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**GASR  
WORKING GROUP**

**GAR**

**Subpart Z**

**Foreword, Definitions, Application, Common  
Reference Systems and infrastructure Reference Code**

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## FOREWORD

The GASR Aerodrome Regulation (GAR) contains the harmonised GASR requirements for aerodromes. The GAR will be presented to EASA as a basis for developing implementing rules and Acceptable Means of Compliance (AMC) when the basic principles and essential requirements for the safety and interoperability regulation for aerodromes will have been adopted by the European legislator.

Basis for the drafting of the aerodrome regulation are the ICAO Standard and Recommended Practises of the ICAO Annex 14, Volume I. Where interoperability requires it the regulation has the character of detailed prescriptive requirements in order not to create any deviations from the ICAO SARP's. This is for instance the case in Subpart J containing the requirements for visual aids for navigation. In the Subparts where choices how to comply with the requirements can be made, the requirements have the character of objective based safety regulations. Section 1 contains the objective, which have to be met by aerodromes (= the rules) and the section 2 material contains the way aerodromes can comply to the requirements (= Acceptable Means of Compliance). There may however be other acceptable means of compliance and when the aerodrome can present a safety case, which proves that a major change can be implemented while meeting the required safety level, the Competent Aviation Authority may accept such a means of compliance. This is for instance the case in subpart D – aerodrome operations and services.

## DEFINITIONS

**Accountable manager.** The manager with responsibility to ensure that the aerodrome operator's organisation has in place the necessary resources, processes, training and other tools to enable him/her to comply with the aerodrome management responsibilities outlined in GAR 1.D and to implement and promote the safety policy.

**Accuracy.** A degree of conformance between the estimated or measured value and the true value.

**Aerodrome.** Any especially adapted area on land, water or man made structure or vessel, for the landing, taking-off and manoeuvring of aircraft including the ancillary equipment, installations and services which these operations may involve for the requirements of aircraft traffic.

**Aerodrome beacon.** Aeronautical beacon used to indicate the location of an aerodrome from the air.

**Aerodrome certificate.** A certificate issued by the appropriate

authority under applicable regulations for the infrastructure and operation of an aerodrome.

**Aerodrome elevation.** The elevation of the highest point of the landing area.

**Aerodrome identification sign.** A sign placed on an aerodrome to aid in identifying the aerodrome from the air.

**Aerodrome operator.** The person or organisation holding the aerodrome certificate and ensuring use of equipment and services to support air operations on airside.

**Aerodrome reference point.** The designated geographical location of an aerodrome.

**Aerodrome traffic density.**

- a) Light. Where the number of movements in the mean busy hour is not greater than 15 per runway or typically less than 20 total aerodrome movements.
- b) Medium. Where the number of movements in the mean busy hour is of the order of 16 to 25 per runway or typically between 20 to 35 total aerodrome movements.
- c) Heavy. Where the number of movements in the mean busy hour is of the order of 26 or more per runway or typically more than 35 total aerodrome movements.

**Aeronautical beacon.** An aeronautical ground light visible at all azimuths, either continuously or intermittently, to designate a particular point on the surface of the earth.

**Aeronautical ground light.** Any light specially provided as an aid to air navigation, other than a light displayed on an aircraft.

**Aeronautical study.** A study of an aeronautical problem to identify possible solutions and select a solution that is acceptable without degrading safety.

**Aeroplane.** A powered heavier-than-air aircraft that has fixed wings from which it derives most of its lift.

**Aeroplane reference field length.** The minimum field length required for take-off at maximum certificated take-off mass, sea level, standard atmospheric conditions, still air and zero runway slope, as shown in the appropriate aeroplane flight manual prescribed by the certificating authority or equivalent data from the aeroplane manufacturer. Field length means balanced field length for

aeroplanes, if applicable, or take-off distance in other cases.

**Aircraft classification number (ACN).** A number expressing the relative effect of an aircraft on a pavement for a specified standard subgrade category.

**Aircraft stand.** A designated area on an apron intended to be used for parking an aircraft.

**Airport.** An aerodrome which includes also the installations and services needed to assist commercial air transport services.

**Airside.** The areas inside the aerodrome boundary where, for their own safety and the safety of aircraft, the general public is not permitted access unless controlled or escorted by a person authorised by the aerodrome operator to do so. This does not include any areas inside terminal buildings.

**Apron.** A defined area, on a land aerodrome, intended to accommodate aircraft for purposes of loading or unloading passengers, mail or cargo, fuelling, parking or maintenance.

**Apron management service.** A service provided to regulate the activities and the movement of aircraft and vehicles on an apron.

**Barrette.** Three or more aeronautical ground lights closely spaced in a transverse line so that from a distance they appear as a short bar of light.

**Calendar.** Discrete temporal reference system that provides the basis for defining temporal position to a resolution of one day (ISO 19108\*).

**Capacitor discharge light.** A lamp in which high-intensity flashes of extremely short duration are produced by the discharge of electricity at high voltage through a gas enclosed in a tube.

**Certified aerodrome.** An aerodrome whose operator has been granted an aerodrome certificate.

**Clearway.** A defined rectangular area on the ground or water under the control of the appropriate authority, selected or prepared as a suitable area over which an aeroplane may make a portion of its initial climb to a specified height.

**Commercial air transport.** The transportation by air of passengers and/or cargo for remuneration or hire.

**Contaminant:** undesirable substance on paved surface with the potential to adversely affect aircraft performance during taxiing, landing or take-off.

**Cyclic redundancy check (CRC).** A mathematical algorithm applied to the digital expression of data that provides a level of assurance against loss or alteration of data.

**Data quality.** A degree or level of confidence that the data provided meet the requirements of the data user in terms of accuracy, resolution and integrity.

**Datum.** Any quantity or set of quantities that may serve as a reference or basis for the calculation of other quantities (ISO 19104\*).

**De-icing/anti-icing facility.** A facility where frost, ice or snow is removed (de-icing) from the aeroplane to provide clean surfaces, and/or where clean surfaces of the aeroplane receive protection (anti-icing) against the formation of frost or ice and accumulation of snow or slush for a limited period of time.

**De-icing/anti-icing pad.** An area comprising an inner area for the parking of an aeroplane to receive de-icing/anti-icing treatment and an outer area for the manoeuvring of two or more mobile de-icing/anti-icing equipment.

**Declared distances.**

- a) Take-off run available (TORA). The length of runway declared available and suitable for the ground run of an aeroplane taking off.
- b) Take-off distance available (TODA). The length of the take-off run available plus the length of the clearway, if provided.
- c) Accelerate-stop distance available (ASDA). The length of the take-off run available plus the length of the stopway, if provided.
- d) Landing distance available (LDA). The length of runway which is declared available and suitable for the ground run of an aeroplane landing.

**Dependent parallel approaches.** Simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are prescribed.

**Displaced threshold.** A threshold not located at the extremity of a runway.

**Effective intensity.** The effective intensity of a flashing light is equal to the intensity of a fixed light of the same colour which will produce the same visual range under identical conditions of observation.

**Ellipsoid height (Geodetic height).** The height related to the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question.

**To ensure.** To make certain something takes place and to be able to convince the Competent Aviation Authority as such. In the case of internal (i.e. within the aerodrome operators organisation) processes and procedures, “ensuring” can be achieved through documents, records, procedures, manuals, supervision etc. In cases of other organisations/entities on the aerodrome, the aerodrome operator is expected to satisfy itself that its requirements are met, for example through contracts, service level agreements, aerodrome rules and regulations, audits, inspections, spot checks or other methods acceptable to the Competent Aviation Authority.

**Fixed light.** A light having constant luminous intensity when observed from a fixed point.

**Frangible object.** An object of low mass designed to break, distort or yield on impact so as to present the minimum hazard to aircraft.

**Geodetic datum.** A minimum set of parameters required to define location and orientation of the local reference system with respect to the global reference system/frame.

**Geoid.** The equipotential surface in the gravity field of the Earth which coincides with the undisturbed mean sea level (MSL) extended continuously through the continents.

**Geoid undulation.** The distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid.

**Gregorian calendar.** Calendar in general use; first introduced in 1582 to define a year that more closely approximates the tropical year than the Julian calendar (ISO 19108\*).

**Grooving.** Cuts made in the pavement surface with evenness, depth and spacing to enhance friction.

**Hazard beacon.** An aeronautical beacon used to designate a danger to air navigation.

**Heliport.** An aerodrome or a part thereof, designed

to be used wholly for the arrival, departure and surface movement of rotorcraft.

**Holding bay.** A defined area where aircraft can be held, or bypassed, to facilitate efficient surface movement of aircraft.

**Holdover time.** The estimated time the anti-icing fluid (treatment) will prevent the formation of ice and frost and the accumulation of snow on the protected (treated) surfaces of an aeroplane.

**Human Factors principles.** Principles which apply to aeronautical 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.

**Identification beacon.** An aeronautical beacon emitting a coded signal by means of which a particular point of reference can be identified.

**Independent parallel approaches.** Simultaneous approaches to parallel or near-parallel instrument runways where radar separation minima between aircraft on adjacent extended runway centre lines are not prescribed.

**Independent parallel departures.** Simultaneous departures from parallel or near-parallel instrument runways.

**Instrument aerodrome.** An aerodrome with one or more instrument runway or a heliport served by APV procedures.

**Instrument runway.** One of the following types of runways intended for the operation of aircraft using instrument approach procedures:

- a) Non-precision approach runway. An instrument runway served by visual aids and a non-visual aid providing at least directional guidance adequate for a straight-in approach.
- b) Precision approach runway, category 1. An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height not lower than 60 m (200 ft) and either a visibility not less than

800 m or a runway visual range not less than 550 m.

c) Precision approach runway, category II. An instrument runway served by ILS and/or MLS and visual aids intended for operations with a decision height lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not less than 350 m.

d) Precision approach runway, category III. An instrument runway served by ILS and/or MLS to and along the surface of the runway and:

A — intended for operations with a decision height lower than 30 m (100 ft), or no decision height and a runway visual range not less than 200 m.

B — intended for operations with a decision height lower than 15 m (50 ft), or no decision height and a runway visual range less than 200 m but not less than 50 m.

C — intended for operations with no decision height and no runway visual range limitations.

**Integrity (aeronautical data).** A degree of assurance that an aeronautical data and its value has not been lost nor altered since the data origination or authorized amendment.

**Intermediate holding position.** A designated position intended for traffic control at which taxiing aircraft and vehicles shall stop and hold until further cleared to proceed, when so instructed by the aerodrome control tower.

**Interoperability.** The possibility for an aircraft/aircrew to fly from place to place according to common rules devised to achieve for the necessary level of safety through provision of unambiguous information (e.g. publications, instructions, procedures, visual aids, etc.) to all users under all intended operational conditions.

**Landing area.** That part of a movement area intended for the landing or take-off of aircraft.

**Landing direction indicator.** A device to indicate visually the direction currently designated for landing and for take-off.

**Laser-beam critical flight zone (LCFZ).** Airspace in the proximity of an aerodrome but beyond the LFFZ where the irradiance is restricted to a level unlikely to cause glare effects.

**Laser-beam free flight zone (LFFZ).** Airspace in the

immediate proximity to the aerodrome where the irradiance is restricted to a level unlikely to cause any visual disruption.

**Laser-beam sensitive flight zone (LSFZ).** Airspace outside, and not necessarily contiguous with, the LFFZ and LCFZ where the irradiance is restricted to a level unlikely to cause flash-blindness or after-image effects.

**Lighting system reliability.** The probability that the complete installation operates within the specified tolerances and that the system is operationally usable.

**Manoeuvring area.** That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

**Marker.** An object displayed above ground level in order to indicate an obstacle or delineate a boundary.

**Marking.** A symbol or group of symbols displayed on the surface of the movement area in order to convey aeronautical information.

**Movement area.** That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, consisting of the manoeuvring area and the apron(s).

**Near-parallel runways.** Non-intersecting runways whose extended centre lines have an angle of convergence/divergence of 15 degrees or less.

**Non-instrument runway.** A runway intended for the operation of aircraft using visual approach procedures.

**Normal flight zone (NFZ).** Airspace not defined as LFFZ, LCFZ or LSFZ but which must be protected from laser radiation capable of causing biological damage to the eye.

**Obstacle.** All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that might create hazard to air operations and:

- a) are located on an area intended for the surface movement of aircraft; or
- b) stand or extend above a defined surface intended to protect aircraft in flight.

**Obstacle free zone (OFZ).** The airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than a low-mass and frangible mounted one

required for air navigation purposes.

**Orthometric height.** Height of a point related to the geoid, generally presented as art MSL elevation.

**Pavement classification number (PCN).** A number expressing the bearing strength of a pavement for unrestricted operations.

**Precision approach runway,** see Instrument runway.

**Primary run way(s).** Runway(s) used in preference to others whenever conditions permit.

**Protected flight zones.** Airspace specifically designated to mitigate the hazardous effects of laser radiation.

**Radio altimeter operating area.** Area defined for the use of landing aircraft radio altimeter. (Subpart F)

**Road.** An established surface route on the movement area meant for the exclusive use of vehicles.

**Road-holding position.** A designated position at which vehicles may be required to hold.

**Runway.** A defined rectangular area on a land aerodrome prepared for the landing and take-off of aircraft.

**Runway end safety area (RESA).** An area symmetrical about the extended runway centre line and adjacent to the end of the strip primarily intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway.

**Runway guard lights.** A light system intended to caution pilots or vehicle drivers that they are about to enter an active runway.

**Runway-holding position.** A designated position intended to protect a runway, an obstacle limitation surface, or an ILS/MLS critical/sensitive area at which taxiing aircraft and vehicles shall stop and hold, unless otherwise authorized by the aerodrome control tower.

**Runway strip.** A defined area including the runway and stopway, if provided, intended:

- a) to reduce the risk of damage to aircraft running off a runway; and

- b) to protect aircraft flying over it during take-off or landing operations.

**Runway turn pad.** A defined area on a land aerodrome adjacent to a runway for the purpose of completing a 180-degree turn on a runway.

**Runway visual range (RVR).** The range over which the pilot of an aircraft on the centre line of a runway can see the runway surface markings or the lights delineating the runway or identifying its centre line.

**Safety assessment.** A systematic, comprehensive evaluation of an implemented system to evaluate whether the safety requirements are met.

**Safety assurance documentation.** Documentation pertinent to systems (and procedures) which affect safety and consequently demonstrate that safety is achieved to an acceptable level.

**Safety audit.** An inspection activity encompassing a certificate holder's systems by the regulator or the aerodrome operator to ascertain fulfilment of requirements.

**Safety case.** A document based on a safety assessment and giving evidence, arguments and assumptions to show that system or equipment hazards have been identified and unacceptable risks mitigated, both in engineering and operational areas in order to meet safety requirements.

**Safety level.** A level how far safety is to be pursued in a given context, assessed with reference to an acceptable risk, based on current values of society.

**Safety management system.** A system for the management of safety at aerodromes, including the organizational structure, responsibilities, procedures, processes and provisions for the implementation of aerodrome safety policies by an aerodrome operator, which provides for monitoring and continuous improvement of safety at, and the safe use of, the aerodrome.

**Safety objective.** The planned and considered goal that has been set by a design or project authority.

**Safety performance indicator.** A specific parameter or indicator which can be used to assess the level of safety.

**Segregated parallel operations.** Simultaneous operations on parallel or near-parallel instrument runways in which one runway is used exclusively for approaches and the other runway is used exclusively for departures.

**Service provider.** The production entities within the aviation community operating or delivering services.

**Shoulder.** An area adjacent to the edge of a pavement so prepared as to provide a transition between the pavement and the adjacent surface for aircraft running off the pavement and to prevent aircraft damages by ingestion and jet blast.

**Sign.**

- a) Fixed message sign. A sign presenting only one message.
- b) Variable message sign. A sign capable of presenting several pre-determined messages or no message, as applicable.

**Signal area.** An area on an aerodrome used for the display of ground signals.

**Slush.** Water-saturated snow which with a heel-and-toe slap-down motion against the ground will be displaced with a splatter; specific gravity: 0.5 up to 0.8.

**Snow (on the ground).**

- a) Dry snow. Snow which can be blown if loose or, if compacted by hand, will fail apart again upon release; specific gravity: up to but not including 0.35.
- b) Wet snow. Snow which, if compacted by hand, will stick together and tend to or form a snowball; specific gravity: 0.35 up to but not including 0.5.
- c) Compacted snow. Snow which has been compressed into a solid mass that resists further compression and will hold together or break up into lumps if picked up; specific gravity: 0.5 and over.

**Station declination.** An alignment variation between the zero degree radial of a VOR and true north, determined at the time the VOR station is calibrated.

**Stopway.** A defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in the case of an abandoned take off.

**Switch-over time (light).** The time required for the actual intensity of a light measured in a given direction to fall from 50 per cent and recover to 50 per cent during a power supply changeover, when the light is being operated at intensities of 25 per cent or above.

**Take-off runway.** A runway intended for take-off only.

**Taxiway.** A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link between one part of the aerodrome and another, including:

- a) Aircraft stand taxilane. A portion of an apron designated as a taxiway and intended to provide access to aircraft stands only.
- b) Apron taxiway. A portion of a taxiway system located on an apron and intended to provide a through taxi route across the apron.
- c) Rapid exit taxiway. A taxiway connected to a runway at an acute angle and designed to allow landing aeroplanes to turn off at higher speeds than are achieved on other exit taxiways thereby minimizing runway occupancy times.

**Taxiway intersection.** A junction of two or more taxiways.

**Taxiway shoulder.** An area adjacent to the edge of the taxiway so prepared as to provide a transition between the pavement and the adjacent surface for aircraft running off the pavement and to prevent damages by ingestion and jet blast.

**Taxiway strip.** An area including a taxiway intended to protect an aircraft operating on the taxiway.

**Taxiway strip graded area.** an area within a taxiway strip intended to reduce the risk of damage to an aircraft accidentally run off the taxiway.

**Threshold.** The beginning of that portion of the runway usable for landing.

**Touchdown zone.** The portion of a runway, beyond the threshold, where it is intended landing aeroplanes first contact the runway.

**Usability factor.** The percentage of time during which the use of a runway or system of runways is not restricted because of the cross-wind component.

## **APPLICABILITY**

### **SECTION 1**

#### **GAR 1.Z001 Scope**

The Aerodromes Regulation lay down the requirements for the certification of aerodromes.

#### **GAR 1.Z005 Aerodromes required to be certified**

The Competent Aviation Authority shall certify an aerodrome in accordance with the Aerodromes Regulation if that aerodrome is used for the take-off and landing of aircraft on civil commercial air transport operations.

*For Future Work Programme: consider extension to “or intended for IFR-operations” and also consider introducing a bottom line for application and extension to “aerodromes open for public use”.*

## **COMMON REFERENCE SYSTEMS**

#### **GAR 1.Z010 Horizontal reference system**

World Geodetic System — 1984 (WGS-84) shall be used as the horizontal (geodetic) reference system. Reported aeronautical geographical coordinates (indicating latitude and longitude) shall be expressed in terms of the WGS-84 geodetic reference datum.

#### **GAR 1.Z015 Vertical reference system**

Mean sea level (MSL) datum, which gives the relationship of gravity-related height (elevation) to a surface known as the geoid, shall be used as the vertical reference system.

#### **GAR 1.Z020 Temporal reference system**

The Gregorian calendar and Coordinated Universal Time (UTC) shall be used as the temporal reference system.

#### **GAR 1.Z025 Use of colour**

Wherever a colour is referred to in this Annex, the specifications for that colour given in Appendix 1 shall apply.

## **INFRASTRUCTURE REFERENCE CODE**

### **GAR 1.Z030**

An infrastructure reference code — code number and letter — which is selected for aerodrome planning purposes shall be determined in accordance with the characteristics of the aeroplane for which an aerodrome facility is intended.

### **GAR 1.Z035**

The infrastructure reference code numbers and letters shall have the meanings assigned to them in Table 1-1.

### **GAR 1.Z040**

The code number for element 1 shall be determined from Table 1-1, column 1, selecting the code number corresponding to the highest value of the aeroplane reference field lengths of the aeroplanes for which the runway is intended.

### **GAR 1.Z045**

The code letter for element 2 shall be determined from Table 1-1, column 3, by selecting the code letter which corresponds to the greatest wing span, or the greatest outer main gear wheel span, whichever gives the more demanding code letter of the aeroplanes for which the facility is intended.

Table 1-1. Aerodrome reference code  
(see 1.7.2 to 1.7.4)

Code number (1)	Code element 1		Code element 2	
	Aeroplane reference field length (2)	Code letter (3)	Wing span (4)	Outer main gear wheel span <sup>a</sup> (5)
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4.5 m
2	800 m up to but not including 1 200 m	B	15 m up to but not including 24 m	4.5 m up to but not including 6 m
3	1 200 m up to but not including 1 800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m
4	1 800 m and over	D	36 m up to but not including 52 m	9 m up to but not including 14 m
		E	52 m up to but not including 65 m	9 m up to but not including 14 m
		F	65 m up to but not including 80 m	14 m up to but not including 16 m

a. Distance between the outside edges of the main gear wheels.

*Note.— Guidance on planning for aeroplanes with wing spans greater than 80 m is given in the Aerodrome Design Manual (Doc 9157), Parts 1 and 2.*

## SECTION 2

### APPLICABILITY

#### **GAR AMC 1.Z005 Scope**

In addition to civil aerodromes the Aerodrome Regulation applies to military aerodromes open to civil use.

#### **GAR IEM 1.Z005 Scope**

The Aerodromes Regulation does not apply to water aerodromes, heliports and helidecks.

*For Future Work Programme: to be amended when heliports are dealt with.*

## **INFRASTRUCTURE REFERENCE CODE**

### **GAR IEM 1.Z030 infrastructure reference code**

The intent of the reference code is to provide a simple method for interrelating the numerous specifications concerning the characteristics of aerodromes so as to provide a series of aerodrome facilities that are suitable for the aeroplanes that are intended to operate at the aerodrome. The code is not intended to be used for determining runway length or pavement strength requirements. The reason for having an infrastructure reference code lies in the fact that aerodrome infrastructure comprises different infrastructure parts such as different sizes of runways, taxiways and aprons which are designed to accommodate different types of critical aircraft dimensions. The infrastructure reference code covers all possibilities to publish the correct situation to aircraft operators.

The code is composed of two elements, which are related to the aeroplane performance characteristics and dimensions. Element 1 is a number based on the aeroplane reference field length and element 2 is a letter based on the aeroplane wing span and outer main gear wheel span. A particular specification is related to the more appropriate of the two elements of the code or to an appropriate combination of the two code elements. The code letter or number within an element selected for design purposes is related to the critical aeroplane characteristics for which the facility is provided. When applying Annex 14, Volume 1, the aeroplanes which the aerodrome is intended to serve are first identified and then the two elements of the code.