TECHNICAL STANDARDS – Issue version (2024) NAMCATS: Part 171 – AERONAUTICAL TELECOMMUNICATIONS SERVICES (ATEL)

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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 171 – " Aeronautical Telecommunications Service" (ATEL). This Part 171 provides for the issue of technical standards as NAM-CATS-RPAs. The Executive Director of Civil Aviation has, pursuant to the empowerment mentioned above, issued technical standards relating to NAMCAR Part 171 (Aeronautical Telecommunications Service) to be known as NAM-CATS-ATEL as further set out in the SCHEDULE herein.

1.3 NAM-CATS-ATEL comprises the standards, rules, requirements, methods, specifications, characteristics and procedures which are applicable in respect of the provision of Aeronautical Telecommunications Services 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 171.02.1 refers to regulation Part 171 of Subpart 02 of the Part 171*

(2) Technical standard 171.02.2 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 (ANSSO) Division 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 International standards, recommended practices and procedures, as amended from time to time, (art 37 of the Chicago Convention) will be incorporated into the technical standards and its attached volumes contained in this document upon release.

(a) ICAO Annex 10 Volumes I to V inclusive, and

(b) ICAO Doc 8071 Volume I — Testing of Radio Navigation Systems – testing of Ground-based Systems; and

(c) ICAO Doc 8071 Volume III - Testing of Radio Navigation Systems – Testing of Surveillance Radar Systems.

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

Miscellaneous:

Volume 1: **Radio navigation aids**

Volume 2: **Communication procedures including those with PANS status**

Volume 3: **Communication systems**

Volume 4: **Surveillance with collision avoidance systems**

Volume 5: **Aeronautical radio frequency spectrum utilisation**

Volume 6**: Communication systems and procedures relating to remotely piloted aircraft systems C2 Link**

These Technical Standards apply with immediate effect.

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

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MS. TOSKA SEM
EXECUTIVE DIRECTOR

Civil Aviation Technical Standards
Relating to
PART 171 – AERONAUTICAL TELECOMMUNICATIONS SERVICES (ATEL)
Volume 0: General Provistions

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171.01.1 DEFINITIONS

Note. All references to "Radio Regulations" are to the Radio Regulations published by the International Telecommunication Union (ITU). Radio Regulations are amended from time to time by the decisions embodied in the Final Acts of World Radiocommunication Conferences held normally every two to three years. Further information on the ITU processes as they relate to aeronautical radio system frequency use is contained in the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including statement of approved ICAO policies (Doc 9718).

1. Definitions

1.1 When the following terms are used in the NAMCARs or NAM-CATS, they have the following meanings:

Accuracy, in relation to a radionavigation service or facility, means the degree to which the value measured or displayed by the service or facility conforms to the true value.

Aeronautical administrative communications (AAC). Communications necessary for the exchange of aeronautical administrative messages.

Aeronautical fixed circuit. A circuit forming part of the aeronautical fixed service (AFS).

Aeronautical fixed station. A station in the aeronautical fixed service.

Aeronautical fixed telecommunication network circuit. A circuit forming part of the aeronautical fixed telecommunication network (AFTN).

Aeronautical operational control (AOC). Communication required for the exercise of authority over the initiation, continuation, diversion or termination of flight for safety, regularity and efficiency reasons.

Aeronautical station (RR S1.81). A land station in the aeronautical mobile service. In certain instances, an aeronautical station may be located, for example, on board ship or on a platform at sea.

Aeronautical telecommunication agency. An agency responsible for operating a station or stations in the aeronautical telecommunication service.

Aeronautical telecommunication log. A record of the activities of an aeronautical telecommunication station.

Aeronautical telecommunication network (ATN). A global internetwork architecture that allows ground, air-ground and avionic data subnetworks to exchange digital data for the safety of air navigation and for the regular, efficient and economic operation of air traffic services.

Aeronautical telecommunication service: A telecommunication service provided for any aeronautical purpose.

Aeronautical telecommunication station. A station in the aeronautical telecommunication service.

AFTN communication centre. An 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.

AFTN destination station. An AFTN station to which messages and/or digital data are addressed for processing for delivery to the addressee.

AFTN origin station. An AFTN station where messages and/or digital data are accepted for transmission over the AFTN.

AFTN station. A station forming part of the aeronautical fixed telecommunication network (AFTN) and operating as such under the authority or control of a State.

Air-ground communication. Two-way communication between aircraft and stations or locations on the surface of the earth.

Air-ground control radio station. An aeronautical telecommunication station having primary responsibility for handling communications pertaining to the operation and control of aircraft in a given area.

Air-to-ground communication. One-way communication from aircraft to stations or locations on the surface of the earth.

Air-report. A report from an aircraft in flight prepared in conformity with requirements for position, and operational and/or meteorological reporting.

Note. Details of the AIREP form are given in PANS-ATM (Doc 4444).

Airborne collision avoidance system (ACAS). An aircraft system based on secondary surveillance radar (SSR) transponder signals which operates independently of ground-based equipment to provide advice to the pilot on potential conflicting aircraft that are equipped with SSR transponders.

Note. SSR transponders referred to above are those operating in Mode C or Mode S.

Aircraft address. A unique combination of twenty-four bits available for assignment to an aircraft for the purpose of air-ground communications, navigation and surveillance.

Aircraft earth station (AES). A mobile earth station in the aeronautical mobile-satellite service located on board an aircraft (see also "GES").

Aircraft operating agency. The person, organization or enterprise engaged in, or offering to engage in, an aircraft operation.

Aircraft station (RR S1.83). A mobile station in the aeronautical mobile service, other than a survival craft station, located on board an aircraft.

Air Traffic Service (ATS). A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service)

Alternative means of communication. A means of communication provided with equal status, and in addition to the primary means.

Altitude. The vertical distance of a level, a point or an object considered as a point, measured from mean sea level (MSL).

Application entity (AE). An AE represents a set of ISO/OSI communication capabilities of a particular application process (see ISO/IEC 9545 for further details).

Area navigation (RNAV). A method of navigation which permits aircraft operation on any desired flight path within the coverage of ground- or space-based navigation aids or within the limits of the capability of self-contained aids, or a combination of these.

Note. Area navigation includes performance-based navigation as well as other operations that do not meet the definition of performance-based navigation.

ATEL Personnel means a person who is engaged by a service provider to do one or more of the following:

(a) operate a facility;

(b) maintain a facility;

(c) conduct measurements of the performance of, and calibration of, a facility during a flight inspection.

ATN security services. A set of information security provisions allowing the receiving end system or intermediate system to unambiguously identify (i.e. authenticate) the source of the received information and to verify the integrity of that information.

ATS direct speech circuit. An aeronautical fixed service (AFS) telephone circuit, for direct exchange of information between air traffic services (ATS) units.

ATS interfacility data communication (AIDC). Automated data exchange between air traffic services units in support of flight notification, flight coordination, transfer of control and transfer of communication.

ATS message handling service (ATSMHS). An ATN application consisting of procedures used to exchange ATS messages in store-and-forward mode over the ATN such that the conveyance of an ATS message is in general not correlated with the conveyance of another ATS message by the service provider.

ATS message handling system (AMHS). The set of computing and communication resources implemented by ATS organizations to provide the ATS message handling service.

ATS provider. A person or organisation approved as an ATS provider under Part 172.

Authorized path. A communication path suitable for a given message category.

Automatic dependent surveillance-broadcast (ADS-B) OUT. A function on an aircraft or vehicle that periodically broadcasts its state vector (position and velocity) and other information derived from on-board systems in a format suitable for ADS-B IN capable receivers.

Automatic dependent surveillance-broadcast (ADS-B) IN. A function that receives surveillance data from ADS-B OUT data sources.

Automatic dependent surveillance — contract (ADS-C). A means by which the terms of an ADS-C agreement will be exchanged between the ground system and the aircraft, via a data link, specifying under what conditions ADS-C reports would be initiated, and what data would be contained in the reports.

Automatic relay installation. A teletypewriter installation where automatic equipment is used to transfer messages from incoming to outgoing circuits.

Note. This term covers both fully automatic and semi-automatic installations.

Automatic telecommunication log. A record of the activities of an aeronautical telecommunication station recorded by electrical or mechanical means.

Automatic terminal information service (ATIS). The automatic provision of current, routine information to arriving and departing aircraft throughout 24 hours or a specified portion thereof.

- ***Data link-automatic terminal information service (D-ATIS).*** The provision of ATIS via data link.

- ***Voice-automatic terminal information service (Voice-ATIS).*** The provision of ATIS by means of continuous and repetitive voice broadcasts.

Availability, for a telecommunication service, radionavigation service or support service, means the percentage of its operating hours that the service is not interrupted.

Bit error rate (BER). The number of bit errors in a sample divided by the total number of bits in the sample, generally averaged over many such samples.

Blind transmission. A transmission from one station to another station in circumstances where two-way communication cannot be established but where it is believed that the called station is able to receive the transmission.

Broadcast. A transmission of information relating to air navigation that is not addressed to a specific station or stations.

Carrier-to-multipath ratio (C/M). The ratio of the carrier power received directly, i.e. without reflection, to the multipath power, i.e. carrier power received via reflection.

Carrier-to-noise density ratio (C/No). The ratio of the total carrier power to the average noise power in a 1 Hz bandwidth, usually expressed in dBHz.

Channel rate. The rate at which bits are transmitted over the RF channel. These bits include those bits used for framing and error correction, as well as the information bits. For burst transmission, the channel rate refers to the instantaneous burst rate over the period of the burst.

Channel rate accuracy. This is relative accuracy of the clock to which the transmitted channel bits are synchronized. For example, at a channel rate of 1.2 kbits/s, maximum error of one part in 10^6 implies the maximum allowed error in the clock is $\pm 1.2 \times 10^{-3}$ Hz.

Circuit mode. A configuration of the communications network which gives the appearance to the application of a dedicated transmission path.

Collision avoidance logic. The sub-system or part of ACAS that analyses data relating to an intruder and own aircraft, decides whether or not advisories are appropriate and, if so, generates the advisories. It includes the following functions: range and altitude tracking, threat detection and RA generation. It excludes surveillance.

Communication centre. An aeronautical fixed station which relays or retransmits telecommunication traffic from (or to) a number of other aeronautical fixed stations directly connected to it.

Configuration, in relation to:

(a) a telecommunication or radionavigation service — means the configuration of each facility and any interconnection between facilities that make up the service; and

(b) a facility — means the configuration of equipment, hardware, software and data, and the interconnections between equipment.

Controller-pilot data link communications (CPDLC). A means of communication between controller and pilot, using data link for ATC communications.

CPDLC message: 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.

CPDLC message set: A list of standards message element and free text message element.

Coverage, in relation to a telecommunication or radionavigation service, means the volume of airspace in which, or the locations between which, the service is nominally provided.

Current data authority. 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.

Double channel simplex. Simplex using two frequency channels, one in each direction.

Note. This method was sometimes referred to as cross-band.

Data link flight information services (D-FIS). The provision of FIS via data link.

Data link initiation capability (DLIC). A data link application that provides the ability to exchange addresses, names and version numbers necessary to initiate data link applications (see Doc 4444).

Directory service (DIR). A service, based on the ITU-T X.500 series of recommendations, providing access to and management of structured information relevant to the operation of the ATN and its users.

Doppler shift. The frequency shift observed at a receiver due to any relative motion between transmitter and receiver.

Duplex. A method in which telecommunication between two stations can take place in both directions simultaneously.

Effective acceptance bandwidth. The range of frequencies with respect to the assigned frequency for which reception is assured when all receiver tolerances have been taken into account.

Effective adjacent channel rejection. The rejection that is obtained at the appropriate adjacent channel frequency when all relevant receiver tolerances have been taken into account.

Elevation. The vertical distance of a point or a level, on or affixed to the surface of the earth, measured from mean sea level.

End-to-end. Pertaining or relating to an entire communication path, typically from (1) the interface between the information source and the communication system at the transmitting end to (2) the interface between the communication system and the information user or processor or application at the receiving end.

End-user. An ultimate source and/or consumer of information.

Energy per symbol to noise density ratio (Es /No). The ratio of the average energy transmitted per channel symbol to the average noise power in a 1 Hz bandwidth, usually expressed in dB. For A-BPSK and A-QPSK, one channel symbol refers to one channel bit.

Equivalent isotropically radiated power (e.i.r.p.). The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna (absolute or isotropic gain)

Essential radio navigation service. A radio navigation service whose disruption has a significant impact on operations in the affected airspace or aerodrome.

Facility: One or more items of equipment, at one or more locations, that provide an aeronautical telecommunication or radio navigation service.

Fan marker beacon. A type of radio beacon, the emissions of which radiate in a vertical fan-shaped pattern.

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

Flight level. A surface of constant atmospheric pressure which is related to a specific pressure datum, 1 013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals.

Note 1. A pressure type altimeter calibrated in accordance with the standard atmosphere:

a) when set to a QNH altimeter setting, will indicate altitude;

b) when set to a QFE altimeter setting, will indicate height above the QFE reference datum;

c) when set to a pressure 1 013.2 hPa, may be used to indicate flight levels.

Note 2. The terms "height" and "altitude", used in Note 1 above, indicate altimetric rather than geometric heights and altitudes.

Forward error correction (FEC). *The process of adding redundant information to the transmitted signal in a manner which allows correction, at the receiver, of errors incurred in the transmission*

Free text message element. Part of a message that does not conform to any standard message element in the PANS-ATM element.

Frequency channel. A continuous portion of the frequency spectrum appropriate for a transmission utilizing a specified class of emission.

Note. The classification of emissions and information relevant to the portion of the frequency spectrum appropriate for a given type of transmission (bandwidths) is specified in the ITU Radio Regulations, Article 2 and Appendix 1.

Fully automatic relay installation. 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.

Functional specification, for a telecommunication service, a radionavigation service or a support service, is a general description of the service, its operating principles and its functions.

Gain-to-noise temperature ratio. The ratio, usually expressed in dB/K, of the antenna gain to the noise at the receiver output of the antenna subsystem. The noise is expressed as the temperature that a 1 ohm resistor must be raised to produce the same noise power density.

Ground earth station (GES). An earth station in the fixed satellite service, or, in some cases, in the aeronautical mobile-satellite service, located at a specified fixed point on land to provide a feeder link for the aeronautical mobile satellite service.

Note. This definition is used in the ITU's Radio Regulations under the term "aeronautical earth station". The definition herein as "GES" for use in the SARPs is to clearly distinguish it from an aircraft earth station (AES), which is a mobile station on an aircraft.

Ground-to-air communication. One-way communication from stations or locations on the surface of the earth to aircraft.

Height. The vertical distance of a level, a point or an object considered as a point, measured from a specified datum.

Homing. 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.

Human Factors principles. Principles which apply to design, certification, training, operations and maintenance and which seek safe interface between the human and other system components by proper consideration to human performance.

Human performance. Human capabilities and limitations which have an impact on the safety and efficiency of aeronautical operations.

Integrity, of a telecommunication service, a radio navigation service or a support service means the likelihood that the information supplied by the service at a particular moment is correct;

International telecommunication service. A telecommunication service between offices or stations of different States, or between mobile stations which are not in the same State.

Interpilot air-to-air communication. 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.

Location indicator. A four-letter code group formulated in accordance with rules prescribed by ICAO and assigned to the location of an aeronautical fixed station.

Logon address. A specified code used for data link logon to an ATS unit.

Mean power (of a radio transmitter). The average power supplied to the antenna transmission line by a transmitter during an interval of time sufficiently long compared with the lowest frequency encountered in the modulation taken under normal operating conditions.

Note. A time of 1/10 second during which the mean power is greatest will be selected normally

Message field. An assigned area of a message containing specified elements of data.

Meteorological operational channel. A channel of the aeronautical fixed service (AFS), for the exchange of aeronautical meteorological information.

Meteorological operational telecommunication network. 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.

Note. "Integrated" is to be interpreted as a mode of operation necessary to ensure that the information can be transmitted and received by the stations within the network in accordance with pre-established schedules.

Mobile surface station. A station in the aeronautical telecommunication service, other than an aircraft station, intended to be used while in motion or during halts at unspecified points.

Mode S subnetwork. A means of performing an interchange of digital data through the use of secondary surveillance radar (SSR) Mode S interrogators and transponders in accordance with defined protocols

Navigation specification. A set of aircraft and flight crew requirements needed to support performance-based navigation operations within a defined airspace. There are two kinds of navigation specifications:

- ***Required navigation performance (RNP) specification.*** A navigation specification based on area navigation that includes the requirement for performance monitoring and alerting, designated by the prefix RNP, e.g. RNP 4, RNP APCH.

- ***Area navigation (RNAV) specification.*** A navigation specification based on area navigation that does not include the requirement for performance monitoring and alerting, designated by the prefix RNAV, e.g. RNAV 5, RNAV 1.

Note.1 The Performance-based Navigation (PBN) Manual (Doc 9613), Volume II, contains detailed guidance on navigation specifications.

Note 2. The term RNP, previously defined as "a statement of the navigation performance necessary for operation within a defined airspace", has been removed from this Annex as the concept of RNP has been overtaken by the concept of PBN. The term RNP in this Annex is now solely used in the context of navigation specifications that require performance monitoring and alerting, e.g. RNP 4 refers to the aircraft and operating requirements, including a 4 NM lateral performance with on-board performance monitoring and alerting that are detailed in Doc 9613.

Network station. An aeronautical station forming part of a radiotelephony network.

Next data authority. The ground system so designated by the current data authority through which an onward transfer of communications and control can take place.

Non-network communications. Radiotelephony communications conducted by a station of the aeronautical mobile service, other than those conducted as part of a radiotelephony network.

NOTAM. A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Offset frequency simplex. A variation of single channel simplex wherein telecommunication between two stations is effected by using in each direction frequencies that are intentionally slightly different but contained within a portion of the spectrum allotted for the operation.

Operational control communications. Communications required for the exercise of authority over the initiation, continuation, diversion or termination of a flight in the interest of the safety of the aircraft and the regularity and efficiency of a flight.

Note— Such communications are normally required for the exchange of messages between aircraft and aircraft operating agencies.

Operating hours, for a telecommunication or radionavigation service, means the times during which the service provider must, under its approval, operate the service.

Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note.— Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.

Point-to-point. Pertaining or relating to the interconnection of two devices, particularly end-user instruments. A communication path of service intended to connect two discrete end-users; as distinguished from broadcast or multipoint service.

Pressure-altitude. An atmospheric pressure expressed in terms of altitude which corresponds to that pressure in the Standard Atmosphere.

Primary frequency. The radiotelephony frequency assigned to an aircraft as a first choice for air-ground communication in a radiotelephony network.

Primary means of communication. The means of communication to be adopted normally by aircraft and ground stations as a first choice where alternative means of communication exist.

Protected service volume. A part of the facility coverage where the facility provides a particular service in accordance with relevant SARPs and within which the facility is afforded frequency protection.

Radio bearing. 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.

Radio direction finding (RR S1.12). Radio determination using the reception of radio waves for the purpose of determining the direction of a station or object.

Radio direction-finding station (RR S1.91). A radio determination station using radio direction finding. *Note— The aeronautical application of radio direction finding is in the aeronautical radio navigation service.*

Radiotelephony network. A 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.

Radio navigation service. A service providing guidance information or position data for the efficient and safe operation of aircraft supported by one or more radio navigation aids

Readback. 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.

Recovery time means the period during which a service is interrupted.

Reliability, of a telecommunication service, a radionavigation service or a support service, means the probability that the service will perform its function or functions without failure for a specified period.

Regular station. A station selected from those forming an en-route air-ground radiotelephony network to communicate with or to intercept communications from aircraft in normal conditions.

Required communication performance (RCP). A statement of the performance requirements for operational communication in support of specific ATM functions (see Manual on Required Communication Performance (RCP) (Doc 9869)).

Route segment. A route or portion of route usually flown without an intermediate stop.

Routing Directory. A list in a communication centre indicating for each addressee the outgoing circuit to be used.

Safety case: A document that provides evidence and argument that a service or facility, or a proposed change to the design of a service or facility, meets safety objectives or levels for the service or facility.

Safety Management System (SMS): A systematic approach to managing safety, including the necessary organisational structures, accountabilities, policies, and procedures.

Secondary frequency. The radiotelephony frequency assigned to an aircraft as a second choice for air-ground communication in a radiotelephony network.

Secondary surveillance radar (SSR). A surveillance radar system which uses transmitters/receivers (interrogators) and transponders.

Semi-automatic relay installation. 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.

Simplex. A method in which telecommunication between two stations takes place in one direction at a time.

Single channel simplex. Simplex using the same frequency channel in each direction.

Slotted aloha. A random access strategy whereby multiple users access the same communications channel independently, but each communication must be confined to a fixed time slot. The same timing slot structure is known to all users, but there is no other coordination between the users.

SNOWTAM. A special series NOTAM notifying the presence or removal of hazardous conditions due to snow, ice, slush or standing water associated with snow, slush and ice on the movement area, by means of a specific format.

Standard message element: Part of a message defined in the PANS-ATM (Doc 4444) in terms of display format, intended use and attributes

Support service: A service, provided to a service provider, that:

(a) is necessary for the functioning of a telecommunication or radionavigation service; and

(b) consists of information in electronic form and the carrier that carries the information.

Surveillance radar. Radar equipment used to determine the position of an aircraft in range and azimuth.

Technical specification, for a telecommunication service or facility, or a radionavigation service or facility, is a detailed description that may use technical terms and concepts, of:

(a) the way in which the service or facility operates and performs its functions; and

(b) the technical standards to which the service or facility has been designed and manufactured.

Telecommunication (RR S1.3). 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.

Teletypewriter tape. A tape on which signals are recorded in the 5-unit Start-Stop code by completely severed perforations (Chad Type) or by partially severed perforations (Chadless Type) for transmission over teletypewriter circuits.

Time division multiple access (TDMA). A multiple access scheme based on time-shared use of an RF channel employing: (1) discrete contiguous time slots as the fundamental shared resource; and (2) a set of operating protocols that allows users to interact with a master control station to mediate access to the channel.

Time division multiplex (TDM). A channel sharing strategy in which packets of information from the same source but with different destinations are sequenced in time on the same channel.

"Torn-tape" relay installation. A teletypewriter installation where messages are received and relayed in teletypewriter tape form and where all operations of relay are performed as the result of operator intervention.

Touchdown. The point where the nominal glide path intercepts the runway.

Note. "Touchdown" as defined above is only a datum and is not necessarily the actual point at which the aircraft will touch the runway.

Traffic information service – broadcast (TIS-B) IN. A surveillance function that receives and processes surveillance data from TIS-B OUT data sources.

Traffic information service – broadcast (TIS-B) OUT. A function on the ground that periodically broadcasts the surveillance information made available by ground sensors in a format suitable for TIS-B IN capable receivers.

> *Note. This technique can be achieved through different data links. The requirements for Mode S extended squitters are specified in Annex 10, Volume IV, Chapter 5. The requirements for VHF digital link (VDL) Mode 4 and universal access transceiver (UAT) are specified in Annex 10, Volume III, Part I.*

Transit delay. In packet data systems, the elapsed time between a request to transmit an assembled data packet and an indication at the receiving end that the corresponding packet has been received and is ready to be used or forwarded.

Tributary station. An aeronautical fixed station that may receive or transmit messages and/or digital data but which does not relay except for the purpose of serving similar stations connected through it to a communication centre.

VHF digital link (VDL). A constituent mobile subnetwork of the aeronautical telecommunication network (ATN), operating in the aeronautical mobile VHF frequency band. In addition, the VDL may provide non-ATN functions such as, for instance, digitized voice.

Z marker beacon. A type of radio beacon, the emissions of which radiate in a vertical cone-shaped pattern.

1.2 Additional definitions pertinent to this Part 171 are contain in the relevant Sub-Parts:

2. Aeronautical telecommunication services

2.1 Aeronautical telecommunication services are the ground-based stations of those services supporting an Air Traffic Service provided under Part 172 (airborne stations are not included). Aeronautical telecommunications services comprise:

(a) ***Aeronautical Broadcasting Service***: A broadcasting service intended for the transmission of information relating to air navigation. *This does not include automated weather information broadcast stations.*

(b) ***Aeronautical Fixed Service (AFS):*** A telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services.

(c) ***Aeronautical Fixed Telecommunication Network (AFTN)***: A worldwide system of aeronautical fixed circuits provided, as part of the aeronautical fixed service, for the exchange of messages

and/or digital data between aeronautical fixed stations having the same or compatible communication characteristics.

(d) ***Aeronautical Telecommunication Network Service***: A global inter-network that allows ground, air-ground and avionic data sub-networks to exchange digital data for the safety of air navigation and for the regular, efficient and economic operation of air traffic services.

(e) ***Aeronautical Mobile Service (RR SI.32)***: A mobile service between aeronautical stations and aircraft stations, or between aircraft stations, in which survival craft stations may participate; emergency position-indicating radio-beacon stations may also participate in this service on designated distress and emergency frequencies. This service does not include ground stations that are provided for other than ATS purposes.

(f) ***Aeronautical Mobile (R) Service (RR SI.33)***: An aeronautical mobile service reserved for communications relating to safety and regularity of flight, primarily along national or international civil air routes.

(g) ***Aeronautical mobile-satellite service (RR S1.35).*** A mobile-satellite service in which mobile earth stations are located on board aircraft; survival craft stations and emergency position-indicating radio beacon stations may also participate in this service.

(h) ***Aeronautical mobile-satellite (R) service (RR S1.36***).An aeronautical mobile-satellite service reserved for communications relating to safety and regularity of flights, primarily along national or international civil air routes.

(i) ***Aeronautical radio navigation service (RR S1.46)***. A radio navigation service intended for the benefit and for the safe operation of aircraft.

(j) Any telecommunication service which processes or displays air traffic control data (including aviation meteorological data) for use by an ATS provider under Part 172.

(k) Electronic briefing and flight plan lodgement service for the use of pilots.

3. Aeronautical radio navigation services

3.1 An aeronautical radio navigation service is a radio navigation service intended for the benefit, and for the safe operation of aircraft. Radio navigation services include radio determination (radar and related surveillance services) supporting ATS.

Compliance Note. The following Radio Regulations are quoted for purposes of reference and/or clarity in understanding of the above definition of the aeronautical radio navigation service:

RR S1.10 *Radio navigation*: Radio determination used for the purpose of navigation, including obstruction warning.

RR S1.9 *Radio determination*: The determination of the position, velocity and/or other characteristics of an object, or the obtaining of information relating to these parameters, by means of the propagation properties of radio waves.

4. Aeronautical telecommunication and radio navigation facilities

4.1 The following list classifies the kinds of facilities used for the provision of aeronautical telecommunication services:

(a) Very High Frequency (VHF) air/ground voice communication facilities;

(b) High Frequency (HF) air/ground voice communication facilities;

(c) Ultra High Frequency (UHF) air/ground voice communication facilities;

(d) Precision approach radio navigation aids;

(e) Instrument Landing System (ILS) facilities;

(f) Non-precision radio navigation aids;

(g) Distance Measuring Equipment (DME);

(h) VHF Omni-Range (VOR) facilities;

(i) Non-directional beacons (NDB);

(j) Flight data processing facilities;

(k) Flight information facilities;

(l) Radar data processing facilities;

(m) Primary surveillance radar facilities;

(n) Secondary surveillance radar facilities;

(o) Multi-lateration radar facilities;

(p) Surface movement radar facilities;

(q) Precision runway monitor facilities;

(r) Automatic dependent surveillance system facilities;

(s) Voice switching and control facilities;

(t) ATS point to point communication facilities;

(u) Air/ground data links;

(v) Ground to ground data interchange networks;

(w) Human Machine Interface systems, including Tower Consoles, ATS Work Stations, and Display facilities;

(x) Uninterruptable and emergency power supplies;

(y) Essential services in buildings and in equipment shelters housing facilities (electrical power supplies, air-conditioning, and security facilities);

(z) Global Navigation Satellite System ground based augmentation stations or facilities;

(aa) Aeronautical databases used in or by a facility;

(bb) Meteorological Display Systems used for ATS;

(cc) Voice and Data Recording facilities;

(dd) Any other facilities supporting ATS provided under Part 172.

171.02.2 APPLICATION FOR CERTIFICATE OR AMENDMENT THEREOF

An application for the issuing of an ATEL service provider certificate, or an amendment thereof, must be made to the Executive Director in the appropriate form published on the NCAA website.

171.02.3 ISSUE OF ATEL SERVICE PROVIDER CERTIFICATE

The ATEL service provider certificate is issued in the appropriate form published by the Executive Director on the NCAA website.

171.02.4 RENEWAL OF ATEL SERVICE PROVIDER CERTIFICATE

An application for the renewal of an ATEL service provider certificate, must be made to the Executive Director on the appropriate form published on the NCAA website.

171.02.5 DUPLICATE CERTIFICATE

An application for a duplicate certificate must be made and issued in the appropriate form published by the Executive Director on the NCAA website.

171.02.6 PRIVILEGES OF ATEL SERVICE PROVIDER CERTIFICATE HOLDER

An ATEL service provider certificate issued under this Part authorises the holder of the certificate to:

(a) provide, install, repair, modify, commission, operate, maintain and decommission an aeronautical telecommunications (ATEL) services or systems used for air traffic services, and aeronautical radio-navigation.
(b) provide flight inspection or calibration services for an ATEL facility used for air navigation or for the provision of air traffic services.

171.03.4 TRAINING AND CERTIFICATION OF ATEL PERSONNEL

1. Minimum academic qualifications

1.1 The minimum academic qualification for ATEL personnel performing operation and maintenance functions associated with aeronautical telecommunication facilities is a university degree in any of the following engineering fields:

(a) radio engineering;

(b) communications engineering;

(c) electrical engineering;

(d) electronic engineering;

1.2 Additional qualification in the following areas is essential:

(a) computer science; or

(b) information technology.

1.3 The Executive Director may accept qualifications or significant practical experience providing equivalence to the requirements in 1.1.

1.4 For those personnel that carry out or supervise electrical and mechanical trade work only, the minimum qualification is an electrical or mechanical trade qualification, as relevant.

1.5 Where an ATEL provider considers, and the Executive Director agrees, that the operation and maintenance of a particular type of facility is not technically complex, lesser qualifications may be acceptable for those personnel who operate and maintain that type of facility.

2. Personnel training and certification - authorizing certificate

2.1 An ATEL provider must provide personnel with an authorising certificate which:

(a) establishes the identity of the personnel;

(b) details the scope of the authorisation granted to the personnel by listing the facilities, or types of facilities, which the personnel is authorised to operate and/or maintain; and

(c) includes a date of effect, and the period of time for which each of the authorisations remain current.

2.2 An ATEL provider must not grant an authorising certificate in respect to a particular facility or a class of facility unless it has established that the personnel:

(a) has undergone a competency based course of instruction or on-the-job training specific to that facility or that class of facility; and

(b) has been assessed to be competent in the operation and maintenance of the facility or the class of facility by an assessor who:

(1) has been trained and accredited in workplace assessment and training at an appropriate technical training facility or institution; and

(2) holds formal recognition of competency in the unit being assessed, at or above the level being assessed; and

(3) has current knowledge of the workplace and job/role of the person being assessed;

Compliance Note: *If an assessor alone does not have all the competencies required, he/she may work together with another assessor who has the additional competencies to conduct assessments.*

3. Refresher training and recency checking procedure

3.1 An ATEL provider must have a process for refresher training and recency checking of personnel to ensure the on-going retention of personnel competency on the facility types for which an authorising certificate has been granted.

71.03.8 DOCUMENTS AND RECORDS TO BE MAINTAINED

1. Documents to be held by the provider

1.1 An ATEL service provider must hold and maintain certain documentation essential to the safe provision of ATEL or ANAV services. These documents form part of the services provider Manual of Operation.

1.2 Documents that are essential for the provision of services under the certificate include:

(a) ICAO Annex 10 Volumes I to V inclusive, as amended from time to time;

(b) ICAO Annex 11, as amended from time to time;

(c) the functional specification and technical specification of services and facilities that are operated and/or maintained by the service provider;

(d) records of the configuration of facilities;

(e) facility operation and maintenance plans;

(f) interface agreements with other organisations;

(g) facility technical manuals or instructions;

(h) local instructions and technical procedures; and

(i) safety cases.

2. Document and data control processes

2.1 An ATEL service provider must establish a document control system which covers the authorisation, standardization, publication, distribution and amendment of all documentation issued by the organisation, or required by the organisation for the provision of ATEL services.

2.2 These processes must ensure:

(a) authorisation of documents and records is made by a designated authority appropriate to the provider's management and safety accountability structures;

(b) that the currency of documents can be readily determined and that only current versions are available for operational use;

(c) availability at locations where needed by the provider's personnel;

(d) a master copy of relevant documents and records is securely held;

(e) archival of documents and records where they have been superseded.

2.3 All documents that are related to and referenced in the Manual of Procedure are to be indexed in that manual.

3. Records system and procedures

3.1 An ATEL service provider must establish a system for records which covers identification, collection, indexing, storage, security, maintenance, access and disposal of records necessary for the provision of ATEL services.

3.2 The records system must provide an accurate chronicle of activities for the purpose of reconstruction of events for air safety investigation, and for system safety analysis. Records kept include:

(a) records of design, manufacturing, procurement, installation, testing, commissioning, modification, and decommissioning;

(b) records of the designated authorities for the design, operation and maintenance for each system;

(c) records of hazard analysis and risk assessments;

(d) records of facility performance and facility maintenance history including performance parameter values, test facilities utilised, identity of authorised technicians conducting operation and maintenance, changes to maintenance procedures;

(e) records of facility failures and faults;

(f) records of defect reports and associated defect investigations;

(g) records of technician's competencies, including details of experience, qualifications, training, competency assessments, and facility authorisations.

171.04.8 SAFETY CASE

1.1 The safety risk assessment in a safety case must:

(a) identify all potential safety hazards associated with the operation of each service, in normal and abnormal modes of operation;

(b) assess the safety risk of each hazard;

(c) identify the means of mitigation of unacceptable safety risks.

1.2 Existing services and/or facilities having a demonstrated history of safe operation for more than two years at the date of initial certification do not need to be covered by a baseline safety case.

1.3 A safety case must be prepared to support a proposed new service, or a proposed change to an existing service, if:

(a) the effect of the service or change would not be in accordance with the certificate issued to the service provider; or

(b) the new service or proposed change requires prior notification to the Executive Director in accordance with the service provider's safety management system requirements.

171.04.10 RADIO SITE APPROVAL

1. Requirements

1.1 Any radio site, whether temporary or permanent must receive prior approval from the Executive Director.

1.2 An application for approval must be made to the Executive Director on the appropriate form and must comply with the requirements specified in this Part.

1.3 The application must indicate the type and duration of the service.

1.4 Safety assurance documentation (safety case) must be submitted with the application for any new service, and must:

(a) contain argument and evidence that the system meets or exceeds the appropriate standard of safety.

(b) reflect one of two situations; the safety of the existing, on-going, operation or a change to the existing operation, such as a new project or procedure.

(c) be presented in a reasonable format as long as its scope is well defined and it provides the necessary arguments and evidence required for its purpose.

1.5 Private radiotelephony base station applications must be accompanied by proof of competency in the use of aeronautical voice radio equipment:

(a) a certificate of competency for aviation base operations personnel is the minimum requirement.

(b) at least two (2) certificates are required for every eight (8) hour daily shift of operation.

(c) a private radiotelephony base station application is not subject to a safety case, but should be accompanied by a motivation justifying the application.

1.6 Hand held or mobile radio equipment used within the confines of an aerodrome are deemed to be a base station.

171.04.12 PROTECTION OF RADIO SITES

1. Introduction

1.1 An ATEL service provider is responsible for the technical safeguarding of all of the radio sites for which they hold approvals.

1.2 An ATEL service provider must register safeguarding maps with the Local Planning Authorities and must receive, from the Local Planning Authority, copies of applications for developments in and within the vicinity of the radio site. This information must be made available to the person responsible for the technical safeguarding of radio sites.

1.3 If safeguarding is not undertaken then it is likely that a gradual degradation of the Integrity of the radio signal will take place. This will be perceived in several ways; for example, complaints from pilots or ATC regarding poor coverage, increased background noise or worsening flight calibration results for ILS and VOR. This can be avoided by proactively safeguarding the technical sites.

1.4 The Executive Director will expect to see evidence of adequate technical safeguarding. If the quality of service of the radio signal reduces below acceptable limits, such service can be withdrawn until corrective measures have been taken.

2. Background

2.1 Technical Safeguarding consists of two processes: Physical protection and radio spectrum protection.

2.2 ***Physical protection***: Most physical objects act as reflectors or diffractors of radio signals. A combination of object size, design, material, proximity and incident radio wavelength, can make

them particularly efficient reflectors or diffractors. ***Technical site safeguarding***, a process applied as part of the technical safeguarding of Radio sites, seeks to prevent any development nearby radio sites, which may degrade the electromagnetic signals by enabling such reflection or diffraction.

3. Physical Protection Process

3.1 Each radio site has a technical area to be safeguarded associated with it. On an aeronautical chart, a frame, representing this area, is drawn around the location of such equipment. If a proposed development falls within that frame or volume, further analysis, or reasoned outright rejection must be considered. In the case of development within an ILS area it is expected that computer modelling of the development is undertaken. The size and shape of the frame is dependent upon the type of equipment and its aerial system.

3.2 The dimensions provided are examples of frame sizes associated with specific types of equipment. These sizes should be applied in the absence of data from other sources. The holders of an electronic services organization approval must obtain specific criteria from the manufacturer or supplier of their equipment. It is likely that the manufacturer may specify a smaller area to be safeguarded, which could provide operational benefits. The holders of an electronic services organisation approval are expected to maintain and apply criteria pertinent to their own technical sites. The criteria used must be made available to an inspector or authorised person on request.

3.3 The following list of equipment is not exclusive.

(a) ILS

Compliance Note: *These dimensions should not be confused with the ILS Critical and Sensitive areas.*

(i) ILS Localiser Cat I/II

The frame can be defined in two separate segments:

a. a sector of 750 metres radius centred on the localiser and ±60° about the runway centreline at ground level, in the direction of the runway threshold.

b. a sector, centred on the localiser, ±15° about the runway centreline and 1500 metres along the runway, at ground level, in the direction of the runway threshold.

(ii) ILS Localiser Cat III

The above Cat I/II segments plus the following:

***Compliance Note**: This frame is defined with respect to the localiser site and the landing "end of concrete" to take account of the variable length of runways and inset threshold conditions.*

(a) a rectangle 300 metres either side of, and parallel to, the extended runway centreline, commencing 100 metres behind the respective localiser, and extending to 100 metres beyond the end of concrete at the landing end of the respective runway.

This space is from ground level:

(b) from 100 metres from the end of concrete, at ground level, on a projected 1:50 slope to a range of 1000 metres, and ±300 metres about the extended runway centreline.

***Compliance Note:** An ATEL service provider may consider extending the above Cat III criteria of ± 300 metres to ± 500 metres if large-scale development, on the edge of the ± 300 metre boundary is likely.*

(iii) ILS Glide Path

This space is defined with respect to the glide path aerial mast. A sector of 750 metres radius ±60° about a line, originating at the glide path aerial, parallel to the approach runway centreline. This space is from ground level.

(iv) DME associated with ILS

An inverted cone of 500 metres radius with a 2% (1:50) slope, originating at the base of the DME aerial.

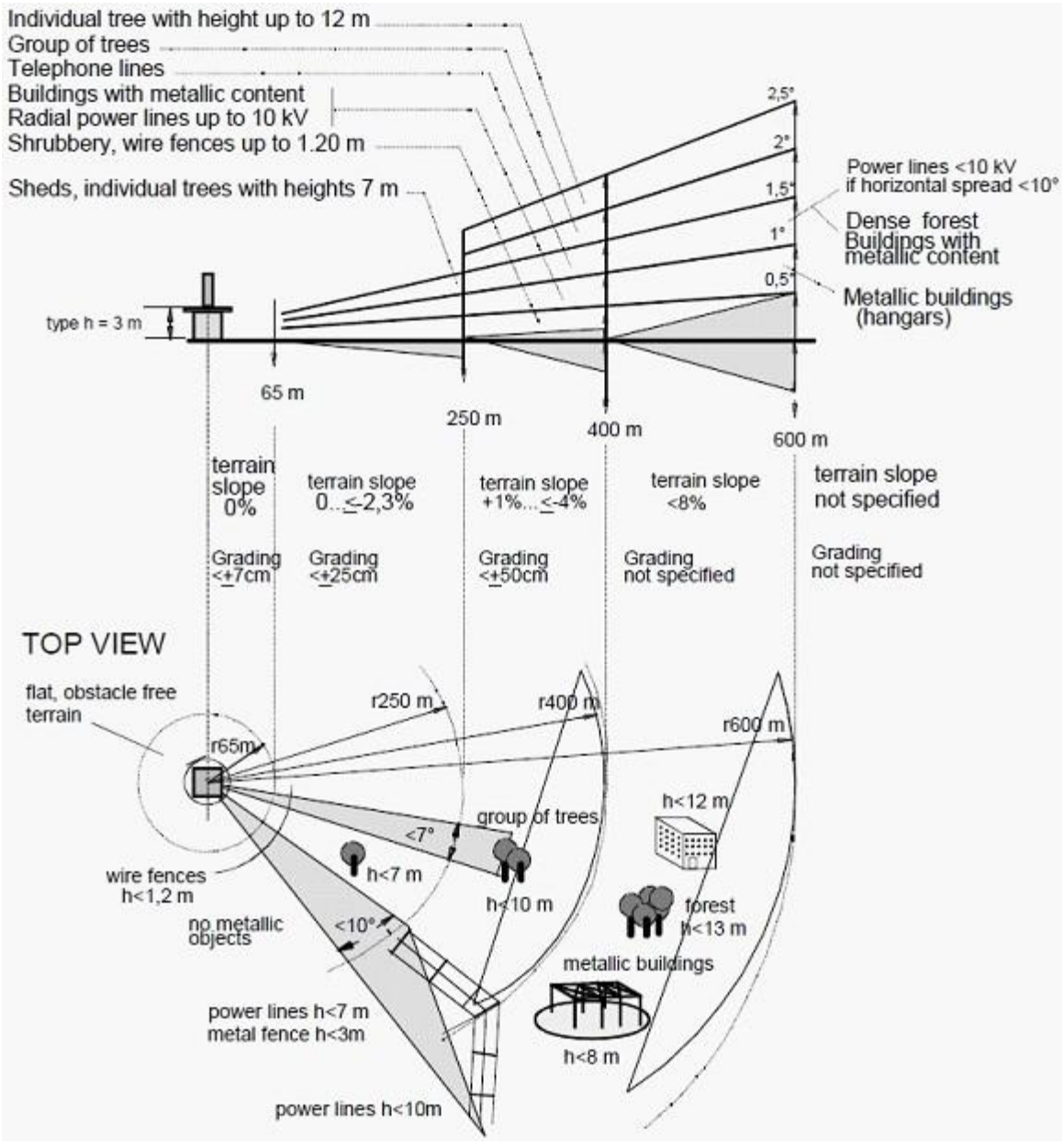
(v) Elevation Systems

A sector of 500 metres radius, centred on the elevation aerial, ±30° about a line parallel to the approach runway centreline.

(vi) VOR

A differentiation exists between the protection criteria of the C-VOR (Conventional VOR) and the D-VOR (Doppler VOR) and should be noted.

C-VOR


Individual tree with height up to 12 m
Group of trees
Telephone lines
Buildings with metallic content
Radial power lines up to 10 kV
Shrubbery, wire fences up to 1.20 m
Sheds, individual trees with heights 7 m
2,5°
2°
1,5°
1°
0,5°
Power lines <10 kV if horizontal spread <10°
Dense forest
Buildings with metallic content
Metallic buildings (hangars)
type h = 3 m
65 m
250 m
400 m
600 m
terrain slope 0%
terrain slope 0...≤2,3%
terrain slope +1%...≤-4%
terrain slope <8%
terrain slope not specified
Grading ≤±7cm
Grading ≤±25cm
Grading ≤±50cm
Grading not specified
Grading not specified
TOP VIEW
flat, obstacle free terrain
r65m
r250 m
r400 m
r600 m
wire fences h<1,2 m
no metallic objects
<7°
h<7 m
group of trees
h<10 m
<10°
h<12 m
forest h<13 m
metallic buildings
h<8 m
power lines h<7 m
metal fence h<3m
power lines h<10m

(vii) DME

The foregoing VOR constraints where co-located with a VOR, otherwise a 2% (1:50) slope surface, originating at the site ground level extending with a 300 metres radius.

(viii) RADAR

a. Line of sight from the installation to surveillance areas or volume must be maintained. No obstruction may penetrate the volume above the radar platform for a distance of 4 600m from the installation, or prevent line-of-sight from the installation to aircraft during the approach phase and movements on runways.

Consultation regarding the non-use of designs or certain materials considered to be reflective, or that could cause attenuation of the signal (such as metal reinforced glass, metal cladding, chain-link fencing, tree, plants, etc.) on elevations facing the installation must be undertaken. Designs must be altered and electromagnetic wave absorption material used for exterior finishes if required by the ATS provider. This applies to any development within a radius of 4 600m from the installation or within 1000m from the aerodrome perimeter, aerodrome included.

b. SSR

Line of sight from the installation to surveillance areas or volume must be maintained to a distance of 15km. No obstruction may penetrate the volume above the radar platform for a distance of 4 600m from the installation, or prevent line-of-sight from the installation to aircraft during the approach phase and movements on runways.

Consultation regarding the non-use of designs or certain materials considered to be reflective or that could cause attenuation of the signal (such as metal reinforced glass, metal cladding, chain-link fencing, etc.), on elevations facing the SSR installation must be undertaken. Designs must be altered and electromagnetic wave absorption material used for exterior finishes, if required by the ATS provider. This

applies to any development within a radius of 4 600m from the installation or within 1000m from the aerodrome perimeter, aerodrome included.

c. Surface Movement Radar

Line-of-sight must be maintained at ground level from the radar to all areas within the aerodrome boundary where any movement of aircraft, personnel or vehicles can occur. Consultation regarding the non-use of designs or certain materials considered to be reflective or that could cause attenuation of the signal (such as metal reinforced glass, metal cladding, chain link fencing, trees, plants, etc.) on elevations facing the installation must be undertaken.

d. Multi-lateration (MLAT)

Line of sight from the installation to surveillance areas or volume must be maintained. No obstruction may penetrate the volume above the surveillance platform for a distance of 4 600m from the installation, or prevent line-of-sight from the installation to aircraft during the approach phase and movements on runways. Consultation regarding the non-use of designs or certain materials considered to be reflective or which could cause attenuation of the signal (such as metal reinforced glass, metal cladding, chain-link fencing, etc.), on elevations facing the MLAT installation must be undertaken. Designs must be altered and electromagnetic wave absorption material used for exterior finishes, if required by the ATS provider. This applies to any development within a radius of 4 600m from the installation or within 1000m from the aerodrome perimeter, aerodrome included.

e. Automatic Dependant Surveillance – Broadcast (ADS-B)

Line of sight from the installation to surveillance areas or volume must be maintained. No obstruction may penetrate the volume above the Surveillance platform for a distance of 4 600m from the installation, or prevent line-of-sight from the installation to aircraft during the approach phase and movements on runways. Consultation regarding the non-use of designs or certain materials considered to be reflective or which could cause attenuation of the signal (such as metal reinforced glass, metal cladding, chain-link fencing, etc.), on elevations facing the ADS-B installation may be undertaken. Designs must be altered and electromagnetic wave absorption material used for exterior finishes, if required by the ATS provider. This applies to any development within a radius of 4 600m from the installation or within 1000m from the aerodrome perimeter, aerodrome included

(ix) VHF Direction Finder (VDF)

Ground level safeguarding of circle radius 120 metres centred on aid, and 2% (1:50) slope from ground level at aid out to a radius of 450 metres.

(x) VHF / UHF Receivers / Transmitters

Ground level safeguarding of circle radius 91 metres centred on the base of the main aerial tower (or equivalent structure). Additionally, from an elevation of 9 metres on this circle, a 2% (1:50) slope out to a radius of 610 metres.

(xi) Radar and Radio Link Routes

Areas of high ground need to be safeguarded against development using designs or certain materials considered to be reflective, or that could cause attenuation of the signal (such as metal-reinforced glass, metal cladding, chain-link fencing, trees, plants, etc.) on elevations facing the installations in order to protect radar/radio beams.

(xii) 75 MHz Marker Beacons

Ground level safeguarding out to a radius of 100 metres.

(xiii) NDB

From the centre of the aerial, at a height of 5 metres out, to a radius of 30 metres, with a further slope to a height of 14 metres above ground, out to a radius of 90 metres.

171.04.15 TEST TRANSMISSIONS

1.1 Transmissions for site evaluation or testing purposes must be limited to a period not exceeding 30 days.

1.2 A temporary facility may radiate for a period not exceeding 90 days

1.3 When a Morse identification signal is radiated during a test transmission the code “TST” (Tango Sierra Tango) must be used.

1.4 Any voice transmission must indicate that it is a test transmission.

171.04.17 STATION (SITE) LOGS

1.1 An ATEL service provider must maintain a site log for all facilities used to provide an ATEL service.

1.2 The site log must record all occurrences and actions relating to operation, maintenance, modification, failure, faults, and removal from and restoration to service.

1.3 Entries in site logs must include the date/time of the entry and the occurrence and must be signed by the technician or other person making the entry.

1.4 Site log records must be retained for at least five years.

171.05.1 RADIO NAVIGATION AIDS

An ATEL service provider must ensure that radio navigation aids used for air navigation comply with the specification standards set out in Document NAM-CATS-ATEL-Volume 1

171.05.2 AERONAUTICAL COMMUNICATION SYSTEMS, PROCEDURES AND ADMINISTRATIVE PROVISIONS

An ATEL service provider must ensure that communication procedures including those with Procedures for Air Navigation Services (PANS) status comply with the specification standards set out in Document NAM-CATS-ATEL-Volume 2.

171.05.3 DIGITAL DATA COMMUNICATION SYSTEMS

An ATEL service provider must ensure that digital data and voice communication systems provided for use in air navigation comply with specifications standards set out in Document NAM-CATS-ATEL-Volume 3.

171.05.4 SURVEILLANCE AND COLLISION AVOIDANCE SYSTEMS

An ATEL service provider must ensure that surveillance and collision avoidance systems provided for air navigation comply with specification standards set out in Document NAM-CATS-ATEL-Volume 4.

171.05.5 AERONAUTICAL RADIO FREQUENCY SPECTRUM UTILIZATION

An ATEL service provider must ensure that the utilisation of aeronautical radio frequency spectrum in air navigation complies with specification standards set out in Document NAM-CATS-ATEL-Volume 5.

171.05.6 COMMUNICATION SYSTEMS AND PROCEDURES RELATING TO REMOTELY PILOTED AIRCRAFT SYSTEMS C2 LINK

An ATEL service provider must ensure that the communication systems and procedures relating to remotely piloted aircraft systems C2 Link comply with specification standards set out in Document NAM-CATS-ATEL-Volume 6.