedures for skill progress checks and skill tests;

(ee) procedures for knowledge progress tests and knowledge tests, including procedures for knowledge test preparation, type of questions and assessments, and standards required for a pass; and

(ff) procedures for question analysis and review and for issuing replacement exams (applicable to knowledge tests).

(vi) Policy regarding training effectiveness, including -

(aa) liaison procedures between training departments;

(bb) requirements for reporting and documentation;

(cc) internal feedback system for detecting training deficiencies;

(dd) completion standards at various stages of training to ensure standardisation;

(ee) individual student responsibilities;

(ff) procedures to correct unsatisfactory progress;

(gg) procedures for changing instructors;

(hh) maximum number of instructor changes per student; and

(ii) procedures for suspending a student from training.

4. Curricula for non-competency-based training programmes

(1) Practical training curriculum

(a) A statement of how the course shall be divided into phases, indicating how the phases shall be arranged to ensure completion in the most suitable learning sequence and that exercises are repeated at the proper frequency.

(b) The curriculum hours for each phase and for groups of lessons within each phase and when progress tests are to be conducted.

(c) A statement of the standard of proficiency required before progressing from one phase of training to the next. It includes minimum experience requirements and satisfactory exercise completion before undertaking the next phase.

(d) Requirements for instructional methods, particularly with respect to adherence to curriculum and training specifications.

(e) Instruction for the conduct and documentation of all progress checks.

(f) Instruction, where applicable, given to all examining staff regarding the conduct of examinations and tests.

(2) Theoretical knowledge curriculum

(a) The curriculum for theoretical knowledge instruction shall be structured with a training specification and objective for each subject.

5. Records

(1) Policy and procedures regarding -

(a) attendance records;

(b) student training records;

(c) staff training and qualification records;

(d) person responsible for checking records and student personal logs;

(e) nature and frequency of record checks;

(f) standardisation of record entries;

(g) personal log entries; and

(h) security of records and documents.

6. Safety management system (if applicable)

The requirement to adopt SMS practices is intended to be restricted to only those training entities whose activities directly impact upon the safe operation of aircraft. Shall that requirement apply to an ATO, the training and procedures manual shall address an ATO's SMS with reference to a separate manual or include the SMS practices within the training and procedures manual.

7. Quality assurance

(1) Provide a brief description of the quality assurance practices with reference to a separate quality manual or include the QA practices within the training and procedures manual.

8. Appendices

(1) As required -

(a) sample progress test forms; and

(b) sample logs, test reports and records.

141.06.4 PERSONNEL

1. The Accountable manager shall be qualified as follows, at minimum -
   (a) knowledge of applicable regulations and operator's standard operating procedures, as applicable;
   (b) knowledge of the cabin crew operating environment and procedures; and
   (c) knowledge of AIC's, workshops and notices published by the Authority.
2. The Accountable manager's responsibilities shall include but not be limited to the following -
   (a) ensuring the current and most recently approved cabin crew training manual is used for all training conducted at the ATO;
   (b) ensuring a current and approved cabin crew safety training programme is used for all training conducted at the ATO;
   (c) ensuring training equipment and facilities meet the required standards and have been approved by the Authority prior to use thereof;
   (d) assuming responsibilities delegated by the relevant management;
   (e) ensuring that suitably qualified instructors and examiners are used for the relevant portions of training or assessment;
   (f) ensuring that documentation is completed fully and correctly;
   (g) ensuring that documentation is submitted to the Authority within the correct time frames;
   (h) liaising with other company departments to ensure that cabin safety objectives are met, as applicable,
   (i) liaising with the Authority;
   (j) in his or her absence, delegating all responsibilities to another qualified individual; and
   (k) administering and communicating as necessary to fulfill the foregoing responsibilities.
3. The role of the accountable manager may be integrated with another role in the organisation, such as head of training or training programme developer.

4. The quality manager is subject to approval by the Authority. He or she shall demonstrate a thorough understanding and knowledge of the administrative and practical responsibilities and procedures associated with the position.
5. The quality manager shall have received suitable training and a recognised qualification in quality management, quality control and auditing to enable him or her to exercise his or her duties at an ATO.
6. The safety manager shall have received suitable training and a recognised qualification in safety management to enable him or her to exercise his or her duties at an ATO.
7. Where the training offered by the ATO is restricted to cabin crew training, the role of the safety manager may be integrated with another in the organisation, such as quality manager.
8. The head of training is subject to approval by the Authority. He or she shall demonstrate a thorough understanding and knowledge of the administrative and practical responsibilities and procedures associated with the position.
9. The head of training shall be qualified as follows, at minimum -
   (a) experience as a cabin crew member;
   (b) management skills;
   (c) experience in instructional and training skills; and
   (d) knowledge of applicable regulations and operator's standard operating procedures, as applicable.
10. The head of training's responsibilities shall include, but are not limited to -
   (a) ensuring a current and approved cabin crew safety training programme;
   (b) ensuring training equipment and facilities meet the required standards;
   (c) providing advice into the development of safety and emergency
   (d) procedures;
   (e) providing advice into the development of directives and notices to cabin crew members, as applicable;
   (f) supervising cabin crew training personnel and ensuring that the appropriate guidance is provided;
   (g) assuming responsibilities delegated by the relevant management;
   (h) training of cabin crew members, in accordance with the approved training programme;
   (i) maintaining cabin crew training records;

(j) liaising with other company departments to ensure that cabin safety objectives are met, as applicable,

(k) liaising with the Authority;

(l) in his or her absence, delegating all responsibilities to another qualified individual;

(m) administering and communicating as necessary to fulfill the foregoing responsibilities; and

(n) for ensuring that all staff and training personnel are familiar with the training and procedures manual and the quality assurance system, that it is understood, implemented, and complied with at all levels.

11. Cabin designated instructors are required to maintain their competency and currency as documented in the regulations.
12. Cabin designated instructors have a responsibility to communicate with the head of training if they notice any deficiencies or discrepancies in the training being conducted.
13. Cabin designated instructors shall ensure that the training requirement, as applicable, has been satisfactorily and that the students are ready to be assessed, theoretically and practically, prior to the conducting of any theoretical test/examination or skills test.
14. Cabin designated instructors shall conduct training according to the ATO's and operator's standard operating procedures, as applicable, and shall therefore be well versed with an ATO's and operator's approved policies and procedures.
15. Cabin designated instructors shall have access to the TPM of a Part 141 approved training organisation or the operations manual of an AOC holder, as applicable.
16. Cabin designated examiners are required to maintain their competency and currency as documented in the regulations.
17. Cabin designated examiners have a responsibility to communicate with the head of training if they notice any deficiencies or discrepancies in the assessments being conducted.
18. Cabin designated examiners shall confirm that the training, as prescribed, has been satisfactorily completed and written examination successfully passed, as applicable, prior to the commencement of any skills testing.
19. Cabin designated examiners shall conduct and issue skills tests according to the operator's and ATO's standard operating procedures, as applicable, and shall therefore be well versed with an operator's and ATO's approved policies and procedures, as applicable.
20. Cabin designated examiners shall have access to the TPM of a Part 141 ATO or the operations manual of a Part 121 AOC holder, as applicable.

21. The training programme developer's responsibilities include, but are not limited to, the following:

(a) designing the training programme;

(b) defining training objectives;

(c) developing course examinations and practical evaluations;

(d) designing training modules;

(e) determining the training strategy;

(f) selecting training media;

(g) producing competency-based training and assessment materials;

(h) carrying out developmental testing of competency-based training and assessment materials; and

(i) improving the training programme, based on analysis of different sources of information.

(8) The role of the training programme developer may be integrated with another role in the organisation, such as accountable manager or head of training.

141.06.5 FACILITIES

1. Classroom size is dependent on the following -

(a) number of students in a class;

(b) student work station size;

(c) class configuration;

(d) size of aisles;

(e) use of media; and

(f) hands-on exercises, if applicable

2. Each student's work station space includes the space required to house the student's work surface, any additional equipment, the chair, the space for chair pushback and manoeuvrability.

3. The learning environment shall eliminate discomforts and other undesirable characteristics by considering the following -

(a) temperature;

(b) ventilation;

(c) lighting which shall be at an adequate level for work or viewing;

(d) distracting sound shall be kept to a minimum;

(e) aesthetic appeal of the work area;

(f) comfortable work stations, including chairs;

(g) adequate work space;

(h) adequate training equipment; visual media that is visible from all angles and seats; and

(i) audio media that is audible to all present.

4. Instructional aids include the use of the following -

(a) computer-based training;

(b) representative equipment;

(c) representative aircraft devices;

(d) models of aircraft and the aviation environment;

(e) audio-visual aids;

(f) live or simulated flight experiences; and

(g) power-point presentations

5. Safety and emergency equipment used on an aircraft shall be available during training, according to the applicable training session.

6. Equipment that is removed from operation, or other representative training equipment considered acceptable by the Authority, may be used for training purposes.

7. Cabin training devices that are capable of recreating realistic situations may be used to provide effective training on safety and abnormal/emergency procedures. When applicable, a mock-up or simulator may be used to enable realistic simulation of cabin crew member duties without continuous need for use of actual aircraft.

8. Cabin training devices shall include parts of the cabin containing lavatories, galleys, a type of emergency exit used in the aircraft, some seat rows, cabin crew seats, attendant panels and overhead bins. Components included in a cabin training device depend on the type of hands-on exercises that are carried out on a particular device. For the purposes of emergency procedures training, cabin training devices shall be able to create an environment which may not be created in a classroom.

9. The following components/items shall be representative of those found on an aircraft -

(a) dials, handles, switches, restraint brackets, and mounting devices to be operated and the force required for their operation;

(b) the weight of emergency exit hatches;

(c) the direction of movement, associated forces, and travel of all controls for all equipment, including the weight of emergency exits when operated without power assist, where applicable; and

(d) stowage location of safety and emergency equipment secured with representative brackets or mounting devices.

10. A cabin training device used for cabin crew training shall include the following features, according to the applicable scenario -

(a) safety and emergency equipment currently required on an aircraft in locations and the restraint brackets representative of those installed on an aircraft;

(b) aircraft systems relevant to cabin crew duties representative of those installed on an aircraft, including but not limited to -

(i) operational cabin call chimes (aural and visual indicators);

(ii) cabin crew communications equipment and associated control panels, including an operational public address system and appropriate attendant panel(s) at the cabin crew station;

(iii) normal and emergency cabin lighting, including fail features; and

(iv) deployable oxygen masks for passengers and cabin crew

(v) internal cabin markings, such as placards and exit markings;

(vi) emergency exit(s);

(vii) a flight deck door and related security features;

(viii) operational ordinance signs visible from each passenger seat and cabin crew station or seat;

(ix) seat dimensions and seat pitch;

(x) simulated cabin windows and features necessary to darken the cabin;

(xi) facilities and sufficient speakers to simulate sound effect or crash noises audible throughout the cabin; and

(xii) smoke simulation capabilities.

11. A CTD used for emergency evacuation training shall include the following features, according to the applicable scenario -

(a) layout of the cabin that are representative of an aircraft in relation to emergency exits, galley areas and safety and emergency equipment stowage;

(b) cabin crew and passenger seat positioning that is representative of that on an aircraft, with accuracy for seats immediately adjacent to exits;

(c) capability to operate exits in normal and emergency modes – particularly in relation to the method of operation and forces required to operate them;

(d) width, height and angle of inflated evacuation slides shall be similar to that found on the aircraft type;

(e) a minimum of two operational emergency exits (one door and one alternate exit or two doors, as applicable) – plus one operational window exit (where applicable). CTDs may be equipped with exits representative of more than one aircraft type. However, where possible, consideration shall be given to ensure the same exit device is opposite, such as two Boeing 747 doors opposite each other as opposed to one Boeing 747 and one A330 door.

(f) at least one cabin crew station located at an operational exit, and additional cabin crew stations depending on the grouping of exits contained in the trainer;

(g) cabin crew stations and the associated attendant panel(s) that are representative of an aircraft;

(h) simulation of an unserviceable exit(s); and

(i) simulation of hazards at emergency exits such as obstacle, fire or water.

12. Emergency Exit Trainer

(1) An ATO may provide training to cabin crew members on an emergency exit trainer instead of an actual aircraft.

(2) The emergency exit trainer shall -

(a) replicate the size, weight, and operating characteristics of the exit of an aircraft type on which the cabin crew member shall operate; and

(b) be designed so that the representative exit may be operated in normal and emergency modes, particularly in relation to method of operation and forces required to operate them.

(3) Differences in exit operating characteristics between actual aircraft exits and the emergency exit trainer may be of critical importance during an emergency evacuation, especially as this may lead the cabin crew members to an incorrect assessment of the serviceability of the exit and to incorrectly operate that exit. When a representative training device does not replicate the actual aircraft exit operating characteristics, any differences between the operating characteristics of the actual aircraft exits and those of the emergency exit trainer shall be highlighted during training.

13. Live Fire Fighting

(1) A firefighting exercise shall be conducted in an area designated and approved for this purpose under the supervision of an instructor or examiner, as applicable.

(2) (ii) The device used for a firefighting exercise shall include aircraft furnishings as found on board an aircraft, such as seats, galley units, lavatories, panels, overhead bins and waste bins.

(3) Fire-fighting equipment and the restraints used shall be representative to those installed on an aircraft with respect to weight, dimensions, controls, types and operations.

(4) Fire extinguishers used for live firefighting shall be charged with the appropriate agent or with an environmentally friendly agent.

14. Water survival

(1) The wet ditching drills shall be carried out in a body of water or pool of sufficient depth to realistically perform the simulated exercise.

(2) The depth of the body of water or pool shall be sufficient to ensure that individuals participating in the water survival drill are able to simulate a deep-water exercise.

(3) The body of water or pool shall be large enough to accommodate the life raft or dinghy whilst leaving adequate space for the crew drills to be completed

(4) A life-raft exercise shall be conducted using life-saving equipment that is representative of that installed on the aircraft with respect to weight, dimensions, appearance, features and operation. The rafts may be substituted if the equipment used is similar with respect to weight, dimensions, appearance and features. In such cases, training shall address any differences in the operation of the raft.

141.06.6 TRAINING AND PROCEDURES MANUAL

1. **The Training and Procedures Manual for use at an ATO conducting approved training courses shall include the following:**

(1) Part 1

(a) general

(i) preamble relating to the use and applicability of the manual.

(ii) table of contents.

(iii) amendment, revision and distribution of the manual:

(iv) procedures for amendment/revision;

(v) amendment record page;

(vi) procedures to control;

(vii) distribution list; and

(viii) list of effective pages.

(b) contain commitment statements signed by the various responsible persons.

(c) glossary of definitions and significant terms, including a list of acronyms and/or abbreviations.

(d) description of the structure and layout of the manual, including:

(e) the various parts, sections, as well as their contents and use; and

(f) the paragraph numbering system.

(g) description of the scope of training authorised under the organisation's terms of approval.

(h) organisation (chart of the ATO's management organisation), and the name of the post holders.

(i) qualifications, responsibilities and succession of command of management and key operational personnel, including but not limited to:

(j) an accountable manager;

(k) a head of training;

(l) a safety officer, as applicable;

(m) a quality manager;

(n) a training programme developer;

(o) an adequate number of instructors relevant to the courses provided;

(p) an adequate number of designated examiners relevant to the courses provided; and

(q) evaluators, and auditors.

2. **Policies dealing with -**

(a) the training organisation's objectives, including ethics and values;

(b) permission required to deviate from the requirements of the organisation's training and procedures Manual;

(c) the selection of an ATO personnel and the maintenance of their qualifications;

(d) the training programme design and development, including the need for programme validation and review, as well as the outsourcing of training programme development to third-party providers;

(e) the evaluation, selection, and maintenance of training material and devices;

(f) sufficient evaluation tools for each training programme;

(g) moderation of evaluation tools;

(h) examination and assessment procedures;

(i) moderation of completed examinations;

(j) internal feedback system for detecting training deficiencies;

(k) maximum number of instructor changes per student;

(l) procedures for suspending a student from training;

(m) the maintenance of the training facilities and equipment;

(n) developing and maintaining a quality system governance model; and

(o) developing and maintaining a culture focused on safety in the workplace, including, when applicable, implementing a safety management system governance model.

3. **Description of the facilities and equipment available, including -**

(a) general use facilities, including offices, stores and archives, library or reference areas;

(b) the number and size of classrooms, including installed equipment; and

(c) the type and number of training devices, including their location if other than at the main training site.

4. **Staff training**

(1) Identification of persons or positions responsible for the maintenance of performance standards and for ensuring the competency of personnel.

(2) Details of the procedures to validate the qualifications and determine the competency of instructional personnel as required by these regulations.

(3) Details of the initial and recurrent training process for all personnel as required by Part 141 of the regulations.

(4) Procedures for proficiency checks and extension of scope training.

(5) Procedures for the developmental programme for candidate cabin designated instructors or cabin designated examiners.

5. **ATO training programmes**

The ATO training programmes cover each individual training programme conducted by the training organisation for its customers. The training programmes consist of a training plan, a theoretical knowledge syllabus and a practical training syllabus, if applicable.

6. **Training plan**

(1) The objective of the course in the form of a statement of what the student is expected to be able to do as a result of the training, the level of performance, and the training constraints to be observed.

(2) Pre-entry requirements, including -

(a) minimum age;

(b) education or qualification requirements;

(c) medical requirements; and

(d) linguistic requirements.

(3) Training curricula, including the -

(a) theoretical training (knowledge);

(b) practical training (skills);

(c) training in the domain of human factors (attitudes); and

(d) monitoring of the training process, including the assessment and examination activities.

(4) Policy for the conduct of student evaluation, including the -

(a) procedures for remediation training before retest or re-examine and knowledge test/examination rewrite procedures;

(b) test/examination reports and records;

(c) procedures for assessment and reassessment of skills tests;

(d) procedures for knowledge progress tests or examinations and knowledge tests/examinations, including procedures for knowledge test or examination preparation, type of questions and assessments, and standards required for a pass;

(e) procedures for test/examination question analysis and review, the issuing replacement tests/examinations (applicable to knowledge assessments);

(f) procedures for moderation of theoretical knowledge tests or examinations; and

(g) procedures for students to appeal the finding(s) raised during a test or examination or assessment.

(5) Policy regarding training effectiveness, including -

(a) liaison procedures between training departments and operators;

(b) requirements for reporting and documentation;

(c) completion standards at various stages of training to ensure standardisation; and

(d) individual student responsibilities.

7. **Theoretical knowledge curriculum**

(1) A statement of how the course shall be divided into modules, indicating how the modules shall be arranged to ensure completion in the most suitable learning sequence and that exercises are repeated at the proper frequency.

(2) A training specification and objective for each module.

(3) The curriculum hours for each module and for groups of lessons within each module and when progress tests/examinations are to be conducted.

(4) A statement of the standard of proficiency required before progressing from one phase of training to the next. It includes minimum experience requirements and satisfactory exercise completion before undertaking the next phase.

(5) Facilitators guide and lesson plan with the requirements for instructional methods, particularly with respect to adherence to syllabi and training specifications.

(6) Instruction for the conduct and documentation of the training programme.

(7) Instruction, where applicable, given to all examining staff regarding the conduct of examinations and tests.

8. **Practical training curriculum**

(1) The curriculum for practical training instruction shall be structured generally as in paragraph 7 above.

(2) The syllabus shall be aligned to the relevant regulation for the applicable training.

9. **Records**

(1) Policy and procedures regarding -

(a) attendance records;

(b) student training records;

(c) staff training and qualification records;

(d) person responsible for checking records and student personal logs;

(e) nature and frequency of record checks;

(f) duration of record retention;

(g) list of documentation that shall be retained;

(h) standardisation of record entries;

(i) instructor/designated examiner reports; and

(j) security of records and documents.

10. **SMS (if applicable)**

(1) The requirement to adopt SMS practices, as per Part 140, is intended to be restricted to only those training entities whose activities directly impact upon the safe operation of aircraft. Shall that requirement apply to an ATO, the Training and procedures manual shall address the ATO's SMS with reference to a separate manual or include the SMS practices within the TPM.

(2) SMS practices are applicable to those entities that require risks to be mitigated for the sake of meeting with occupational health and safety standards, and shall include -

(a) a clear definition of the level of safety that the organisation intends to achieve;

(b) proof by the approved organisation to the Director that adequate safety measures to maintain the required level of safety shall be or have been instituted;

(c) the components and elements described below.

11. **Components and elements required for a safety management system**

(1) Safety Policy and Objectives

(a) Management commitment and responsibility

(i) an ATO shall define its safety policy which shall be in accordance with international and national requirements;

(ii) the safety policy shall reflect its commitments regarding safety; including a clear statement about the provision of the necessary human and financial resources for its implementation; and be communicated, with visible endorsement, throughout the organisation; and

(iii) the safety policy shall be reviewed at least biannually to ensure that it remains relevant and appropriate to the organisation.

(b) SMS implementation plan

(i) an ATO shall develop and maintain an SMS implementation plan that defines the organisation's approach to manage safety in a manner that meets the organisation's safety needs;

(ii) it shall address the coordination between the SMS of an ATO and the SMS of other service providers (that may affect aviation safety and security) with whom an ATO may interface during the provision of services; and

(iii) the SMS implementation plan shall be endorsed by senior management of the organisation.

(c) Coordination of emergency response planning

(d) An ATO shall develop, coordinate, and maintain an emergency response plan that ensures orderly and efficient transition from normal to emergency operations, and return to normal operations.

(e) Documentation

(f) An ATO shall develop and maintain SMS documentation as applicable to its size and requirements

(2) Safety risk management

(a) Hazard identification process

(b) An ATO shall develop and maintain a formal process for effectively collecting, recording, acting on and generating feedback about hazards in operations, based on a combination of reactive, proactive and predictive methods of safety data collection.

Note: Reactive methods refer to methods of identifying hazards that are based on the investigation of occurrences. Proactive methods aim to use any other *information within the organisation for the identification of potential hazards. Predictive methods rely on data that is collected within the organisation that could be used effectively to predict the existence of hazards, usually done by trend analysis.*

(c) Risk assessment and mitigation process

(i) an ATO shall develop and maintain a formal risk management process that ensures analysis (in terms of probability and severity of occurrence), assessment (in terms of tolerability or acceptability) and control (in terms of mitigation) of risks to an acceptable level;

(ii) a means of analysing, assessing, and controlling risk shall be implemented by the ATO;and

(iii) an ATO shall define those levels of management with authority to make decisions regarding the tolerability or acceptability of safety risks, and the introductions of mitigating measures.

(3) Safety assurance

(a) Monitoring and measurement of safety performance

(i) an ATO shall develop and maintain the means to verify the safety performance of the organisation compared to the safety policy and objectives, and to validate the effectiveness of safety risk controls; and

(ii) the safety reporting procedures relating to safety performance and monitoring shall clearly indicate which types of operational behaviours are acceptable or unacceptable and include the conditions under which immunity from disciplinary action would be considered. A non-punitive policy is required to enhance the reporting culture. Immunity from disciplinary action may not be granted in instances of violation and negligence.

(4) The management of change

(a) An ATO shall develop and maintain a formal process to identify changes within the organisation which may affect established processes and services; to describe the arrangements to ensure safety performance before implementing changes; and to eliminate or modify safety risk controls that are no longer needed or effective due to changes in the operational environment.

(5) Continuous improvement of the SMS

(a) An ATO shall develop and maintain a formal process to identify the causes of sub-standard performance of the SMS, to determine the implications of sub-standard performance in operations, and to eliminate such causes. This may be achieved through audits of the SMS to ensure its effective implementation.

(6) Safety promotion

(a) Training and education

(i) am ATO shall develop and maintain a safety training programme that ensures that personnel responsible for the associated functions as contained in the SMS are trained and competent to perform the SMS duties; and

(ii) the scope of the safety training shall be appropriate to each individual's involvement in the SMS.

(7) Safety communication

(a) An ATO shall develop and maintain formal means for safety communication, which ensures that all personnel are fully aware of the SMS, conveys safety critical information, and explains on safety actions are taken and on the safety procedures introduced or changed.

(8) Safety reporting requirements

(a) An appropriate manager tasked with the safety management system shall report to the Accountable Manager on all hazards identified and the mitigation strategies implemented.

12. **Quality assurance**

(1) Provide a brief description of the quality assurance practices, as required by technical standard 141.01.17, with reference to a separate quality manual or include the QA practices within the training and procedures manual.

(2) Policies dealing with -

(a) internal assessment of instructors/designated examiners;

(b) review process for student evaluation forms;

(c) staff meeting procedure;

(d) non-compliance procedure; and

(e) procedure by which other quality indicators such as facility malfunction reports, incidents, occurrences, feedback, complaints, and other defects are brought into the quality control system.

13. **Appendices**

(1) As required -

(a) curricula vitae of instructors or designated examiners;

(b) copy of certificate to be issued on completion of training;

(c) out-sourced training – copy of signed contract with relevant ATO's or Facilities;

(d) student evaluation form;

(e) instructor or designated examiner evaluation form;

(f) internal audit form;

(g) training manuals;

(h) lesson plans and Facilitator guides;

(i) training Programme(s);

(j) progress tests and examinations; and

(k) practical drill sheets (in house assessments) a copy of the approved training organisation's approval document.

141.07.1 REQUIREMENTS RELATING TO TRAINING

1. E-LEARNING SYSTEM AND SERVICE PROVISION BY OPERATOR

(1) E-Learning systems shall comply with the following general requirements as a minimum:

Item	Risk Cat 1	Risk Cat 2	Risk Cat 3	Risk Cat 4	Risk Cat 5
Definition	Self declaration	Development and enrichment training. Not regulated but can be audited	Mandatory / Regulated theory exam with practical component to verify knowledge and skills.	Mandatory / Regulated training with a knowledge test	Initial Licenses / Ratings
Authentication	Self declaration	Logon via Unique password	Theory - Logon via Unique password and signature of forms, Practical - instructor signature and license no on forms	Knowledge Test - Logon via Unique password, Rigorous/undeniable identification (biometrics / proxy controlled / controlled exam environment) record taken before / during assessment, Examiner signature	SACAA Authorised exam center, proof of ID on entry

Standards	Internally defined Policy	Internally defined and potentially approved by SACAA	As per regulations	As per regulations	As per regulations
Record keeping	Self declaration / Attendance	Audit trail	All data kept for 5 years	All data kept for 5 years	All data kept for 5 years
Moderation	None	Internal	Internal moderation and SACAA auditing	Internal moderation and SACAA auditing	Internal moderation and SACAA auditing
Assessment	None	Online knowledge test, random questions from master list or randomized question and answer order.	Online knowledge test, random questions from master list; Instructor verification of knowledge during practical testing prior to completion of forms	Online knowledge test, random questions and answers from master list	As per regulations
Remediation	None	Any incorrect answers	Any incorrect answers immediately remediated as per	Any incorrect answers	As per regulations

		immediately remediated as per online database	online database for online or verbal discussion with learner	immediately remediated	
Security Features	Can match signature if warranted by audit	Internal annual audit to database access and internal audit trail of results	Secure database of questions, annual audit of access to database theory: Online verification	Secure database of questions, annual audit of access to database	As per standard operating procedures
Examples	Flight experience	Lithium Battery, Thunderstorm avoidance, CRM	Welding, RNAV	Flight test, Dangerous Goods	Flight test

(a) the programme shall have an acceptable identification system and password as a minimum-security feature in alignment with the risk matrix;

(b) when conducting an evaluation or knowledge test under risk category 4 to 5 of the risk matrix, then the programme shall take a minimum of 15 random identifiable photos, or a continuous video, or invigilator monitoring the student during the evaluation or knowledge test or have an automated exit from the exam & failure should the testee image change from the uploaded registration photo, or the testee moves out of the camera view, or an additional person comes into the camera view, or any voice/s can be heard;

(c) exam records shall be maintained and shall not be able to be deleted or manipulated;

(d) where applicable, an acceptable form of moderation must be demonstrated; if after moderation it is found the question was defective or not clear and the student is awarded the marks then a record from the moderator showing the student mark awarded must be kept with the results, however the marks on the system cannot be manipulated.

(e) whenever a question is revised it shall be blocked from the random questions available to the student but, should remain in the system for audit purposes;

(f) the programme information should have either a backup or be stored in different servers, in case of any eventualities happening;

(g) a register of course revisions and/or changes should be kept in a safe manner preferably with an additional backup;

(h) the programme shall assess the student when the exam/skills test time has lapsed regardless of the number of questions answered;

(i) with the exception of timed modules trainees must be given adequate time to complete the training;

(j) in the case where a minimum tutorial time applies, the programme shall not permit the student to write the accompanying knowledge test until those minimum tutorial course hours have been met and the course modules have been completed;

(k) program shall be built in a way not to allow fast forwarding to the knowledge test and any self-assessment must be completed;

(l) the programme must regulate interaction during learning every 2 min and 30 seconds or logout the student automatically;

(m) during exam/knowledge test, any disturbance/logout is regarded as a fail;

(n) an instructor or a subject matter expert shall be available to assist the learner, who is using the programme;

(o) the programme shall incorporate well-organized courseware with menus, modules and instructions;

(p) the flow of information shall build and develop knowledge, skills and abilities in a logical order;

(q) the usability of computer-based training systems in addressing software, human-computer interaction, and hardware factors shall be a primary consideration;

(r) the programme should include audio and visual instructions;

(s) Where applicable, the e-learning online system shall be designed to administer formative and/or summative tests to make a judgment on learner achievement;

(t) the pass mark for the knowledge tests and exams shall be no less than the regulated or prescribed pass mark;

(u) a learner is allowed a maximum of two re-writes thereafter, shall redo the course for readmission to the exam;

(v) a candidate shall receive their results after they have completed the exam and where the candidate is declared competent, the system must remediate to 100%;

(w) the training programme and the system shall be approved by the Director; as per the risk matrix;

(x) identity management and authentication shall be built into the system;

(y) the system shall be hosted within the Republic and have information protection mechanisms; and

(z) All information shall be kept for a minimum period of five (5) years.

2. VIRTUAL TRAINING SYSTEM AND SERVICE PROVISION BY AN OPERATOR

(1) Virtual training systems shall comply with the following general requirements as a minimum:

(a) online classroom capable learning management platform;
(b) a stable and suitable interface with candidate;
(c) full control of the user data. Confidential management of candidate details, interactions and results;
(d) a digital candidate training file that cannot be manipulated by any third party viewing the results of knowledge progress assessments or processes. Keep recordings of the webinars for 2 years for audit purposes;
(e) reference material through course material other than audio or visual shall be supplied by the service provider;
(f) a well-established matrix of tutorials to achieve pre-set levels of accomplishments towards the total required exposure;
(g) a data base of knowledge progress questions and tasks as applicable;
(h) training will be audio and visual;
(i) tasks that may be required for some courses shall be handled through the chat function of the virtual training system and assessed by the subject matter expert;
(j) ensure adherence to the validity processes required by digital verification and locking anyone from joining the session. This shall be a closed system;
(k) do random manual audits every month to determine system security;
(l) ensure all information is under the full control of the operator and protected;
(m) provide a subject matter expert, assessor and moderator suitably qualified;
(n) proof of moderation shall be available;
(o) a certificate in digital format and digitally randomly numbered, provided to the candidate in PDF format, properly referenced and verifiable through a system quick search function; and
(p) present courses accredited for lecturing by the service provider shall strictly follow the approved content and flow"."

AMENDMENT OF TECHNICAL STANDARD 147.

13 Document SA-CATS 147 hereby amended by the insertion of Technical Standard 147.01.4 the following Technical Standard

"147.01.4 Safety inspections and audits

1. **Classifications of findings or non-compliance**

1.1 Level 1 Finding

A level 1 non-compliance or finding poses imminent danger, safety and security risk to persons in an aircraft or to persons or to property on the ground and shall necessitate the exercising of immediate discretionary enforcement powers vested in the inspectors, authorised officers and/or authorised persons in the interest of safeguarding aviation safety and security in terms of Section 115 and 116 of Civil Aviation Act (Act No. 13 of 2009). A level 1 finding is in all instances a safety concern and shall require remedial action acceptable by the Director within 24 hours by an approval holder.

1.2. Level 2 Finding

A level 2 non-compliance or finding poses a serious safety and security risk to persons in an aircraft or to persons or to property on the ground and shall be resolved within a short time frame. It is the responsibility of approval holder to develop action plans within agreed time frames and follow-up inspections or audits to verify rectification of the non-compliances. A response containing a corrective action plan shall be accepted by the Director within 7 days.

Note: *Previous findings, which have not been addressed (repetitive or continuous non-compliance findings or blatant disregard for the Authority findings), may be upgraded to a Level 2 or Level 1 finding.*

Note: *A level 2 or level 1 non-compliance on one part of the operation may not necessarily affect the whole operation.*

1.3. Level 3 **Finding:**

A non-compliance or finding which shall not necessarily have an immediate direct impact on safety or security on its own. It is left to approval holder to rectify and shall not necessitate a follow-up inspection. An approval holder is required to notify the Authority within a specified time frame, when rectification has been effected. These findings are normally administrative in nature. Generally a response containing corrective actions shall be received within 14 working days.

1.4. **Observation:**

A practice or condition that indicates a trend that may lead to a future non-compliance, it is highly recommended that an operator shall respond to the observation"."

AMENDMENT OF TECHNICAL STANDARD 148

14. Document SA-CATS 148 is hereby amended by the insertion for Technical Standard 148.01.5 of the following Technical Standard:

"148.01.5 Safety inspections and audits

2. Classifications of findings/non-compliance

1.1 Level 1 Finding

A level 1 non-compliance or finding poses imminent danger, safety and security risk to persons in an aircraft or to persons or to property on the ground and shall necessitate the exercising of immediate discretionary enforcement powers vested in the inspectors, authorised officers or authorised persons in the interest of safeguarding aviation safety and security in terms of Section 115 and 116 of Civil Aviation Act (Act No. 13 of 2009). A level 1 finding is in all instances a safety concern and shall require remedial action acceptable by the Director within 24 hours by an approval holder.

1.2. Level 2 Finding

A level 2 non-compliance or finding poses a serious safety and security risk to persons in an aircraft or to persons or to property on the ground and shall be resolved within a short time frame. It is the responsibility of approval holder to develop action plans within agreed time frames and follow-up inspections or audits to verify rectification of the non-compliances. A response containing a corrective action plan shall be accepted by the Director within 7 days.

Note: *Previous findings, which have not been addressed (repetitive or continuous non-compliance findings or blatant disregard for the Authority findings), may be upgraded to a Level 2 or Level 1 finding.*

Note: *A level 2 or level 1 non-compliance on one part of the operation may not necessarily affect the whole operation.*

1.3. Level 3 **Finding:**

A non-compliance or finding which shall not necessarily have an immediate direct impact on safety or security on its own. It is left to approval holder to rectify and shall not necessitate a follow-up inspection. An approval holder is required to notify the Authority within a specified time frame, when rectification has been effected. These findings are normally administrative in nature. Generally, a response containing corrective actions shall be received within 14 working days.

1.4. **Observation:**

A practice or condition that indicates a trend that may lead to a future non-compliance, it is highly recommended that an operator shall respond to the observation"."

AMENDMENT OF TECHNICAL STANDARD 171

14. Document SA-CATS 171 is hereby amended by the insertion after section 2 in Technical Standard 171.03.8 of the following section:

"3. Communication procedures with PANS-OPS

(1) Aeronautical mobile-satellite (R)* service (RR S1.36) means an aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes.

(2) International telecommunication service means a telecommunication service between offices or stations of different States, or between mobile stations, which are not in the same State, or are subject to different States.

(3) Aerodrome control radio station means station providing radio communication procedure with PAN OPS between an aerodrome control tower and aircraft or mobile aeronautical stations.

(4) Aeronautical telecommunication station means station in the aeronautical telecommunication service.

(5) Communication centre means an aeronautical fixed telecommunication network (AFTN) station whose primary function is the relay or retransmission of AFTN traffic from or to a number of other AFTN stations connected to it.

(6) AFTN destination station means an AFTN station to which messages and digital data are addressed for processing for delivery to the addressee.

(7) AFTN origin station means an AFTN station where messages and digital data are accepted for transmission over the AFTN.

(8) AFTN station means a station forming part of the aeronautical fixed telecommunication network (AFTN) and operating as such under the authority or control of a State.

(9) Aircraft station (RR S1.83) means a mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft.

(10) Communication centre means an aeronautical fixed station which relays or retransmits telecommunication traffic from or to a number of other aeronautical fixed stations directly connected to it.

(11) Mobile surface station means station in the aeronautical telecommunication service, other than an aircraft station, intended to be used while in motion or during halts at unspecified points.

(12) Network station means an aeronautical station forming part of a radiotelephony network.

(13) Radio direction finding (RR S1.12) means Radio determination using the reception of radio waves for the purpose of determining the direction of a station or object.

(14) Radio direction-finding station (RR S1.91) means a radio determination station using radio direction finding.

(15) Regular station means station selected from those forming an en-route air-ground radiotelephony network to communicate with or to intercept communications from aircraft in normal conditions.

(16) Tributary station means an aeronautical fixed station that may receive or transmit messages and digital data but which does not relay except for the purpose of serving similar stations connected through it to a communication centre.

(17) Air-to-ground communication means one-way communication from aircraft to stations or locations on the surface of the earth.

(18) Duplex means a method in which telecommunication between two stations can take place in both directions simultaneously.

(19) Ground-to-air communication means one-way communication from stations or locations on the surface of the earth to an aircraft.

(20) Interpilot air-to-air communication means two-way communication on the designated air-to-air channel to enable aircraft engaged in flights over remote and oceanic areas out of range of VHF ground stations to exchange necessary operational information and to facilitate the resolution of operational problems.

(21) Non-network communications means Radiotelephony communications conducted by a station of the aeronautical mobile service, other than those conducted as part of a radiotelephony network.

(22) Radiotelephony network means group of radiotelephony aeronautical stations which operate on and guard frequencies from the same family and which support each other in a defined manner to ensure maximum dependability of air-ground communications and dissemination of air-ground traffic.

(23) Readback means a procedure whereby the receiving station repeats a received message or an appropriate part thereof back to the transmitting station so as to obtain confirmation of correct reception.

(24) Simplex means a method in which telecommunication between two stations takes place in one direction at a time.

(25) Telecommunication (RR S1.3) means any transmission, emission, or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems.

(26) Homing means the procedure of using the direction-finding equipment of one radio station with the emission of another radio station, where at least one of the stations is mobile, and whereby the mobile station proceeds continuously towards the other station.

(27) Radio bearing means the angle between the apparent direction of a definite source of emission of electro-magnetic waves and a reference direction, as determined at a radio direction-finding station. A true radio bearing is one for which the reference direction is that of true North. A magnetic radio bearing is one for which the reference direction is that of magnetic North.

(28) Automatic relay installation means a teletypewriter installation where automatic equipment is used to transfer messages from incoming to outgoing circuits.

(29) Fully automatic relay installation means a teletypewriter installation where interpretation of the relaying responsibility in respect of an incoming message and the resultant setting-up of the connections required to effect the appropriate retransmissions is carried out automatically, as well as all other normal operations of relay, thus obviating the need for operator intervention, except for supervisory purposes.

(30) Message field means an assigned area of a message containing specified elements of data.

(31) Semi-automatic relay installation means a teletypewriter installation where interpretation of the relaying responsibility in respect of an incoming message and the resultant setting-up of the connections required to effect the appropriate retransmissions require the intervention of an operator but where all other normal operations of relay are carried out automatically.

(32) Aeronautical telecommunication agency means an agency responsible for operating a station or stations in the aeronautical telecommunication service.

(33) Aircraft operating agency means person, organisation or enterprise engaged in, or offering to engage in, an aircraft operation.

(34) Primary frequency means the radiotelephony frequency assigned to an aircraft as a first choice for air-ground communication in a radiotelephony network.

(35) Secondary frequency means the radiotelephony frequency assigned to an aircraft as a second choice for air-ground communication in a radiotelephony network.

(36) Controller Pilot Data Link Control (CPDLC) message means information exchanged between an airborne system and its ground counterpart. A CPDLC message consists of a single message element or a combination of message elements conveyed in a single transmission by the initiator.

(37) CPDLC message set means list of standard message elements and free text message elements.

(38) Current data authority means the designated ground system through which a CPDLC dialogue between a pilot and a controller currently responsible for the flight is permitted to take place.

(39) Free text message element means part of a message that does not conform to any standard message element in the PANS-ATM (Doc 4444).

(40) Logon address means aa specified code used for data link logon to an ATS unit.

(41) Next data authority means the ground system so designated by the current data authority through which an onward transfer of communications and control can take place.

(42) Standard message element means part of a message defined in the PANS-ATM (Doc 4444) in terms of display format, intended use and attributes.

(43) Aeronautical fixed circuit means a circuit forming part of the aeronautical fixed service (AFS).

(44) Aeronautical fixed telecommunication network circuit means circuit forming part of the aeronautical fixed telecommunication network (AFTN).

(45) Aeronautical telecommunication log means record of the activities of an aeronautical telecommunication station.

(46) ATS direct speech circuit means an aeronautical fixed service (AFS) telephone circuit, for direct exchange of information between air traffic services (ATS) units.

(47) Automatic telecommunication log means a record of the activities of an aeronautical telecommunication station recorded by electrical or mechanical means.

(48) Frequency channel means a continuous portion of the frequency spectrum appropriate for a transmission utilizing a specified class of emission.

(49) Meteorological operational channel means a channel of the aeronautical fixed service (AFS), for the exchange of aeronautical meteorological information.

(50) Meteorological operational telecommunication network means an integrated system of meteorological operational channels, as part of the aeronautical fixed service (AFS), for the exchange of aeronautical meteorological information between the aeronautical fixed stations within the network.

(51) Route segment means route or portion of route usually flown without an intermediate stop.

(52) Routing Directory means a list in a communication centre indicating for each addressee the outgoing circuit to be used"."

AMENDMENT OF TECHNICAL STANDARD 172

15 Document SA-CATS 172 is hereby amended by the insertion after Technical Standard 172.03 18 of the following Technical Standard:

"**172.03.22 FRMS**

1. FRMS REQUIRMENTS

(1) An ATSU's FRMS policy shall meet the following requirements:

(a) to be signed by the accountable executive of the organisation;

(b) to be communicated to all the relevant areas and levels of the organisation;

(c) declare management commitment to effective safety reporting;

(d) declare management commitment to the provision of adequate resources for the FRMS;

(e) declare management commitment to continuous improvement of the FRMS;

(f) identify clear lines of accountability for management, air traffic controllers, and all other involved personnel;

(g) require periodic reviews to ensure it remains relevant and appropriate; and

(h) establish a forum that ensures the involvement of the local professional body and employee representation to review policy and procedure changes relating to FRM as well as reviewing fatigue risks and solutions.

(2) An ATS provider shall define its FRMS policy and such policy shall:

(a) define the scope of FRMS operations;

(b) reflect the shared responsibility of management, ATS personnel and other involved personnel; and

(c) clearly state the safety objectives of the FRMS.

2. FRMS documentation

(1) An ATS provider shall develop and keep the following current FRMS documentation and records:

(a) FRMS policy and objectives;

(b) FRMS processes and procedures;

(c) accountabilities, responsibilities and authorities for these processes and procedures;

(d) mechanisms for ongoing involvement of management, ATS personnel and all other involved personnel;

(e) FRMS training programmes, training requirements and attendance records;

(f) scheduled and actual duty and non-duty periods and break periods between times in position in a duty period with significant deviations and reasons for deviations noted; and

(g) FRMS outputs including findings from collected data, recommendations, and actions taken.

3. FRMS processes

(1) An air traffic services provider shall develop and maintain the following three fundamental and documented processes for fatigue hazard identification:

(a) The predictive process shall identify fatigue hazards by examining ATS personnel scheduling and taking into account factors known to affect sleep and fatigue and their effects on performance. Methods of examination may include but are not limited to:

(i) air traffic services or industry operational experience and data collected on similar types of operations or from other industries with shift work or 24-hour operations;

(ii) evidence-based scheduling practices; and

(iii) bio-mathematical models.

(b) The proactive process shall identify fatigue hazards within current air traffic services operations. Methods of examination may include but are not limited to:

(i) self-reporting of fatigue risks;

(ii) fatigue surveys;

(iii) relevant ATS personnel performance data;

(iv) available safety databases and scientific studies;

(iv) tracking and analysis of differences in planned and actual worked times; and

(v) observations during normal operations or special evaluations.

(c) Reactive

The reactive process shall identify the contribution of fatigue hazards to reports and events associated with potential negative safety consequences to determine how the impact of fatigue could have been minimized. At a minimum, the process may be triggered by any of the following:

(i) fatigue reports;

(ii) confidential reports;

(iii) audit reports; and

(iv) incidents.

4. Fatigue-related risk assessment

(a) an air traffic services provider shall develop and implement risk assessment procedures that determine when the associated risks require mitigation;

(b) the risk assessment procedures shall review identified fatigue hazards and link them to:

(i) operational processes;

(ii) their probability;

(iii) possible consequences; and

(iv) the effectiveness of existing preventive controls and recovery measures.

5. Risk mitigation

(a) An air traffic services provider shall develop and implement fatigue risk mitigation procedures that:

(i) select the appropriate mitigation strategies;

(ii) implement the mitigation strategies; and

(iii) monitor the strategies' implementation and effectiveness.

6. FRMS safety assurance processes

(1) An ATS provider shall develop and maintain FRMS safety assurance processes to:

(a) provide for continuous FRMS performance monitoring, analysis of trends, and measurement to validate the effectiveness of the fatigue safety risk controls.

The sources of data may include, but are not limited to:

(i) hazard reporting and investigations;

(ii) audits and surveys; and

(iii) reviews and fatigue studies for both internal and external;

(b) provide a formal process for the management of change. This shall include but is not limited to:

(i) identification of changes in the operational environment that may affect the FRMS;

(ii) identification of changes within the organisation that may affect the FRMS; and

(iii) consideration of available tools which could be used to maintain or improve FRMS performance prior to implementing changes; and

(c) provide for the continuous improvement of the FRMS. This shall include but not be limited to:

(i) the elimination and modification of preventive controls and recovery measures that have had unintended consequences or that are no longer needed due to changes in the operational or organisational environment;

(ii) routine evaluations of facilities, equipment, documentation and procedures; and

(iii) the determination of the need to introduce new processes and procedures to mitigate emerging fatigue-related risks.

7. FRMS promotion processes

(1) FRMS promotion processes support the ongoing development of the FRMS, the continuous improvement of its overall performance, and attainment of optimum safety levels. The following shall be established and implemented by the air traffic service provider as part of its FRMS:

(a) training programmes to ensure competency commensurate with the roles and responsibilities of management, ATS personnel and all other involved personnel under the planned FRMS; and

(b) an effective FRMS communication plan that:

(i) explains FRMS policies, procedures and responsibilities to all relevant stakeholders; and

(ii) describes communication channels used to gather and disseminate FRMS-related information"."

AMENDMENT OF TECHNICAL STANDARD 175

16. Document SA-CATS 175 is hereby amended by:

(a) the substitution of Subpart 2 and 3 Table with the following Tables of contents:

175.02.2 [QUALITY MANAGEMENT SYSTEM] QMS

1. Minimum standards

175.03.1 RESPONSIBILITY AND FUNTIONS

175.03.3 [PUBLICATION OF AERONAUTICAL INFORMATION OR IAIP] SCOPE OF AERONAUTICAL INFORMATION

[1. Procedure for publication

2. **Conditions, requirements, rules, procedures and standards for publication of aeronautical information**

3. **Components of an IAIP]**

175.03.4 [PRE-FLIGHT AND POST-FLIGHT INFORMATION SERVICES] AERONAUTICAL INFORMATION PRODUCTS AND SERVICES

175.03.5 [ERROR CORRECTION IN PUBLISHED INFORMATION] AERONAUTICAL INFORMATION UPDATES.".

(b) the substitution for Technical Standard 175.02.2 of the following Technical Standard:

"175.02.2 [QUALITY MANAGEMENT SYSTEM] QMS

1. **Minimum standards**

(1) **[The holder of an AIS certificate]** AIS provider shall establish internal **[quality assurance procedures]** QMS to ensure compliance with, and the adequacy of the **[organizational]** organisational **[procedures]** QMS.

(2) The **[procedures]** QMS referred to in **[paragraph]** subsection (1) shall specify —

(a) the level of quality that **[the certificate holder]** an AIS provider intends to achieve;
(b) the level and frequency of internal reviews;
(c) the person or persons responsible for carrying out the internal reviews;
(d) how the findings of the internal reviews are to be recorded and reported to an **[the]** Accounting **[Officer]** Manager;
(e) how quality indicators such as error reports, incidents, and complaints are incorporated into the internal **[quality assurance procedures]** QMS;
(f) the senior person's responsibilities for analysis and overview of the internal reviews;
(g) the means for rectifying any deficiencies found during an internal review; and

(h) the documentation requirements for all aspects of the review.

(3) **[The]** A senior person who has the responsibility for internal **[quality assurance]** QMS shall have direct access to the accountable **[manager] Manager** on matters affecting the adequacy, accuracy, timeliness, format, and dissemination of the published aeronautical information. Shall the **[organization]** organisation already have an established QMS approved under an alternate Part of the Regulations, such QMS may be approved in terms of this Part provided the provisions of paragraph 2 are met.

(4) The **[quality management system]** QMS established shall follow the International Organization for Standardization (ISO) 9000 series of quality assurance standards and be certified by an appropriate organisation.

(5) Audits shall be used to check compliance of the QMS. Initiating action against identified nonconformities, and be used to correct the cause, and such action shall be taken without undue delay. All audit observations and remedial actions shall be evidenced and properly documented"."

(c) the substitution for section 3 in Technical Standard 175.02.10 of the following section:

"**3. Preparation**

An SSI manual is prepared under the direction of the officer-in-charge of the unit and shall be verified by the person responsible for the service **[e.g. the manager of the flight information region such as a senior person]** by a Senior person"."

(d) the substitution for Subpart 3 of the following Subpart:

175.03.1 RESPONSIBILITY AND FUNCTIONS

1. **Responsibilities of an AIS**

(1) An AIS provider shall-

(a) receive, collate or assemble, edit, format, publish/store and distribute aeronautical data and aeronautical information concerning the entire territory of Republic as well as those areas over the high seas for which Republic is responsible for the provision of ATS. Aeronautical data and aeronautical information shall be provided as aeronautical information products;

(b) obtain aeronautical data and aeronautical information to enable it to provide pre-flight information service and to meet the need for in-flight information from:

(i) the AIS of other States; and

(ii) other sources that may be available.

(c) where aeronautical data and aeronautical information is obtained as paragraph (b), when distributed shall be clearly identified as having the authority of the originating State;

(d) where aeronautical data and aeronautical information is obtained as per paragraph (b), be verified before distribution and if not verified shall, when distributed shall be clearly identified as such; and

(e) promptly make available to the AIS of other States any aeronautical data and aeronautical information necessary for the safety, regularity or efficiency of air navigation required by them, to enable them to comply.

2. **Exchange of aeronautical data and aeronautical information**

(1) An AIS provider shall-

(a) arrange, for the issuance and receipt of NOTAM distributed by telecommunication, as necessary, to satisfy operational requirements;

(b) wherever practicable, establish direct contact between AIS of other States in order to facilitate the international exchange of aeronautical data and aeronautical information;

(c) except as provided in paragraph (e), make available one copy of each of the following aeronautical information products, that have been requested by the AIS of another State, in the mutually agreed form(s), without charge:

(i) AIP, including Amendments and Supplements;

(ii) AIC;

(iii) NOTAM; and

(iv) aeronautical charts.

(d) in the event of exchange of more than one copy of the elements of aeronautical information products, and other air navigation documents, including those containing air navigation legislation and regulations, be subject to bilateral agreement between the participating Contracting States and entities;

(e) when aeronautical data and aeronautical information are provided in the form of digital data sets to be used by the AIS, they shall be provided on the basis of agreement between the Contracting States concerned;

(f) in the procurement of aeronautical data and aeronautical information, including the elements of aeronautical information products, and other air navigation documents, including those containing air navigation legislation and regulations, by States other than Contracting States and by other entities shall be subject to separate agreement between the participating States and entities; and

(g) use globally interoperable aeronautical data and aeronautical information exchange models for provision of data sets.

175.03.2 AIM

1. **AIM**

AIM requirements shall be applicable to the aeronautical data chain in terms of collection, processing, storing, integration, exchange and delivery; from data origination to distribution to the next intended user, taking into consideration the intended use of data.

2. **Data quality specifications**

(1) The order of data accuracy and resolution shall be in accordance with the Aeronautical Data Catalogue. It provides a general description of the AIM data

scope and consolidates data that shall be collected and maintained by an AIS provider. It also provides a reference for aeronautical data origination and publication requirements contained in the Procedures for Air Navigation Services- Aeronautical Management (PANS=AIM, DOC 10066)

(2) Data integrity

(a) The integrity of aeronautical data shall be maintained throughout the data process from survey or origin to distribution to the next intended user in the following manner:

(i) Routine:
shall avoid data corruption throughout the processing of data.

(ii) Essential:
shall ensure that data corruption does not occur at any stage of the entire process and may include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity level; and

(iii) Critical:
shall ensure that data corruption does not occur at any stage of the entire process and may include additional integrity assurance procedures to fully mitigate the effects of the faults identified by thorough analysis of the overall system architecture as potential data integrity risk.

(3) Data traceability

Traceability of aeronautical data shall be ensured and retained as long as the data is in use.

(4) Data timeliness

Timeliness of aeronautical data shall be ensured by including limits on the effective period of the data elements.

(5) Data completeness

Completeness of aeronautical data shall be ensured in order to support its intended use.

(6) Data format

The format of delivered aeronautical data shall be adequate to ensure that the data is interpreted in a manner that is consistent with its intended use.

3. Aeronautical data and aeronautical information verification and validation

(1) Material to be issued as part of an aeronautical information product shall be thoroughly checked by a data originator before it is submitted to the AIS provider in order to ensure that all necessary information has been included and that it is correct in detail.

(2) An AIS provider shall -

(a) thoroughly check material submitted to be used as part of aeronautical information products to ensure all necessary information has been included and that is correct; and

(b) establish verification and validation procedures which ensure that upon receipt of aeronautical data and aeronautical information quality requirements are met.

4. Data error detection

(1) An AIS provider and data originator shall use digital error detection techniques;

(a) during transmission and storage of aeronautical data set and aeronautical data

(b) in order to maintain the integrity levels as in 175.03.2.1 (6)

5. Use of automation

(1) An AIS provider shall use automation in order to ensure the quality, efficiency and cost-effectiveness of aeronautical information services;

(2) An AIS provider and data originator shall-

(a) give due consideration to the integrity of data and information when automated processes are implemented, and mitigating steps taken where risks are identified; and

(b) enable digital aeronautical data exchange between the parties involved in the data processing chain; and use aeronautical information exchange models and data exchange models designed to be globally interoperable

6. Human factors considerations

(1) An AIS provider shall:

(a) take into consideration human factors principles which facilitate their optimum utilisation; and

(b) take due consideration where human interaction is required and mitigating steps taken where risks are identified.

175.03.3 SCOPE OF AERONAUTICAL DATA AND AERONAUTICAL INFORMATION

1 Scope of aeronautical data and aeronautical information

(1) The aeronautical data and aeronautical information to be received and managed by an AIS provider shall include at least the following sub-domains:

(a) national regulations, rules and procedures;

(b) aerodromes and heliports;

(c) airspace;

(d) ATS routes;

(e) instrument flight procedures;

(f) radio navigation aids/systems;

(g) obstacles;

(h) terrain; and

(i) geographic information.

(2) Determination and reporting of aeronautical data shall be in accordance with the accuracy and integrity classification required to meet the needs of the end-user of aeronautical data.

2 Metadata

(1) The metadata to be collected shall include, as a minimum:

(a) the names of the organizations or entities performing any action of originating, transmitting or manipulating the data;

(b) the action performed; and

(c) the date and time the action was performed.

175.03.4. AERONAUTICAL INFORMATION PRODUCTS AND SERVICES

1. When aeronautical data and aeronautical information are provided in multiple formats, processes shall be implemented to ensure data and information consistency between formats.

1. Aeronautical information in a standardised presentation

(1) An AIS provider shall present AIP, AIP Amendments, AIP Supplements, AIC and NOTAM.

(2) The AIP, AIP Amendment, AIP Supplement and AIC shall be provided on paper and an electronic document.

(3) The AIP, AIP Amendment, AIP Supplement and AIC when provided as an electronic document (eAIP) shall allow for both displaying on electronic devices and printing on paper.

2. AIP

(1) An AIP shall contain current information, data and aeronautical charts relating to:

(a) the regulatory and airspace requirements for air navigation in which Republic is responsible for air traffic services;

(b) the South African services and facilities that support international air navigation to and from Republic.

(c) aerodromes as defined in Part 1 operating under an aerodrome operating certificate issued in accordance with Part 139.

(2) The AIP may contain current information, data, and aeronautical charts relating to an aerodrome not operating under an aerodrome operating certificate, but accepted for publication if –

(a) an aerodrome operator provides an AIS provider with the required data and information relating to the aerodrome; and

(b) accepts responsibility for the accuracy and currency of that data and information as an authorised data originator.

(3) The AIP shall include at an appropriate location –

(a) a statement to advise which certificated organisations are responsible for the air navigation facilities, services and procedures covered by the AIP;

(b) the general conditions under which those services and facilities are available for use;

(c) a list of the significant differences with the ICAO Standards, Recommended Practices and Procedures that the Republic has filed under Article 38 of the Convention;

(d) a summary of any significant standards, practices and procedures followed by Republic, where the ICAO Standards Recommended Practices and Procedures allow alternative courses of action.

(4) Each publication that forms part of the AIP shall –

(a) specify the purpose of the publication, the geographic area covered, and that the publication is part of an AIP;

(b) be self-contained, include a table of contents with page numbers, and be paginated clearly;

(c) specify that it is published by an AIS provider or under the authority of the Director;

(d) not duplicate information unnecessarily and if duplication is necessary, there shall be no difference in the duplicated information in respect of the same facility, service or procedure;

(e) be dated and have amendment number, or if the publication is in loose-leaf form, each page shall be dated. The date shall consist

of the day, month by name, and the year when the aeronautical information becomes effective;

(f) be updated by means of AIP Amendments or by reissue at regular intervals; and

(g) show clearly the degree of reliability of any unverified information.

(5) A publication published in loose-leaf form shall –

(a) specify on each page, which publication the page belongs to and that the page is part of the AIP;

(b) contain a checklist that –

(i) gives the current date, and page number or chart title of each page or chart in the publication;

(ii) is issued with each AIP amendment;

(iii) specifies which publication it belongs to; and

(iv) is printed with a page number and the date.

3. Electronic AIP (eAIP)

(1) An AIS provider shall present AIP, AIP amendments, AIP Supplements and AIC in an electronic format as follows:

(a) the format, structure of chapters, sections and subsections of the information shall be the same as the AIP;

(b) new or revised information shall be identified either by an annotation against it in the margin or by a mechanism that allows comparing the new/revised information with the previous information; and

(c) eAIP shall be able to be printed in a paper format.

4. AIP amendments

(1) An AIS provider shall ensure that permanent changes to the AIP are published as AIP amendments. Each AIP amendment shall be allocated a serial number, which shall be consecutive.

(2) Each AIP amendment page, including the cover sheet, shall display a publication date. A brief indication of the subjects affected by the amendment shall be given on the AIP amendment cover sheet.

(3) The AIS provider shall establish and publish the publication dates for its AIP amendments in the AIP.

5. AIP supplements

(1) An AIS provider shall ensure that temporary changes of long duration (three months or longer) and information of short duration which contains extensive text and graphics are published as an AIP supplement.

(2) A checklist of AIP Supplements currently in force shall be issued with each AIP Supplement or at intervals of not more than one month. The checklist shall be given the same distribution as the supplement.

(3) When an error occurs in an AIP Supplement or when the period of validity of an AIP Supplement is changed, a new AIP Supplement shall be published as a replacement.

6. NOTAM

(1) The Director shall designate an International NOTAM Office responsible for the provision of a NOTAM service and for the exchange of NOTAM internationally.

(2) NOTAM service shall –

(a) operate the NOF on a 24-hour basis;

(b) establish agreements with other international NOF for the exchange of

(c) ensure that –

(i) the NOF is connected to the ATN;

(ii) the ATN connection provides for printed communication;

(iii) the NOF has appropriate facilities to issue and receive NOTAM distributed by means of telecommunication;

(d) promptly issue a NOTAM that is in accordance with PANS AIM (DOC 10066) and Annex 15, whenever information received under technical standard 175.03.1 which requires the issuance of a NOTAM; and

(e) at intervals of not more than one month, issue a checklist over the AFS of the NOTAM and AIP Amendments that are currently in force, and latest published AIP Supplement and AIC.

(3) A NOTAM office shall allocate each a serial number identified by a letter (A, B and, C, D, E and F) and four digits followed by a stroke and two-digit numbers for the year. The four-digit numbers shall be consecutive and based on the calendar year.

(4) The A series NOTAM is information of concern to long- or medium range flights and given selected international distribution.

(5) The B series NOTAM is information on all aerodromes/heliports, facilities and procedures available for use in international civil aviation and given international distribution to adjacent States only.

(6) The C series NOTAM is information of concern to aircraft other than those engaged in international civil aviation and given national distribution only.

(7) The D NOTAM containing information of concern for military airports only and given selected international distribution.

(8) The E NOTAM containing information of concern for heliports, helipads or helistops only and given international distribution to adjacent States only.

(9) The F NOTAM containing information of an administrative nature (e.g.: Hand Amendments, Publications, Trigger NOTAM); and given selected international distribution.

(10) Each NOTAM shall be brief, deal with only one subject, and be compiled so that its meaning is clear without reference to another document to enable the interpretation of the NOTAM published.

(11) If a NOTAM contains information that requires an amendment to the South African AIP or an AIP Supplement or temporary information of long duration, the NOTAM shall contain a cross-reference to the affected AIP text or AIP Supplement.

(12) If a NOTAM is issued which cancels or supersedes a previous NOTAM, the serial number of the previous NOTAM shall be specified.

(13) If an error is detected in a NOTAM, a replacement NOTAM which cancels the original shall be issued.

(14) Location indicators included in the text of a NOTAM shall conform to those as prescribed in ICAO Document 7910. A curtailed form of such indicators shall not be used. If no location indicator is assigned to the location, the name of the place and the coordinates shall be entered in the text of the NOTAM.

(15) The NOTAM checklist shall be issued every month end and shall –

(a) refer to the latest AIP Amendments, AIP Supplements and AIC; and

(b) have the same distribution as the actual NOTAM series to which the checklist refers and shall be clearly identified as a checklist.

(16) A monthly printed plain language Summary of NOTAM in force including a reference to the latest AIP AMDT, checklist of AIP SUP and AIC issued, shall be prepared with a minimum delay and forwarded by the most expeditious means to the recipients of the Aeronautical Information Product.

(17) The exchange of NOTAM between international NOTAM offices shall, as far as practicable, be limited to the requirements of the receiving States concerned.

7. AIC

(1) An AIC shall be issued whenever it is necessary to promulgate the following information:

(a) a long term forecast of any major change in legislation, regulation, procedures or facilities.

(b) information of a purely explanatory or advisory nature liable to affect flight safety.

(c) Information or notification of explanatory or advisory nature concerning technical, legislative or administrative matters.

(2) AIC's are classified into the following subjects: General, Operation of Aircraft, Personnel Licensing, Air Navigation Services, Aerodromes and Airworthiness. Serial numbers shall be allocated, and each subject shall be published through a medium.

(3) AIC's shall be numbered consecutively based on the year.

(4) The date of issue shall appear on each AIC, and when an AIC is re-issued or amended, the number and the date of issue shall be changed.

(5) A checklist of AIC currently in force shall be issued monthly.

(6) AIC's shall be made available to all South African Pilot license holders, Contracting States, all ATS units and subscribers of aeronautical information.

(7) The Director shall approve all AIC's before publication.

8. Aeronautical charts

(1) The aeronautical charts listed below shall, when available for designated international aerodromes/heliports, form part of the AIP, or be provided separately to recipients of the AIP:

(a) Aerodrome/Heliport Chart — ICAO;
(b) Aerodrome Ground Movement Chart — ICAO;
(c) Aerodrome Obstacle Chart — ICAO Type A;
(d) Aerodrome Obstacle Chart — ICAO Type B (when available);
(e) Aerodrome Terrain and Obstacle Chart — ICAO (Electronic);
(f) Aircraft Parking/Docking Chart — ICAO;
(g) Area Chart — ICAO;
(h) ATC Surveillance Minimum Altitude Chart — ICAO;
(i) Instrument Approach Chart — ICAO;
(j) Precision Approach Terrain Chart — ICAO;
(k) Standard Arrival Chart — Instrument (STAR) — ICAO;
(l) Standard Departure Chart — Instrument (SID) — ICAO; and
(m) Visual Approach Chart — ICAO.

(2) The Enroute Chart — ICAO, shall when available, form part of the AIP, or be provided separately to recipients of the AIP. The aeronautical charts listed below shall, when available, be provided as aeronautical information products:

(a) World Aeronautical Chart — ICAO 1:1 000 000;
(b) Aeronautical Chart — ICAO 1:500 000;
(c) Aeronautical Navigation Chart — ICAO Small Scale; and
(d) Plotting Chart — ICAO chart.

9 Digital data sets

(1) Digital data shall be in the form of the following data sets:

(a) AIP data set;

(b) terrain data sets;

(c) obstacle data sets;

(d) aerodrome mapping data sets; and

(e) instrument flight procedure data sets.

(2) Each data set shall be provided to the next intended user together with at least the minimum set of metadata that ensures traceability as specified in Technical Standard 175.03.3 2.

(3) The content and structure of digital data sets shall be defined in terms of an application schema and a feature catalogue.

(4) A checklist of valid data sets shall be regularly provided.

(5) Contents of digital data sets shall include:

(a) An AIP data set: which shall include the following subjects, with the properties indicated in brackets being included as a minimum (if applicable):

(i) ATS airspace (type, name, lateral limits, vertical limits, class of airspace);

(ii) special activity airspace (type, name, lateral limits, vertical limits, restriction, activation);

(iii) ATS route and other route (designator, flight rules);

(iv) route segment (navigation specification, from point, to point, track, length, upper limit, lower limit, minimum en-route altitude (MEA), minimum obstacle clearance altitude (MOCA), direction of cruising level, required navigation performance);

(v) waypoint – en-route (identification, location, formation);

(vi) aerodrome/heliport (ICAO location indicator, name, designator IATA, served city, certified ICAO, certification date,

certification expiration date, control type, field elevation, reference temperature, magnetic variation, reference point);

(vii) runway (designator, nominal length, nominal width, surface type, strength);

(viii) runway direction (designator, true bearing, threshold, take off run available (TORA), take-off distance available (TODA), accelerate-stop distance available (ASDA), landing distance available (LDA));

(ix) final approach and take-off (FATO) (designation, length, width, threshold point);

(x) touchdown and left-off (TLOF) (designator, centre point, length, width, surface type);

(xi) radio navigation aid (type, identification, name, aerodrome/heliport served, hours of operation, magnetic variation, frequency/channel, position, elevation, magnetic bearing, true bearing, zero bearing direction); and

(xii) The AIP data set includes relevant AIP Amendments and AIP Supplements.

(b) Terrain data sets which shall :

(i) provide a terrain grid which shall be angular or linear and shall be of regular or irregular shape;

(ii) include spatial (position and elevation), thematic and temporal aspects for the surface of the Earth containing naturally occurring features such as mountains, hills, ridges, valleys, bodies of water, and permanent ice and snow, and exclude obstacles. Depending on the acquisition method used, this shall represent the continuous surface that exists at the bare Earth, the top of the canopy or something in-between, also known as "first reflective surface";

(iii) provide only one feature type, i.e., terrain, in terrain data sets. Feature attributes describing terrain shall be those listed in Appendix 6, Table A6-1 of the PANS-AIM, Doc 10066. The terrain feature attributes listed in Appendix 6, Table A6-1 of the

PANS-AIM, Doc 10066 represent the minimum set of terrain attributes, and those annotated as mandatory shall be recorded in the terrain data set;

(iv) conform to the applicable numerical requirements in Appendix 1 of the PANS-AIM, Doc 10066.

(c) Obstacle data set which shall:

(i) provide obstacle data elements as features that shall be represented in the data sets by points, lines or polygons;

(ii) define obstacle feature types which shall be provided and described according to the list of mandatory attributes provided in Appendix 6, Table A6-2 of the PANS-AIM, Doc 10066;

(iii) conform to the applicable numerical requirements contained in Appendix 1 of the PANS-AIM, Doc 10066; and

(iv) include the obstacle data product specification, supported by geographical coordinates for each aerodrome included within the data set, shall describe the following areas:

(aa) areas 2a, 2b, 2c, 2d;

(bb) the take-off flight path area; and

(cc) the obstacle limitation surfaces

10 Distribution services

(1) General

(a) Aeronautical Information Products shall be distributed to all users who request them; and

(b) AIP, AIP Amendments, AIP Supplements and AIC shall be made available by the most expeditious means.

(2) NOTAM distribution

(a) NOTAM shall be distributed on the basis of a request;

(b) NOTAM shall be prepared in conformity with the relevant provisions of the ICAO communication procedures;

(c) AFS shall, whenever practicable, be employed for NOTAM distribution;

(d) when a NOTAM is sent by means other than the AFS, a six-digit date-time group indicating the date and time of NOTAM origination, and the identification of the originator shall be used, preceding the text;

(e) the Republic as the originating State shall select the NOTAM that are to be given international distribution;

(f) international exchange of NOTAM shall take place only as mutually agreed between the international NOTAM offices concerned, and between the NOTAM offices and multinational NOTAM processing units; and

(g) the Republic as the originating State shall, upon request, grant distribution of NOTAM series other than those distributed internationally.

(3) PRE-FLIGHT INFORMATION SERVICES

(a) The aeronautical information required for pre-flight information services shall include, where applicable –

(i) a summary of current NOTAM and other information of an urgent character, in a plain text PIB;

(ii) relevant elements of the Aeronautical Information Product;

(iii) relevant maps and charts; and

(iv) current information relating to the aerodrome of departure concerning any of the following:

(v) construction or maintenance work on or immediately next to the manoeuvring area;

(vi) rough portions of any part of the manoeuvring area, whether marked or not, including broken parts of the surface of runways and taxiways;

(vii) presence and depth of snow, ice, or water on runways and taxiways, including their effect on surface friction;

(viii) snow, drifted or piled on or next to runways or taxiways;

(ix) parked aircraft or other objects on or immediately next to taxiways;

(x) the presence of other temporary hazards including those created by birds;

(xi) failure or irregular operation of part or all of the aerodrome lighting system including approach, threshold, runway, taxiway, and obstruction lights, and manoeuvring area unserviceability lights, and aerodrome power supply;

(xii) failure, irregular operation or changes in the operational status of air navigation facilities including ILS and markers, PSR, SSR, VOR, NDB, VHF aero mobile channels, RVR.

(4) POST FLIGHT INFORMATION SERVICES

(a) For any aerodrome/heliport used for international air operations, arrangements shall be made to receive information concerning the state and operation of air navigation facilities or services noted by flight crews.

(b) The arrangements referred to in subsection (a) above shall ensure that such information is made available to the AIS for distribution as the circumstances necessitate.

(c) For any aerodrome or heliport used for international air operations, arrangements shall be made to receive information concerning the presence of wildlife hazards observed by flight crews.

(d) The information about presence of wildlife hazards shall be made available to the aeronautical information service for distribution as the circumstances necessitate.

175.03.4. AERONAUTICAL INFORMATION UPDATES

1. Aeronautical information regulation and control (AIRAC)

(1) Information concerning the following circumstances shall be distributed under the regulated system (AIRAC), basing establishment, withdrawal or significant changes upon a series of common effective dates at intervals of 28 days:

(a) limits (horizontal and vertical), regulations and procedures applicable to:

(i) flight information regions;

(ii) control areas;

(iii) control zones;

(iv) advisory areas;

(v) ATS routes;

(vi) permanent danger prohibited and restricted areas (including type and periods of activity when known) and air defence identification zones (ADIZ); and

(vii) permanent areas or routes or portions thereof where the possibility of interception exists.

(b) positions, frequencies, call signs, identifiers, known irregularities and maintenance periods of radio navigation aids, and communication and surveillance facilities;

(c) holding and approach procedures, arrival and departure procedures, noise abatement procedures and any other pertinent ATS procedures;

(d) transition levels, transition altitudes and minimum sector altitudes;

(e) meteorological facilities (including broadcasts) and procedures;

(f) runways and stopways;

(g) taxiways and aprons;

(h) aerodrome ground operating procedures (including low visibility procedures);

(i) approach and runway lighting; and

(j) aerodrome operating minima.

(2) The information notified under the AIRAC system shall not be changed further for at least another 28 days after the effective date, unless the circumstance notified is of a temporary nature and would not persist for the full period.

(3) Information provided under the AIRAC system shall be made available by the aeronautical information service (AIS) so as to reach recipients at least 28 days in advance of the effective date.

(4) When information has not been submitted by the AIRAC date, a NIL notification shall be distributed not later than one cycle before the AIRAC effective date concerned.

(5) Implementation dates other than AIRAC effective dates shall not be used for pre-planned operationally significant changes requiring cartographic work and/or for updating of navigation databases.

(6) The regulated system (AIRAC) shall be used for the provision of information relating to the establishment and withdrawal of, and premeditated significant changes in, the circumstances listed below:

(a) position, height and lighting of navigational obstacles;

(b) hours of service of aerodromes, facilities and services;

(c) customs, immigration and health services;

(d) temporary danger prohibited and restricted areas and navigational hazards, military exercises and mass movements of aircraft; and

(e) temporary areas or routes or portions thereof where the possibility of interception exists.

(7) Whenever major changes are planned and where advance notice is desirable and practicable, information shall be made available by the AIS so as to reach recipients at least 56 days in advance of the effective date. This shall be applied to the

establishment of, and premeditated major changes in, the circumstances listed below, and other major changes if deemed necessary:

(a) new aerodromes for international instrument flight rules (IFR) operations;

(b) new runways for IFR operations at international aerodromes;

(c) design and structure of the ATS route network;

(d) design and structure of a set of terminal procedures (including change of procedure bearings due to magnetic variation change);

(e) circumstances listed in subsection (1) if the Republic's area of responsibility or any significant portion thereof is affected or if cross-border coordination is required.

(8) Guidance material on what constitutes a major change is included in the Aeronautical Information Services Manual (Doc 8126).

2. AIP updates

(1) The aeronautical information publication (AIP) shall be amended or reissued at such regular intervals as may be necessary to keep it up to date.

(2) Permanent changes to the AIP shall be published as AIP Amendments.

3. NOTAM

(1) When an AIP Amendment or an AIP Supplement is published in accordance with AIRAC procedures, a Trigger NOTAM shall be originated.

(2) Detailed specifications concerning the Trigger NOTAM are contained in the Procedures for Air Navigation Services — Aeronautical Information Management (PANS-AIM, Doc 10066).

(3) A NOTAM shall be originated and issued promptly whenever the information to be distributed is of a temporary nature and of short duration, or when operationally significant permanent changes or temporary changes of long duration are made at short notice, except for extensive text and/or graphics.

(4) A NOTAM shall be originated and issued concerning the following information:

(a) establishment, closure or significant changes in operation of aerodrome(s) or heliport(s) or runways;

(b) establishment, withdrawal or significant changes in operation of aeronautical services (aerodromes, AIS, ATS, communications, navigation and surveillance (CNS), meteorology (MET), search and rescue (SAR), etc.);

(c) establishment, withdrawal or significant changes in operational capability of radio navigation and air-ground communication services. This includes:

(i) interruption or return to operation,

(ii) change of frequencies,

(iii) change in notified hours of service,

(iv) change of identification, change of orientation (directional aids),

(v) change of location,

(vi) power increase or decrease amounting to 50% or more,

(vii) change in broadcast schedules or contents, and

(viii) or irregularity or unreliability of operation of any radio navigation and air-ground communication services or limitations of relay stations including operational impact, affected service, frequency and area;

(d) unavailability of back-up and secondary systems, having a direct operational impact;

(e) establishment, withdrawal or significant changes to visual aids;

(f) interruption of or return to operation of major components of aerodrome lighting systems;

(g) establishment, withdrawal or significant changes to procedures for air navigation services;

(h) occurrence or correction of major defects or impediments in the manoeuvring area;

(i) changes to and limitations on availability of fuel, oil and oxygen;

(j) major changes to search and rescue facilities and services available;

(k) establishment, withdrawal or return to operation of hazard beacons marking obstacles to air navigation;

(l) changes in regulations requiring immediate action, such as prohibited areas for SAR action;

(m) presence of hazards which affect air navigation (including obstacles, military exercises, displays, fireworks, sky lanterns, rocket debris, races, major parachuting events outside promulgated sites and remotely piloted aircraft system activity in uncontrolled airspace);

(n) planned laser emissions, laser displays and search lights if pilots' night vision is likely to be impaired;

(o) erecting or removal of, or changes to, obstacles to air navigation in the take-off/climb, missed approach, approach areas and runway strip;

(p) establishment or discontinuance (including activation or deactivation) as applicable, or changes in the status of prohibited, restricted or danger areas;

(q) establishment or discontinuance of areas or routes or portions thereof where the possibility of interception exists and where the maintenance of guard on the VHF emergency frequency 121.5 MHz is required;

(r) allocation, cancellation or change of location indicators;

(s) changes in aerodrome/heliport rescue and firefighting category

(t) presence or removal of, or significant changes in, hazardous conditions due to snow, slush, ice, radioactive material, toxic chemicals, volcanic ash deposition or water on the movement area;

(u) outbreaks of epidemics necessitating changes in notified requirements for inoculations and quarantine measures;

(v) observations or forecasts of space weather phenomena, the date and time of their occurrence, the flight levels where provided and portions of the airspace which may be affected by the phenomena;

(w) an operationally significant change in volcanic activity, the location, date and time of volcanic eruptions and horizontal and vertical extent of volcanic ash cloud, including direction of movement, flight levels and routes or portions of routes which could be affected;

(x) release into the atmosphere of radioactive materials or toxic chemicals following a nuclear or chemical incident, the location, date and time of the incident, the flight levels and routes or portions thereof which could be affected and the direction of movement;

(y) establishment of operations of humanitarian relief missions, such as those undertaken under the auspices of the United Nations, together with procedures and limitations which affect air navigation; and

(z) implementation of short-term contingency measures in cases of disruption, or partial disruption, of ATS and related supporting services.

(5) The following information shall not be notified by NOTAM:

(a) routine maintenance work on aprons and taxiways which does not affect the safe movement of an aircraft;

(b) runway marking work, when aircraft operations can safely be conducted on other available runways, or the equipment used can be removed when necessary;

(c) temporary obstructions in the vicinity of aerodromes/heliports that do not affect the safe operation of an aircraft;

(d) partial failure of aerodrome/heliport lighting facilities where such failure does not directly affect aircraft operations;

(e) partial temporary failure of air-ground communications when suitable alternative frequencies are known to be available and are operative;

(f) the lack of apron marshalling services and road traffic control;

(g) the unserviceability of location, destination or other instruction signs on the aerodrome movement area;

(h) parachuting when in uncontrolled airspace under VFR, when controlled, at promulgated sites or within danger or prohibited areas;

(i) training activities by ground units;

(j) unavailability of back-up and secondary systems if these do not have an operational impact;

(k) limitations to airport facilities or general services with no operational impact;

(l) national regulations not affecting general aviation;

(m) announcement or warnings about possible/potential limitations, without any operational impact;

(n) general reminders on already published information;

(o) availability of equipment for ground units without containing information on the operational impact for airspace and facility users;

(p) information about laser emissions without any operational impact and fireworks below minimum flying heights;

(q) closure of movement area parts in connection with planned work locally coordinated of duration of less than one hour;

(r) closure or unavailability of, or changes in, operation of aerodrome(s)/heliport(s) outside the aerodrome(s)/heliport(s) operational hours; and

(s) other non-operational information of a similar temporary nature.

(6) Information which relates to an aerodrome and its vicinity and does not affect its operational status may be distributed locally during pre-flight or in-flight briefing or other local contact with flight crews.

4. Data set updates

(1) Data sets shall be amended or reissued at such regular intervals as may be necessary to keep them up to date.

(2) Permanent changes and temporary changes of long duration (three months or longer) made available as digital.

(3) Data shall be issued in the form of a complete data set or a subset that includes only the differences from the previously issued complete data set.

(4) When made available as a completely reissued data set, the differences from the previously issued complete data set shall be indicated.

(5) When temporary changes of short duration are made available as digital data (digital NOTAM), they shall use the same aeronautical information model as the complete data set.

(6) Updates to AIP and digital data sets shall be synchronized"."