

PROPOSAL FOR THE AMENDMENT OF DOCUMENT SA-CATS 171 ISSUED UNDER THE CIVIL AVIATION REGULATIONS, 2011

Aeronautical telecommunication service providers (Electronic Service Organisations)

PROPOSER

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PROPOSER'S INTEREST

The proposer has been established in terms of the Civil Aviation Act, 2009 (Act No. 13 of 2009), to control and regulate civil aviation in South Africa and to oversee the functioning and development of the civil aviation industry, and, in particular, to control, regulate and promote civil aviation safety and security.

GENERAL EXPLANATORY NOTE

Words in **[bold and square brackets]** indicate deletions from the existing regulations.
Words underlined with a solid line indicate insertions in the existing regulations.

1. PROPOSAL FOR THE AMENDMENT OF DOCUMENT SA-CATS 171

1.1 It is hereby proposed to amend Document SA-CATS 171 by —

- (a) the deletion in Technical Standard 171.03.7 of subsection (1) of the following subsection:

[171.03.7

SPECIFICATIONS REGARDING NAVIGATION AIDS

- (1) Specifications as outlined in ICAO Annex 10 Volume 1 Chapters 1, 2, 3 and all Attachments and maintained to the standards of the following associated documentation, namely the "Manual on testing of radio navigational aids – Doc 8071 (as amended), consisting of:**

- (a) Volume I, Testing of Ground-Based Radio Navigation Systems;**
- (b) Volume II, Testing of Satellite-based Radio Navigation Systems;**
- (c) Volume III, Testing of Surveillance Radar Systems; or**
- (d) The manufactures recommendations, if it is more demanding than the standards of Doc 8071.]**

(b) the deletion in Technical Standard 171.03.8 of section 1 of the following section:

[171.03.8

SPECIFICATIONS REGARDING COMMUNICATION PROCEDURES

1. Specifications outlined in the following ICAO Annexure 10 Volume II chapters
 - (a) Chapter 2: Administrative Provisions relating to the International Aeronautical Telecommunication Service;
 - (b) Chapter 3: General Procedures for the International Telecommunication Service;
 - (c) Chapter 4: Aeronautical Fixed Service (AFS)
 - (d) Chapter 5: Aeronautical Mobile Service - Voice Communication; and
 - (e) Chapter 6: Aeronautical Radio Navigation Service.
 - (f) Chapter 7: Aeronautical Broadcast Service.
 - (g) Chapter 8: Aeronautical Mobile Service - Data Link Communications.]

(c) the deletion of Technical Standard 171.03.9 as follows:

[171.03.9

SPECIFICATIONS DATA AND VOICE COMMUNICATION SYSTEMS

1. Specifications as outlined in ICAO Annex 10 Volume III

- (1) Maintenance shall be done in accordance with manufactures recommendations or shall be done at least annually; whichever requirement is the more demanding.
- (2) The following checks shall be included during maintenance for communication systems:
 - (a) Transmitter frequency stability
 - (b) Transmitter modulation
 - (c) Transmitter power
 - (d) Receiver sensitivity
 - (e) Antenna cabling
 - (f) Connectors at antenna and equipment
 - (g) Cleanliness of both the equipment and radio site]

(d) the deletion of Technical Standard 171.03.10 as follows:

[171.03.10

SPECIFICATIONS REGARDING SURVEILLANCE AND COLLISION AVOIDANCE SYSTEMS

- (1) Specifications as outlined in Annex 10 Volume IV and maintained to the standards of the following associated documentation, namely the "Manual on testing of radio navigational aids - Doc 8071 (as amended), consisting of –
 - (a) Volume I, Testing of Ground-Based Radio Navigation Systems;
 - (b) Volume II, Testing of Satellite- based Radio Navigation Systems;
 - (c) Volume III, Testing of Surveillance Radar Systems; or
 - (d) The manufactures recommendations, if it is more demanding than the standards of Doc 8071.]

(e) the deletion of Technical Standard 171.03.11 as follows:

[171.03.11

SPECIFICATIONS REGARDING RADIO FREQUENCY SPECTRUM UTILISATION

- (1) Specifications regarding radio frequency spectrum are outlined in Annex 10 Volume V and Doc 9718.]

(f) the deletion of Technical Standard 171.03.12 as follows:

[171.03.12

SPECIFICATIONS REGARDING METEOROLOGICAL EQUIPMENT

(1) Specifics concerning the siting and construction of meteorological equipment are contained in Annex 14, Volume 1, Chapter 8.

(2) Where an ATSU is required, meteorological sensing equipment be provided to measure, monitor and relay to the remote display system within the ATSU the following information –

(a) Real time surface wind direction and speed;

(b) Real time surface air temperature and dew point;

(c) Real time barometric pressure; and

(d) At aerodromes where CAT I, II, and III instrument approach and landing operations are authorized automated equipment for measuring and remote indicating of runway visual range and cloud height.

(3) Meteorological instruments shall be exposed, operated and maintained in accordance with the practices, procedures and specifications contained in ICAO Annex 3. The accuracy of meteorological instruments shall comply with the requirements of ICAO as contained in Annex 3, Attachment B.

(4) In addition to the specifications of Annex 3, the following specifications shall be adhered to –

(a) Environmental operating conditions

(i) Systems shall recover to their calibrated specifications from specified meteorological extreme conditions that may occur in the South Africa, but which are outside the norm for aerodrome operations.

(ii) Sensors and equipment installed within the environment to be measured, shall operate within and recover to the tolerance values specified over the following range of environmental conditions and safety/operating requirements

(iii) The systems shall be designed to fail-to-safe where possible.

Environmental Condition	In Tolerance Range	Operating Recoverable range
Temperature	minus 25°C to plus 50°C	minus 30°C to plus 70°C
Pressure	800 to 1050mb (hPa)	800 to 1200mb (hPa)
Humidity	5 to 100% RH condensing	0 to 100% RH condensing
Windspeed	0 to 100 knots	0 to 130 knots

(b) Surface wind speed and direction measurement

(i) Sensor Performance Requirements

(aa) The surface wind speed and direction measuring equipment shall have a level of performance, which is able to provide an accurate and uncorrupted representative measurement of wind speed and direction at a height of approximately 10m (30 ft) above the

whole runway and the whole runway complex if there is more than one runway. Multiple sensors may be required to satisfy this objective.

(bb) Representative surface wind observations should be obtained by the use of sensors appropriately sited as determined by local conditions. Sensors for surface wind observations for local routine and special reports should be sited to give the best practicable indication of conditions along the runway, e.g. liftoff and touchdown zones. At aerodromes where topography or prevalent weather conditions cause significant differences in surface wind at various sections of the runway, additional sensors should be provided.

(cc) Surface wind indicators relating to each sensor shall be located in the appropriate Air Traffic Services Unit (ATSU's) with corresponding indicators in the meteorological station. The indicators in the meteorological station and the air traffic services units shall relate to the same sensors, and where separate sensors are required as specified in paragraph (bb), the indicators shall be clearly marked to identify the runway and section of runway monitored by each sensor.

(ii) Wind Speed & Direction Sensor Accuracy

(aa) With wind speeds in excess of 3 knots, the wind direction system shall be capable of producing an overall accuracy better than plus or minus 10 degrees, including 'dead band'.

(bb) The sensor shall be sampled at a minimum sample rate of four per second. If wind variation information is processed at the sensor head or in a remote processing unit, samples / averages shall be transmitted at a minimum rate of once per second.

(cc) Systems relying on polled sampling, shall ensure the complete data word from the remote sensor is sampled at a minimum of once every second.

(dd) The equipment shall measure a 3 second gust as a rolling average of the wind speed samples.

(ee) The equipment shall produce 2 and 10 minute rolling averages of the wind speed and direction.

(ff) The average direction displayed shall take regard of the numerical discontinuity at North.

(iii) Wind Speed & Direction Sensor Resolution for Analogue & Digital Systems Operationally desirable and currently attainable accuracy of measurement

Element to be observed	Operationally desirable accuracy of meteorological instrumentation	Attainable accuracy of measurement
Mean surface wind	Direction: $\pm 10^\circ$ Speed: $\pm 2\text{km/h}$ (1kt) up to 19km/h (10kt)	Direction: $\pm 5^\circ$ Speed: $\pm 2\text{km/h}$ (1kt) up to 37km/h (20kt) $\pm 5\%$ above 37km/h (20kt)
Variations from the mean surface wind	$\pm 4\text{km/h}$ (2kt), in terms of longitudinal and lateral components	Direction: $\pm 5^\circ$ Speed: $\pm 2\text{km/h}$ (1kt) up to 37km/h (20kt) $\pm 5\%$ above 37km/h (20kt)
Runway visual range	$\pm 10\text{m}$ up to 400m $\pm 25\text{m}$ between 400m and	$\pm 25\text{m}$ up to 150m $\pm 50\text{m}$ between 150m and

	800m	500m
	± 10% above 800m	± 10% above 500m up to 2 000m
Cloud height	± 10m (33ft) up to 100m (330ft) ± 10% above 100m (330ft)	± 10m (33ft) up to 1 000m (3 300ft) ± 30m (100ft) above 1 000m (3 300ft) ± 10% above 100m (330ft) up to 3 000m (10 000ft)
Air temperature and dew point temperature	± 1°C	± 0,2°C
Pressure value (QNH, QFE)	± 0,5hPa	± 0,3hPa

(vi) Displays

(aa) The display device shall be designed in such a way as to draw the attention of the operator to significant reportable changes in the displayed surface wind information.

(bb) The display shall provide information compliant with the ICAO Annex 3 Chapter 4.5.5 requirements for marked discontinuity, wind variation and wind speed (gusts).

(cc) On aerodromes with multiple runways, the display shall indicate the sensor selected, (or indicate the runway selected on dedicated displays) and display the surface wind information relevant to the active runway(s).

(dd) If wind direction and deviation is displayed as a circle, the display shall have a resolution of at least 10 degrees. The combined numeric and analogue display shall be linked so that both display the same information relevant to the chosen display mode.

(c) Ground based pressure measurement equipment

(aa) Pressure Sensor Performance Requirements

(A) No aerodrome observing system shall be dependent upon a single sensor for pressure measurement. A minimum of 2 co-located sensors shall be used with an integrity within 0,5mb (hPa) of each other.

(B) The measurement system shall provide a pressure reading to an accuracy of ±0.5mb (hPa), or better over a range of at least 800 to 1050mb (hPa).

(C) The sensor shall provide an output with a minimum system resolution of 0,1mb (hPa).

For automated systems, the sensor shall be sampled at a minimum rate of once a minute.

The reference level for computation of QFE shall be the aerodrome elevation. For non-precision approach runways, the thresholds of which are 2m (7ft) or more below the aerodrome elevation, and for precision approach runways, the QFE, if required, shall refer to the relevant threshold elevation.

(bb) Displays

(A) The display device shall be designed in such a way as to draw the attention of the operator to a change of 1 mb or more from the previous reading to 1 decimal place, (i.e. 998,4 mb to 997,4 mb).A

(B) The display shall provide the indication of pressure to the nearest tenth of a millibar/hectoPascal).

(C) On aerodromes with multiple runways and sensor systems, the display shall indicate the sensor selected, (or indicate the runway selected on dedicated displays) and display the pressure information relevant to the active runway(s).

(D) Where a combined numeric and analogue display is used, they shall be linked so that both display the same information relevant to the chosen display mode.

(d) Ground based temperature and dew-point measurement

(i) Sensor Performance Requirements

(aa) The equipment shall be installed in a position such that the sensor measurements are suitable for the operational purpose and representative of the whole runway or runway complex.

(bb) The sensors shall be mounted approximately 1,25m (4ft) above an earth or grass surface and in such a position, where it will not be degraded by anomalous temperatures and protected from the exhaust fumes of aircraft.

(cc) The sensors shall be exposed in an instrument housing or properly ventilated screen, which provides protection from atmospheric radiation and water drops either as precipitation or fog.

(ii) Accuracy

(aa) The equipment shall be capable of measurement to an accuracy better than plus or minus 0,5 degree Celsius for air temperature and Dew-point, over the operating range -30 to +50 degrees Celsius. The sensor(s) shall be sampled at minimum of once per minute.

Resolution

Air temperature and the Dew point temperature shall be reported to the nearest whole degree Celsius rounded up.

Note: Dew-point must be displayed for temperatures below zero.

(e) Meteorological instruments maintenance requirements

(i) The equipment shall operate, and be maintained, in a manner, which fulfils the operational purpose in all respects.

(ii) The equipment shall be certified by a person accredited by the manufacture of the specific equipment to manufacturer's specification four times per year when associated with an aerodrome with Instrument Landing System (ILS) equipment and once per year otherwise, unless manufacturers requirements states a shorter period of time.

(iii) The equipment shall be re-certified after any repair that could jeopardise the state of calibration thereof.

(iv) Certification shall be traceable through a recognised accrediting organisation.

(v) A comprehensive fault, repair and maintenance record shall be kept.

(f) Meteorological information records

(i) Where automated meteorological instruments are in use, the equipment shall be capable of producing a printed record of data recorded during the preceding 30 days.]

(g) the insertion after Technical Standard 171.03.14 “STATION (SITE) LOGS” of the following list of appendices:

1. Appendix 171.03.07: Specification Regarding Radio Navigation Aids
2. Appendix 171.03.8: Specification Regarding Communication Procedures
3. Appendix 171.03.9: Specification Regarding DATA and VOICE Communication
4. Appendix 171.03.10: Specification Regarding Surveillance and Collision Avoidance System
5. Appendix 171.03.11: Specification Regarding Radio Spectrum and Utilisation.

2. Motivation

The Civil Aviation Amendment Act, 2021 (Act 22 of 2021) has provided for all exemptions under the purview of the Minister of Transport to approve or disapprove. While the processes for these to be brought to the Minister’s consideration are being developed it is envisaged these will be time-consuming and not accommodative to urgent requests that require shorted turnaround timeframes. The proposal for the DCAs discretionary powers will assist in this regard while not taking the legislative authority for Minister to consider these requests and applications.