TECHNICAL STANDARDS – Issue version (2020)
NAMCATS: Part 71 – AIRSPACE AND AIR ROUTES

Document: 1/1/3/1/71

ISSUE DATE 15th July 2020

1. General

1.1 Section 227 of the Civil Aviation Act, 2016 (Act no. 6 of 2016 – hereinafter "the Act") empowers the Executive Director of Civil Aviation to issue technical standards for civil aviation "on such matters as may be prescribed". Section 227(3) of the Act further empowers the Executive Director of Civil Aviation to incorporate into a technical standard any international aviation standard or any amendment without publishing the text of such standard or any amendment "by mere reference" to the title, number and year of issue of such standard or amendment or to any other particulars by which such standard or amendment is sufficiently identified.

1.2 By way of Government Notice 89/2020 published in Government Gazette 7157 dated 27th March 2020, NAMCARS (amendment 2020) provides for Part 71 – "Airspace and Air Routes Air" (AAR). This Part 71 provides for the issue of technical standards as NAM-CATS-AAR. The Executive Director of Civil Aviation has, pursuant to the empowerment mentioned above, issued technical standards relating to NAMCAR Part 71 (Airspace & Air Routes) to be known as NAM-CATS-AAR as further set out in the SCHEDULE herein.

1.3 NAM-CATS-AAR comprises the standards, rules, requirements, methods, specifications, characteristics and procedures which are applicable in respect of standard units of measurement to be used in all aspects of civil aviation air and ground operations.

1.4 To the extent possible, each reference to a technical standard in this document, is a reference to the corresponding regulation in the Namibian Civil Aviation Regulations.

Example: *(1) Technical standard 71.02.1 refers to regulation Part 71 of Subpart 02 of the Part 71*

(2) Technical standard 71.02.2 refers to either the whole, or more than one specific regulation, of Subpart 02 of Part 2.

1.5 Where there is any perceived disparity of meaning or inconsistency between these technical standards and the regulations, the provisions of the regulations will take precedence.

1.6 Where there is a difference between a standard and procedure prescribed in ICAO documents and the Civil Aviation Technical Standards (CATS), the CATS standard will prevail.

2. GUIDANCE MATERIAL

2.1 Guidelines and recommendations in support of any particular technical standard are contained in schedules or appendices to, and/or compliance notes inserted throughout, the technical standards. These guidelines, upon release, are intended to provide recommendations and guidance to illustrate a means, but not necessarily the only means of complying with the regulations and technical standards. They may explain certain regulatory requirements by providing interpretive and explanatory materials. It is expected that service providers will document internal actions in their own operational manuals, to put into effect those, or similarly adequate, practices.

3. AMENDMENTS TO THE TECHNICAL STANDARDS

3.1 The NCAA Safety Division ANS Safety Oversight Section (ANSO) has responsibility for the technical content of this technical standard.

3.2 This technical standard is issued, and may only be amended, under the authority of the Executive Director of Civil Aviation.

3.3 Requests for changes to the content of this technical standard must be forwarded to the Executive Director and may come from:

(a) technical areas within NCAA; or

(b) aviation industry service providers or operators; or

(c) pilots and ATC staff.

3.4 The need to change the content of this technical standard may arise for any of the following reasons:

(a) to ensure safety;

(b) to ensure standardisation;

(c) to respond to changed NCAA regulations or standards;

(d) to respond to changes initiated by ICAO;

(e) to accommodate proposed initiatives or new technologies.

3.5 NCAA may approve trials of new procedures or technologies to develop appropriate standards.

4. INTERNATIONAL STANDARDS

4.1 Section 227 of the Civil Aviation Act, 2016 empowers the Executive Director of Civil Aviation to issue technical standard for civil aviation. Section 227 of the Civil Aviation Act, 2016 further empowers the Executive Director of Civil Aviation to incorporate into a technical standard any international aviation standard or any amendment without stating the text of such standard or amendment, “by mere reference” to the title, number and year of issue of such standard or amendment, or to any other particulars by which such standard or amendment is sufficiently identified.

4.2 The following international standards, recommended practices and procedures, as amended from time to time, are incorporated into the technical standards contained in this document

(a) ICAO Annex 2 (Rules of the Air);

(b) ICAO Annex 4 (Aeronautical Charts);

(c) ICAO Annex 11 (Air Traffic Services);

(d) ICAO Annex 15 (Aeronautical Information Services);

(e) ICAO Annex 19 (Safety Management);

(f) ICAO PANS-OPS (Doc 8168) Volume II;

(g) ICAO Regional Supplementary Procedures (Doc 7030);

(h) ICAO Air Traffic Services Planning Manual, (Doc 9426);

(i) ICAO Separation Minima Manual (Doc 9689);

(j) ICAO RVSM Manual (Doc 9574);

(k) ICAO Performance Based Navigation (PBN) Manual (Doc 9613);

(l) ICAO Safety Management Manual (Doc 9859);

(m) ICAO Required Communications Performance Manual (Doc 9869);

(n) ICAO Continuous Descent Operations Manual (Doc 9931);

(o) ICAO Regional RVSM Monitoring Agency Procedures (Doc 9937);

(p) ICAO Circular 330 – Civil Military Cooperation in ATM (2011); and

(q) International Standards Organisation (ISO) 31000:2009 Risk Management.

4.3 Differences from ICAO Standards, Recommended Practices and Procedures are published in the AIP.

These Technical Standards apply with immediate effect and repealed the – Civil Aviation Technical Standards NAM-CATS-ATS “Airspace and Air Traffic Services” published under Government Notices No. 3135 of 23 January 2004.

Further access is available on NCAA website: www.ncaa.com.na/resources

Enquiries : sos-anso@ncaa.com.na

15/07/2020

REINHARD GAERTNER
INTERIM EXECUTIVE DIRECTOR

SCHEDULE

PART 71 – AIRSPACE AND AIR ROUTES
(NAM-CATS-AAR)

List of Technical Standards

71.01.1 DEFINITIONS

1. The following definitions are applicable within this technical standard:

***Acceptable Risk criteria*:** Criteria for determining whether the frequency and severity of specified accidents (such as midair collisions) are at an acceptably low level, or whether a higher level of service or restrictions are required to reduce risks to an acceptable level.

Administering authority: means the person or entity responsible for managing the activity within a volume of airspace.

***Aerodrome control service*:** Air traffic control service for aerodrome traffic.

***Aeronautical Study*:** A formal process for the systematic analysis of the hazards, benefits and costs associated with the provision of airspaces and at aerodromes to determine whether levels of air traffic service, and air traffic management measures, need to be established, upgraded, downgraded or discontinued.

***Air traffic*:** All traffic in flight or operating on the maneuvering area of an aerodrome.

***Air traffic advisory service*:** A service provided within advisory airspace to ensure separation, in so far as practical, between aircraft which are operating on IFR flight plans.

***Aircraft Movement*:** An aircraft take-off or a landing at an airport. For airport traffic purposes, one arrival and one departure is counted as two movements.

***ALARP*:** A level of risk that may be higher than the acceptable risk level, but is tolerated providing it can be demonstrated that risks have been kept As Low As Reasonably Practical.

Annex: means an Annex to the Convention on International Civil Aviation (Chicago Convention).

Approach (terminal area) control service**:** Air traffic control service for arriving or departing flights.

Area (en-route) control service**:** Air traffic control service for controlled flights in control areas.

ARM (Airspace Risk Model): a cause/consequence model designed to calculate risk levels in various airspace environments.

Civil Activity Use Airspace: Airspace which has been designated for Civilian activities, including aviation and non-aviation activities that are either recreational or commercial in nature.

Classification: of airspace, includes re-classification of the airspace.

Control area**:** A controlled airspace extending upwards from a specified limit above the earth.

Control zone (CTR): A controlled airspace extending upwards from the surface of the earth to a specified upper limit.

Controlled airspace: An airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

Flight information region*:* An airspace of defined dimensions within which flight information service and alerting service are provided.

Flight information service: A service provided for the purpose of giving advice and information useful for the safe and efficient conduct of flights.

Flexible Use of Airspace: Airspace which has been designated for Military activities and of a temporary nature.

RVSM Airspace*:* Airspace in which Reduced Vertical Separation Minima between aircraft applies. This normally means applying 1000 feet instead of 2000 feet vertical separation to aircraft between FLs 290 and 410.

Terminal control area: A control area normally established at the confluence of ATS routes in the vicinity of one or more major aerodromes.

Traffic avoidance advice: Advice provided by an ATS unit specifying maneuvers to assist the pilot to avoid a collision.

***Traffic information*:** Information issued by an ATS unit to alert a pilot to other known or observed air traffic which may be in proximity to the position or intended route of flight and to help the pilot avoid a collision.

71.02 AIRSPACE STANDARDS AND METHODS

71.02.2 AERODROME SERVICES-Standards

1. Aerodrome control service

1.1 Further to the provisions in Part 172 regarding aerodrome control service, there are two aspects which need to be taken into account in their planning and operation. These concern:

a) The co-operation between the aerodrome control tower and other agencies responsible for the provision of services at the aerodrome where that aerodrome control tower is located;

b) The internal arrangement for sharing the task of providing aerodrome control service where more than one controller on duty is needed.

1.2 With respect to co-operation between the aerodrome control tower and other agencies it is essential that detailed arrangements be concluded between the aerodrome control tower and all those agencies likely to conduct activities on the manoeuvring area of the aerodrome, ensuring that the aerodrome control tower can exercise its control function over aircraft in that area without interference and without creating hazards to aircraft under its control. This applies particularly in those cases when maintenance and/or construction work is being undertaken on the manoeuvring area.

1.3 As to the provision of service to aircraft and other traffic operating on the apron, it is now accepted practice that this task should be referred to as the apron management service and that this service should be conducted so as to assist pilots and persons in charge of vehicles on the apron to avoid collisions as well as to obtain a coherent pattern of movements on the apron.

1.4 This service may be achieved by systematic arrangements defining tracks to be followed by the different participants constituting the overall traffic on the apron and/or, by the provision

of individual guidance, either by voice or by other, appropriate signal devices. At small and medium aerodromes, where the apron can be fully overseen by the aerodrome control tower, the provision of apron management service is best entrusted to the aerodrome control tower because it retains the unity of service and avoids a change in responsibility for services in the transition area between the apron and the manoeuvring area.

1.5 However, at larger aerodromes with extended apron areas, there often exists a situation where the aerodrome control tower cannot oversee the entire apron because of its complexity and it would therefore be unfeasible to entrust the aerodrome control tower with the apron management service. In such cases it will be necessary to have apron management service performed by a special agency which is normally provided by the aerodrome operator.

1.6 If a special agency performs apron management service it must, however, be ensured that specific agreements are concluded between the ATS unit in question and the aerodrome operator which define, in detail, the respective areas of responsibility on the aerodrome, as well as the procedures to be employed for serving ground traffic. Such arrangements apply especially to methods used in the transition area between the apron and the manoeuvring area so as to avoid any possible incompatibilities between the methods employed.

1.7 As to internal arrangements for sharing tasks where more than one controller is on duty (1.1 b) above), it is obviously a question which falls largely into the field of facility management (DOC 9426 see Part IV, Section 2, Chapter 1). However, it should also be realized that any arrangements made in this respect should in the first place be dictated by operational considerations, i.e. the safety and efficiency of the service rendered to traffic and not by considerations of administrative convenience or other non-operational considerations.

71.02.3 BOUNDARIES OF DESIGNATED AIRSPACE

1. Navigation Tolerances and Vertical Buffers

1.1 Navigation tolerances are integral factors in airspace design, in determining terrain/obstacle clearance, instrument approach procedure design and lateral separation point calculations.

1.2 The expected navigation accuracy for domestic en-route navigation is based on the characteristics of Instrument Landing System (ILS), Global Navigation Satellite System (GNSS), VHF Omni-directional Radio Range (VOR), Non-directional Radio Beacon (NDB), Distance Measuring Equipment (DME) and Tactical Air Navigation Aid (TACAN) systems and therefore relates to the angular characteristics of azimuth systems and range characteristics of DME/TACAN systems, or the positional error of GNSS, Inertial Navigation Systems (INS) or Inertial Reference Systems (IRS).

1.3 The Root-Sum-Square (RSS) method is used to calculate error budgets for the navigation tolerances listed in this document.

2. Air traffic separation and airspace design tolerances

2.1 The design of controlled airspace should provide for the 'containment' of air traffic to which an air traffic control service is being provided. When manual means are utilised for the design of airspace (or the calculation of lateral separation) the ICAO specified values should be rounded up to the next higher half degree or half nautical mile. The specified values are:

- ILS Localizer Front Beam: ± 2.4 degrees
- GNSS: reserved
- VOR and TACAN radials: ± 5.2 degrees
- DME: ± 0.25 nm plus 1.25% of the distance from the antenna.
- NDB/Locator: ± 6.9 degrees

- DR Navigation: Where there is no change of track and initial track guidance is available ± 9 degrees, otherwise ± 12 degrees.

Compliance Note: *A Deduced Reckoning (DR) tolerance of 9 degrees is assumed to apply outside the rated coverage of the initial tracking aid.*

2.2 When a VOR and an NDB are co-sited (within 600 metres or 0.324 nm), the worst case navigation tolerances should be used for the design of airspace. However, the separation standards to be applied are to be based on the most accurate instrument in the aircraft as indicated on the flight plan.

2.3 The values promulgated in PANS-OPS Volume II must be applied when computer programs are used for airspace design or the determination of lateral separation. These values are based on the '95% containment level'.

3. Obstacle clearance

3.1 The navigation tolerances for the calculation of en route safety heights and the splay angles in the terminal area for instrument approach/missed approach procedures should be based on the '99.7% containment level'. Values associated with VORs and NDBs for this purpose are promulgated in PANS-OPS Volume II.

3.2 The navigation tolerances/splay angles are:

- VOR: ± 7.8 degrees

- NDB: ± 10.3 degrees
- DR: Where there is no change of track and initial track guidance is available ± 10.3 degrees, otherwise ± 15 degrees.

Compliance Note: *A DR tolerance of 10.3 degrees is assumed to apply outside the rated coverage of the initial tracking aid.*

3.3 The width of the obstacle clearance area, excluding the buffer area, must not exceed 50 NM either side of track.

4. Lateral buffers in airspace design

4.1 The navigation tolerance areas for entry and holding procedures are determined in accordance with PANS-OPS Volume II and depend on the performance category of the aircraft using the procedure.

4.2 A 1 NM buffer should be applied between the primary navigation tolerance areas (i.e., 95% containment) of any combination of air routes, holding patterns and approach or departure areas.

4.3 The lateral buffer must be applied when the adjoining airspace is designated as Prohibited or Restricted, but not when the adjoining airspace is Class G.

4.4 The lateral separation minimum is 1 NM between the possible positions of two aircraft or an aircraft and another aviation activity. The possible position of an aircraft is defined as the navigation tolerance area. However, under the VFR, visual navigation tolerances may be reduced where visual fixes or features can be used to effect separation.

4.5 The overhead cone tolerance (i.e. the minimum) for lateral separation is 1 nm.

5. Vertical buffers in airspace design

5.1 A minimum 500 ft vertical design 'buffer' should be provided between the base/steps of Class A, B, C and D airspace and the lowest level useable by an aircraft operating within such airspace. This is to segregate aircraft within such airspace and VFR aircraft which may be cruising at a CTA base/step in Class G airspace and, hence, may not be known to the ATS provider.

71.02.4 AIRSPACE CLASSIFICATION AND AERODROME SERVICE - METHODS

1. Service to be commensurate with airspace classification

1.1 Unless otherwise approved by the Executive Director on the basis of an Aeronautical Study, the level of service provided, and the associated procedures, must comply with those specified for the airspace classification.

Provision of higher Classification or Service than that required

1.2 There may be circumstances where an air traffic service provider can demonstrate a requirement for a particular classification to better ensure an 'orderly and expeditious flow of air traffic'. Also, there may be circumstances where an airspace user contracts with a provider for a higher level of service than that required on safety grounds. These are not safety matters for the Executive Director.

1.3 In such cases, the agency designing airspace volumes will have the responsibility to ensure that, especially where the level of hazard is low, adequate recognition of the freedoms of other airspace users, as a potential cost if lost or curtailed, is made in assessing the benefit/cost analysis as part of the Aeronautical Study.

1.4 The carriage of airborne collision avoidance systems (ACAS) by aircraft in a given area must not be a factor in determining the need for air traffic services in that area.

2. Airspace Classifications

2.1 Generic Criteria

The generic minimum safety criteria associated with the different airspace classifications are as follows:

(a) **Class A:** Airspace may be classified as Class A where it is demonstrated through an Aeronautical Study that an operational requirement exists to provide an air traffic control service for the separation of IFR flights and to exclude VFR flights from the airspace, e.g. airspace in which an RVSM requirement applies.

Within Class A airspace, IFR flights only are permitted, all flights are subject to air traffic control service and are separated from each other.

(b) **Class B:** Airspace may be classified as Class B where it is demonstrated through an Aeronautical Study that an operational requirement exists to provide an air traffic control service for the separation of IFR flights and that, as random maneuvering of VFR flights to avoid other VFR flights would create an unacceptable collision risk to IFR flights, separation is also required for VFR flights.

Within Class B airspace, IFR and VFR flights are permitted, all flights are subject to air traffic control service and are separated from each other.

(c) **Class C:** Airspace may be classified as Class C where it is demonstrated through an Aeronautical Study that an operational requirement exists to provide an air traffic control service to IFR flights for separation from other IFR flights and from VFR flights.

Within Class C airspace, IFR and VFR flights are permitted, all flights are subject to air traffic control service and IFR flights are separated from other IFR flights and from VFR flights. VFR flights are separated for IFR flights and receive traffic information in respect of other VFR flights.

(d) **Class D:** Airspace may be classified as Class D where it is demonstrated through an Aeronautical Study that an operational requirement exists to provide an air traffic control service to IFR flights for separation from other IFR flights and that it is necessary for pilots of IFR flights to be aware of VFR flights which have the potential to cause a collision hazard.

Within Class D airspace, IFR and VFR flights are permitted and all flights are subject to air traffic control service. IFR flights are separated from other IFR flights and receive traffic information in respect of VFR flights. VFR flights receive traffic information in respect of all other flights.

(e) **Class E:** Airspace may be classified as Class E where it is demonstrated through an Aeronautical Study that an operational requirement exists to provide an air traffic control service to IFR flights for separation from other IFR flights.

Within Class E airspace, IFR and VFR flights are permitted, IFR flights are subject to air traffic control service and are separated from other IFR flights. All flights receive traffic information as far as is practical.

(f) **Class F:** Airspace may be classified as Class F where an air traffic control service is not required, or through a particular contingency cannot be provided, and facilities exist to enable the provision of advice, to 'ensure separation' between IFR flights, to a reasonable extent.

Within Class F airspace, IFR and VFR flights are permitted, all participating IFR flights receive an air traffic advisory service and all flights receive flight information service if requested.

Compliance Notes:

Where air traffic advisory service is implemented, this should only be a temporary measure only until such time as it can be replaced by air traffic control service.

(g) **Class G:** All airspace not classified in accordance with the above classifications, must be designated as Class G.

Within Class G airspace, IFR and VFR flights are permitted and receive flight information service if requested.

2.2 Application to terminal areas

In terminal areas, the above criteria must be used in conjunction with terminal control area criteria.

2.3 Requirements in airspace classes

The requirements for flights within each class of airspace are contained in Appendix 1.

Compliance Note: *Where the ATS airspaces adjoin vertically, i.e. one above the other, flights at a common level would comply with requirements of, and be given services applicable to, the less restrictive class of airspace. In applying these criteria, Class B airspace is therefore considered less restrictive than Class A airspace; Class C airspace less restrictive than Class B airspace, etc.*

3. *Aerodrome Control Service*

3.1 The provision of an aerodrome control service at an uncontrolled aerodrome must be assessed by an Aeronautical Study where total annual aircraft movements:

(a) exceed 2,000 IFR; or,

(b) exceed 10,000 of which at least 10% are IFR; or,

(c) otherwise exceed 15,000.

3.2 Hours of coverage for aerodrome control

The Aeronautical Study must determine the appropriate hours of coverage.

Compliance Note: *As a guide, passenger transport operations must be covered, and traffic peaks and approximately 90% of movements should be covered.*

3.3 Control Zone

A control zone must be established for the provision of an aerodrome control service. If it meets the requirements for Class C terminal airspace, the control zone must be Class C. Otherwise, it must be Class D.

4. Terminal Area Airspace

4.1 For this criterion, terminal area airspace is that airspace above a control zone that is designed, in accordance with the technical standards, to encompass the climb/descent profiles of the IFR flights using the aerodrome.

4.2 ***Class C Terminal Airspace:*** An Aeronautical Study must assess the provision of Class C terminal airspace where the annual total of IFR movements through the airspace exceeds 2,000.

4.3 ***Class D/E Terminal Airspace:*** An Aeronautical Study must assess the provision of Class D terminal airspace where a Class D control zone has been established. However, Class E airspace may be used in lieu of Class D where radar coverage exists, in which case the carriage and use of Mode C transponders is mandatory for all aircraft.

5. Aeronautical Flight Information Service (AFIS)

5.1 The provision of an Aeronautical Flight Information Service (AFIS) must be assessed where:

(a) The total annual number of IFR aircraft movements at the aerodrome exceeds 1,500; or

(b) The total annual number of aircraft movements at the aerodrome exceeds 7,500.

5.2 AFIS hours of coverage

The Aeronautical Study will be used to determine the appropriate hours of coverage.

Compliance Note: *As a guide, passenger transport operations must be covered, and traffic peaks and approximately 90% of movements should be covered.*

5.3 Discontinuance

An established level of service may be discontinued where:

(a) it is upgraded to a higher level; or

(b) an Aeronautical Study establishes that the current level of service is no longer required.

6. Flight Information Service

All flights must be provided with Flight Information Service, on request.

6.1 Relevant ICAO Interpretations

(1) ***FIS:*** *Part 172 - Collision hazards to aircraft operating in airspace Classes C, D, E, F and G:* Where an Aeronautical Study indicates a requirement to provide information on collision hazard in such airspaces, or, where industry agrees and so requests, the Executive Director may specify requirements for Class C, D, E, F and Class G airspace, or portions thereof, where it is required that all flights, or only IFR flights, must be known to the air traffic system for the purpose of providing traffic information.

Compliance Note: *Part 91- Rules of the Air - submission of flight plans for flight information and position reports for flight information service, are relevant.*

(2) ***Continuous two-way communication:*** Part 172, 'continuous two-way' means the capability to maintain continuous two-way radio communications with other aircraft and with the air traffic services provider(s) responsible for providing services in the airspace.

(3) ***Traffic avoidance advice:*** Part 172 Class C and D, 'traffic avoidance advice'. This advice can only be guaranteed where the controller has the aircraft concerned under observation, either visually, or on radar. This interpretation is consistent with international practice.

(4) ***Collision prevention in Class E airspace:*** Part 172 states, *inter alia*, that the objective of the air traffic control services 'shall be to prevent collisions between aircraft'. This objective is applicable to the extent required by the levels of service(s) specified for each airspace classification. For example, in Class E airspace, through the application of separation minima, this objective applies to IFR flights in relation to other IFR flights. It also applies, as far as practical, through the issue of traffic information, traffic advisories and safety alerts, to IFR flights in relation to VFR flights that are known to the system, and to VFR flights that are receiving a service from air traffic control in relation to IFR and known VFR flights.

71.03 DESIGNATION OF AIRSPACES

71.03.2 Flight Information Region

1. In determining a requirement to establish a flight information region, an airspace classification volume or an air route, the Executive Director must take into consideration the recommendations made by the National Airspace Committee, established in terms of Part 11, and consult the regional planning requirements set out in the Air Navigation Plan - Africa-Indian Ocean Region (ICAO AFI plan).

2. Flight information regions must be delineated to cover the whole of the air route structure to be served by such regions.

3. A flight information region must include all airspace within its lateral limits, except as limited by an upper flight information region.

4. Where a flight information region is limited by an upper flight information region, the lower limit specified for the upper flight information region constitutes the upper vertical limit of the flight information region and must coincide with a VFR cruising level.

Compliance Note: *In cases where an upper flight information region is established the procedures applicable therein need not be identical with those applicable in the underlying flight information region.*

5. A flight information region, airspace volume or air route must be published in accordance with the AIRAC Cycle in an AIP, AIP SUP or a NOTAM.

Conduct of Aeronautical Studies

6. Where the triggers listed later in this document are reached, the Executive Director requires that site-specific reviews of individual locations be conducted to determine the class of airspace and level of air traffic service that should apply. The site-specific review is termed an Aeronautical Study.

Compliance Note: *The Executive Director must publish the method for the conduct of an aeronautical study through the Civil Aviation Authority Advisory Pamphlet. The aeronautical study method may be compliant with the requirements of ISO 31000 or any other method that the Executive Director considers to be acceptable.*

71.03.3 CONTROL AREAS

1. Control Area Steps

1.1 Control areas including airways and terminal control areas must be delineated so as to encompass sufficient airspace to contain the flight paths of those IFR flights or portions thereof to which it is desired to provide the applicable parts of the air traffic control service, taking into account the capabilities of the navigation aids normally used in that area. Sufficient controlled airspace should be established to encompass the arrival, departure and where necessary, the holding flight paths of IFR flights. There should be a balance between instrument approach procedure design and airspace design so as to minimize the amount of airspace required. Simplification of terminal area airspace configuration is a prime requisite. Vertical and lateral limits should be standardized to the maximum extent practicable.

***Compliance Note**: In a control area other than one formed by a system of airways, a system of routes may be established to facilitate the provision of air traffic control.*

1.2 The design of control area (CTA) steps must allow for:

(a) provision of a 3 degree approach gradient;
(b) provision of a 500 FT vertical buffer;
(c) containment of instrument departure procedures.

1.3 Lateral Limits

Control area steps should be designed in a circular configuration centred on the aerodrome DME. Where a VOR is located within 0.5 NM of the DME, then VOR radials and arcs may be used to define the boundaries of the sub-areas. Use of the VOR outside of the 0.5 NM limit requires the Executive Director's approval.

1.4 Vertical Limits

The base of the lowest step must not be less than 1000 FT above ground or water.

1.5 Coincidence with VFR cruising levels

When the lower limit of a control area is above 3000 FT it must coincide with a VFR cruising level.

1.6 First step for CTRs less than 7nm radius

For CTRs of less than 7 NM in Class D airspace and where Performance Category C aircraft operate, the first step must accommodate the 500 FT vertical 'buffer' and a 3-degree approach gradient from the end of the runway. In this case the lower limit of the first step will be 1000 FT AGL. For 7 NM CTRs, the first step must be at 1500 FT AGL.

1.7 Profiles

The profiles in Table 1, based on 300 FT per NM (3 degree), apply for aerodrome elevations of less than 450 FT. Most types of pressurized aircraft, on descent to the terminal area, will be contained in the CTA and CTR. There is no requirement for non-pressurized high performance aircraft to be contained. However, the CTA steps may be adjusted to suit local circumstances provided the minimum criteria are not infringed.

1.8 Where the aerodrome elevation is more than 450 FT, the actual elevation must be rounded up to the nearest 500 feet and added to the levels indicated.

Example: *Aerodrome elevation = 3240 FT. Rounded to 3500 FT. Cat D aircraft operate. First step = 3500 + 1500 = 5000 FT. Second step = 3500 + 2500 = 6000 FT, etc.*

1.9 In Table 1, 'x NM' equals the distance from the DME to the threshold of the outermost runway. This distance, to the nearest 0.5 NM, is added to the lateral limit distance for the CTA step to give the CTA step lower level radius from the DME.

Control Zone Radius	Control Area Step		
	Lower Level	Lateral Limits	Radius from DME
5nm (approx)	1000 FT	CTR to 10 NM	5 + x NM
7NM or more	1500 FT	CTR to 10 NM	7 + x NM
	2500 FT	10 NM to 15 NM	10 + x NM
	3500 FT	15 NM to 20 NM	15 + x NM
	4500 FT	20 NM to 30 NM	20
	7500 FT	30 NM to 60 NM	30
	12,500 FT	60 NM to 90 NM	60
	FL165	90 NM to 120 NM	90
	FL205	120 NM to 150 NM	120
	FL245	150 NM out	150

Table 1

2. Transition Areas for Performance Category D aircraft

2.1 For Performance Category D aircraft operating in controlled airspace, a transition area must be provided to contain a 3.3% minimum climb gradient Standard Instrument Departure (SID). The SID must be designed so as to minimize the amount of controlled airspace required.

2.2 The transition area must be provided, where practical, from the primary instrument departure runway(s) and will not normally exceed a distance of 10 NM from the threshold unless noise abatement procedures or other operational requirements make it necessary to extend this distance. The minimum width of the transition area is determined by the primary tolerance area of the SID.

2.3 Lower limit

The lower limit of the transition area must be 1000 ft above ground or water.

71.03.4 CONTROL ZONES

1. 1. CTR Design

1.1 Containment

Unless otherwise approved by the Executive Director, a CTR must meet the design requirements of this section and must contain the visual manoeuvring (circling) area for the respective performance category of aircraft using the aerodrome (visual manoeuvring area criteria are promulgated in PANS-OPS).

2. Geographic Reference

2.1 The Aerodrome Reference Point (ARP) of the aerodrome is used to facilitate the mapping process. This provides a single point of origin for airspace design at a location and overcomes the problem of using navigation aids that are not necessarily located near the geographic centre of the aerodrome.

2.2 The DME or other navigation aid location may be used as the 'reference or mapping point' for the design of the CTR if the DME or other navigation aid is located within 0.5 NM of the ARP. A DME or navigation aid located greater than 0.5 NM from the ARP can only be used as a reference point with the approval of the Executive Director.

2.3 Geographical features, e.g. coastline, may be used to delineate CTR boundaries.

3. *Performance Category D aircraft*

3.1 At aerodromes where Performance Category D aircraft operate, the CTR must meet the following design criteria:

(a) the CTR must encompass 7 NM arcs from the runway thresholds.

(b) in the case of a single runway, the arcs may be joined by lines drawn parallel to the runway.

(c) where there is more than one runway:

(1) the arcs must be joined by tangential lines or, if more practicable, contained within a circular CTR with the ARP (or, if applicable, a DME or other navigation aid) as the centre; and

(2) where the resultant radius is greater than 7 NM, it is rounded-up to the next half NM.

4. *Performance Category C aircraft*

4.1 At aerodromes where Performance Category C aircraft operate (but not Category D), the boundary of the CTR must encompass either 5 NM arcs from the runway thresholds, or, a 5 NM circular configuration based on the ARP (or, if applicable, a DME or other navigation aid).

5. *Performance Category A/B aircraft*

5.1 At aerodromes where only Performance Category A/B aircraft operate, the CTR must encompass a 5 NM radius from the ARP (or, if applicable, a DME or other navigation aid).

6. *Vertical Limits*

6.1 Where associated with overlying CTA, the upper limit of the CTR must be contiguous with the lower limit of the CTA. The upper limit may vary depending on the type and volume of traffic and ATC procedures used, but will not normally exceed 3500 FT AGL.

71.05 SPECIAL USE AIRSPACE

1. Declaration of Prohibited and Restricted Areas

Prohibited and restricted areas designated by the Executive Director must be published in the AIP. The administering authority responsible for each prohibited or restricted area must be included therein.

1.1 Prohibited and Restricted Area Dimensions

a) Lateral Limits of Prohibited and Restricted Areas

The lateral limits of Prohibited and Restricted Areas must encompass the activities of the organisation or entity responsible for administering those activities (the Administering Authority).

1.2 Vertical Limits of Prohibited and Restricted Areas

The vertical limits of a prohibited or restricted area must encompass the activities of the Administering Authority, and must include buffers to provide safe separation for aircraft over/under flying the relevant area at the promulgated vertical limits.

2. Vertical limits encompassing aviation activities

2.1 The upper vertical limits of an airspace encompassing aviation activities must be determined as follows:

(a) determine the upper Planned Height (PH) of the activity and whether supersonic flight is expected;

(b) for ordnance delivery where the ordnance may exceed the planned upper level of the delivery aircraft, add an Assessed Firing Activity Buffer (AFAB), as notified by or obtained from the user, to obtain an Activity Height (AH);

(c) add the Appropriate Vertical Separation Minimum (AVSM), which is the relevant ATC vertical separation minimum applicable at the upper AH/PH or the type of operation (supersonic or not);

(d) for Air Defense operations where the upper activity level is more than 10,000FT, add an Air Defense Pressure Buffer (ADPB) of 1000 FT to compensate for the differences between altimeter settings used by aircraft within the area and those outside;

(e) round up the resultant level to the nearest 500/1000FT level and publish/promulgate as the area upper limit (AUL).

2.2 The lower vertical limits of an airspace encompassing aviation activities must be determined as follows:

(a) determine the planned lower PH of the activity and if supersonic flight is expected;

(b) subtract the AVSM, which is the relevant ATC vertical separation minimum applicable at the lower PH or to the type of operation (supersonic or not);

(c) for Air Defense operations where the resultant lower limit is more than 10,000FT, subtract an ADPB of 500 FT;

(d) round down the resultant level to the nearest 500/1000FT level and publish/promulgate as the area lower limit (ALL).

3. Vertical limits encompassing non-aviation activities

3.1 The upper vertical limits of an airspace encompassing non-aviation activities must be determined as follows:

(a) determine the Planned Height (PH) of the non-aviation activity;

(b) add the Assessed Firing Activity Buffer (AFAB) as notified by or obtained from the user to obtain an Activity Height (AH);

(c) add an Instrument/Pilot Tolerance (IPT) buffer, as follows:

(1) 500 FT when the AH is at or below FL290; or

(2) 1000 FT when the AH is above FL290;

(d) where the result from (a) to (c) is higher than 10,000 FT, add a Pressure Variation Buffer (PVB) of 1,000FT to compensate for variations to the atmospheric pressure below 1013 hPa;

(e) round up the resultant level to the nearest 100 FT level and publish/promulgate as the area upper limit (AUL).

3.2 Published vertical limits

The promulgated vertical limits of prohibited and restricted areas and restricted airspaces shown in AIP, Charts and NOTAM must contain these buffers.

4. Application of Navigation Tolerances and Buffers

4.1 Segregation of flying operations exists in adjacent airspaces, or in adjacent portions of the same airspace when:

(a) in the vertical plane, the vertical spacing of the aircraft conforms to the air traffic control vertical minimum appropriate to the levels involved;

(b) in the horizontal plane, the possible positions of the aircraft are separated by a minimum buffer of 1 NM.

4.2 Where special procedures or equipment so permit, segregation may be agreed on the basis that the aircraft subject to special procedures or the special equipment are guaranteed by the Administering Authority to not fly beyond the designated horizontal boundary.

4.3 Except as specified in paragraphs 3.4 and 3.5 below, adjacent airspace must be delineated as follows:

(a) when one of the airspaces is controlled airspace, the buffer must be added to the navigation tolerances of air routes and must be contained within CTA;

(b) when one of the airspaces is uncontrolled airspace, the buffer must be contained in the restricted areas.

4.4 Aircraft operating at the vertical limits of prohibited areas and restricted areas/airspaces are separated from activities within those airspaces.

4.5 Where designated airspaces vertically adjoin each other, all the airspaces concerned must be treated as one. The lower limit of the lower airspace and the upper limit of the highest airspace must be the vertical limits.

4.6 Where the vertical limits of designated airspaces under the control of separate Administering Authorities vertically adjoin or overlap, Local Instructions in the ATS provider Station Standing Instructions must detail the highest / lowest useable level in each airspace. This is intended to avoid the loss of a level at the boundary through the application of buffer spaces to each area.

2. 5. Restricted areas for civil emergencies

5.1 When required for civil emergencies, restricted areas normally with dimensions of 1 NM radius and 0-1,500 FT AGL may be established. Where a more extensive area is required, a buffer of 1 NM may be applied when determining the lateral boundaries.

3. 6. Separation from Air Defence activities

6.1 Where surveillance-based separation is used, a Safety Tolerance Area (defined as a block of airspace which moves with the transiting aircraft and from which air defense activity is to be excluded) must be applied as follows:

(a) 2,000 FT above and below the transiting aircraft;

(b) 10 NM radius horizontally, by radar, centred on the transiting aircraft.

6.2 Where surveillance-based separation is not employed, or where a civil air traffic controller is not co-located within the air defense unit, Defence ATC is responsible for devising procedural clearances to ensure separation between transiting aircraft and the air defense activity.

6.3 Where procedural control is employed, separation must be achieved through the segregation of airspace, either vertically or laterally. Minimum vertical separation must be 2000 FT. Air defence units must be responsible for containing their air operations within the limits imposed by Defence ATC.

6.4 When a civil air traffic controller is applying radar separation between transit traffic and air defence activity, direct, continuous and static free, two way communications must be available between all aircraft involved and the air defense and ATC unit.

6.5 Communication must be established with transit traffic prior to entry into airspace reserved or restricted for air defence activity. In addition, the civil air traffic controller must have direct contact with the air defense controller responsible for that air defence activity, either through hotline communication or by co-location.

7. Explosive Ordnance Protective Airspace

7.1 When inspections are being conducted at Explosive Storage Facilities near aerodromes, a Restricted Area of dimensions ½ NM radius and 0-300 FT AGL must be established. Where this proves to be impracticable, a review must be sought from the military authorities before a Restricted Area is established.

7.2 Where the detonation of munitions and explosive ordnance is authorized, a Restricted Area of dimensions determined by the appropriate military authority, using approved safety templates and buffers must be established and activated by NOTAM.

8. Commercial Blasting

8.1 Where regular Commercial Blasting Operations are conducted within 5 NM of a certified, licensed or permitted aerodrome (including heliport) a Danger Area of dimensions 1 NM radius and 0-500 FT AGL must be established.

8.2 When such a Danger Area has been promulgated, the operator should be requested to notify the relevant air traffic service provider of intended blasting times so that, where possible, aircraft whose operations may conflict with the detonation may be informed.

71.05.4 Danger Areas

1 Danger Areas are designated when it is appropriate to caution operators or pilots of aircraft that it is necessary for them to assess the dangers in relation to specific activity within a particular area and take action accordingly to ensure the safety of their aircraft.

2. ***Vertical limits of Danger Areas***

The vertical limits of Danger Areas are the upper and lower limits of the activities within the airspace.

3. ***Lateral limits of Danger Areas***

The lateral limits of Danger Areas are the extent to which activities may take place within the area.

4. Establishment of Flying Training Areas

4.1 Flying training areas may be established to permit organisations to conduct flying training and should only be promulgated within operational documentation of the training organisation and relevant air traffic service providers.

4.2 In selecting flying training areas, the following factors should be considered:

(a) suitability of terrain for flying training purposes;
(b) accessibility from the aerodrome;
(c) dimensions, having regard to the type of aircraft which will utilize the area;
(d) the need to establish the area clear of other civil and military aerodromes,
(e) populated and built-up areas and hospitals and other similar institutions;
(f) the need, where practicable, to establish the area clear of regularly used tracks and other airspaces in accordance with the airspace segregation principle.

4.3 Consideration may be given to designation of a flying training area as a Danger Area:

(a) where two or more aircraft will be together using the training area for significant periods of time; and,
(b) their activities may pose a potential danger for other aircraft transiting or operating in close proximity to the airspace concerned.

(c) where justified by the risk levels, a training area may be designated as a Restricted area.

71.05.6 Civil Activity Use Airspace

1. Civil Activity Use Airspace Areas are designated when it is appropriate to caution operators or pilots of aircraft that it is necessary for them to assess the dangers in relation to specific activity within a particular area and take action accordingly to ensure the safety of their aircraft.

2. **Lateral limits of Civil Activity Use Airspace Areas**

   The lateral limits of Civil Activity Use Airspace must encompass the activities of the organisation or entity responsible for administering those activities (the Administering Authority).

3. **Vertical limits of Civil Activity Use Airspace Areas**

   The vertical limits of a Civil Activity Use Airspace must encompass the activities of the Administering Authority, and must include buffers to provide safe separation for aircraft over/under flying the relevant area at the promulgated vertical limits.

4. **Proposed Sites for Civil Activity Use Airspace Areas**

   Various Civil Aviation Activities require sites to either land, take off, recover or base the operation from. Each site will be individually assessed by the Executive Director.

5. **Users of Civil Activity Use Airspace Areas**

Users of the Civil Activity Use Airspace are identified as any civilian user which requires usage of the airspace but do not satisfy the requirement for other published operating areas, they are usually of a short term nature and pose a danger to other operators or pilots of aircraft. These users can either be recreational or commercial and encompass many aviation events, operations, sites and emerging aviation aircrafts e.g. RPAS.

6. List of operations for Civil Activity Use Airspace Areas

(a) Aerial Photography;

(b) Aerial Survey;

(c) Aerobatics Box;

(d) Aerobatics Display;

(e) Air Show;

(f) Air Race;

(g) Banner Towing;

(h) Blasting;

(i) Calibrations;

(j) Fireworks Display;

(k) Fly Inn;

(l) Fly Past;

(m) Formation Flights;

(n) Game Capture;

(o) Gliding;

(p) Hang Gliding;

(q) Helium Balloon Release;

(r) Hot Air Balloon;

(s) Kite Flying;

(t) Laser Beam Display;

(u) Model Aircraft Operations;

(v) Paragliding;

(w) Pipeline Inspection;

(x) Power line Inspection;

(y) Pyrotechnics;

(z) Rocket Firing;

(aa) RPAS/Drone Operations;

(bb) Search Light Display;

(cc) Special Air Event;

(dd) Search and Rescue Exercises;

(ee) Skydiving;

(ff) Skydiving Drop Zones;

(gg) Sky Lanterns Release;

(hh) Survey Flight;

(ii) Tethered Balloon;

(jj) Unmanned Balloon; and

(kk) Any other Activity defined by the Executive Director.

71.07 AIR ROUTES

1 General

1.1 Air route design should incorporate both the appropriate navigation tolerances (95% containment values) and the overhead cone tolerance. The minimum width of an air route, which is determined by the dimensions of the overhead cone of the navigation aid providing track guidance, is ± 4 nm up to and including Flight Level (FL) 200 and ± 5 nm above that level.

1.2 The maximum width of an air route, determined by applying the navigation tolerance, should be ± 30 NM.

1.3 The 'angular method' is used to determine the boundaries of an air route. The overhead cone tolerance line is drawn parallel to the track until it intercepts the navigation tolerance line drawn from the navigation aid or position fix point. Beyond the intersection of these lines the air route boundary expands along the navigation tolerance line until it in turn intersects with the navigation tolerance line drawn from the next navaid/position fix on the route or the maximum route width. The maximum route width boundaries, if applied, are drawn parallel to the required track.

1.4 Where ATC (electronic) surveillance is normally used to monitor aircraft and track keeping, airspace may be designed using the relevant surveillance separation standard between nominal track and the airspace lateral boundary.

APPENDIX 1: ATS AIRSPACE CLASSES – SERVICES PROVIDED AND FLIGHT REQUIREMENTS

Class	*Type of flight*	*Separation provided*	*Service provided*	*Speed limitation**	*Radio communication requirement*	*Subject to an ATC clearance*
A	IFR only	All aircraft	Air traffic control service	Not applicable	Continuous two-way	Yes
B	IFR	All aircraft	Air traffic control service	Not applicable	Continuous two-way	Yes
	VFR	All aircraft	Air traffic control service	Not applicable	Continuous two-way	Yes
C	IFR	IFR from IFR IFR from VFR	Air traffic control service	Not applicable	Continuous two-way	Yes
	VFR	VFR from IFR	1) Air traffic control service for separation from IFR; 2) VFR/VFR traffic information (and traffic avoidance advice on request)	250 kt IAS below 10 000 ft AMSL	Continuous two-way	Yes
D	IFR	IFR from IFR	Air traffic control service including traffic information about VFR flights (and traffic avoidance advice on request)	250 kt IAS below 10 000 ft AMSL	Continuous two-way	Yes
	VFR	Nil	Traffic information between VFR and IFR flights (and traffic avoidance advice on request)	250 kt IAS below 10 000 ft AMSL	Continuous two-way	Yes
E	IFR	IFR from IFR	Air traffic control service and traffic information about VFR flights as far as practical	250 kt IAS below 10 000 ft AMSL	Continuous two-way	Yes
	VFR	Nil	Traffic information as far as practical	250 kt IAS below	No	No

				10 000 ft AMSL		
F	IFR	IFR from IFR as far as practical	Air traffic advisory service; flight information service	250 kt IAS below 10 000 ft AMSL	Continuous two-way	No
	VFR	Nil	Flight information service	250 kt IAS below 10 000 ft AMSL	No	No
G	IFR	Nil	Flight information service	250 kt IAS below 10 000 ft AMSL	Continuous two-way	No
	VFR	Nil	Flight information service	250 kt IAS below 10 000 ft AMSL	No	No

*When the height of the transition altitude is lower than 10 000 ft AMSL, FL 100 should be used in lieu of 10 000 ft.