Draft Annex X to ED Decision 201X/XXX/R

'Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Annex III (Part-ADR-OR) to Regulation (EU) No 139/2014 on organisation requirements — aerodrome operators'

Annex III to ED Decision 2014/012/R is amended as follows:

The text of the amendment is arranged to show deleted text, new or amended text as shown below:

— deleted text is ~~struck through~~;

— new or amended text is highlighted in grey;

— an ellipsis '(…)' indicates that the rest of the text is unchanged.

1. AMC1 ADR.OR.D.007(b) is deleted:

~~**AMC1 ADR.OR.D.007(b) Management of aeronautical data and aeronautical information**~~
~~SECURITY MANAGEMENT FOR AERONAUTICAL DATA AND AERONAUTICAL INFORMATION PROVISION ACTIVITIES~~

~~(a) The security management objectives should be:~~

~~(1) to ensure the security of aeronautical data and aeronautical information received, produced, or otherwise employed so that it is protected from interference, and access to it is restricted only to those authorised; and~~

~~(2) to ensure that the security management measures meet appropriate national, EU, or international requirements for critical infrastructure and business continuity, and international standards for security management, including:~~

~~(i) ISO/IEC 17799:2005 — Information technology — Security techniques — Code of practice for information security management;~~

~~(ii) ISO 28000:2007: — Specification for security management systems for the supply chain.~~

~~(b) Regarding the ISO standards, the relevant certificates issued by an appropriately accredited organisation, are considered as an Acceptable Means of Compliance.~~

2. GM1 ADR.OR.D.007(b) is added as follows:

GM1 ADR.OR.D.007(b) Management of aeronautical data and aeronautical information
INFORMATION SECURITY THREAT

Information security threat may be any circumstance or event with the potential to adversely impact the operation, systems and/or constituents due to human action (accidental, casual or purposeful, intentional or unintentional, mistaken) resulting from unauthorised access, use, disclosure, denial, disruption, modification, or destruction of information and/or information system interfaces. This should include malware and the effects of external systems on dependent systems, but does not include physical threats.

3. AMC1 ADR.OPS.A.010 is amended as follows:

AMC1 ADR.OPS.010 Data quality requirements
GENERAL REQUIREMENTS

~~(a) The integrity of aeronautical data should be maintained throughout the data process from survey/origin to the next intended user. Based on the applicable integrity classification, the validation and verification procedures should:~~

~~(1) for routine data: avoid corruption throughout the processing of the data;~~

~~(2) for essential data: assure corruption does not occur at any stage of the entire process and may include additional processes as needed to address potential risks in the overall system architecture to further assure data integrity at this level; and~~

~~(3) for critical data: assure corruption does not occur at any stage of the entire process and include additional integrity assurance procedures to fully mitigate the effect of faults identified by thorough analysis of the overall system architecture as potential data integrity risks.~~

~~(b) The aerodrome operator should determine and report aerodrome-related aeronautical data in accordance with the accuracy and integrity requirements set in the following tables:~~

~~**Latitude and longitude**~~	~~**Accuracy**~~ ~~**Data Type**~~	~~**Integrity**~~ ~~**Classification**~~
~~Aerodrome reference point~~	~~30 m~~ ~~surveyed/calculated~~	~~routine~~
~~Navaids located at the aerodrome~~	~~3 m~~ ~~surveyed~~	~~essential~~
~~Obstacles in Area 3~~	~~0.5 m~~ ~~surveyed~~	~~essential~~
~~Obstacles in Area 2 (the part within the aerodrome boundary)~~	~~5 m~~ ~~surveyed~~	~~essential~~
~~Runway thresholds~~	~~0.3 m~~ ~~surveyed~~	~~critical~~
~~Runway end (flight path alignment point)~~	~~1 m~~ ~~surveyed~~	~~critical~~
~~Runway centre line points~~	~~1 m~~ ~~surveyed~~	~~critical~~
~~Runway holding position~~	~~0.5 m~~ ~~surveyed~~	~~critical~~
~~Taxiway centre line/parking guidance line points~~	~~0.5 m~~ ~~surveyed~~	~~essential~~
~~Taxiway intersection marking line~~	~~0.5 m~~ ~~surveyed~~	~~essential~~

Exit guidance line	0.5 m surveyed	essential
Apron boundaries (polygon)	1 m surveyed	routine
De-icing/anti-icing facility (polygon)	1 m surveyed	routine
Aircraft stand points/INS checkpoints	0.5 m surveyed	routine

Table 1 – Latitude and longitude

Elevation/altitude/height	**Accuracy Data type**	**Integrity Classification**
Aerodrome elevation	0.5 m surveyed	essential
WGS-84 geoid undulation at aerodrome elevation position	0.5 m surveyed	essential
Runway threshold, non-precision approaches	0.5 m surveyed	essential
WGS-84 geoid undulation at runway threshold, non-precision approaches	0.5 m surveyed	essential
Runway threshold, precision approaches	0.25 m surveyed	critical
WGS-84 geoid undulation at runway threshold, precision approaches	0.25 m surveyed	critical
Runway centre line points	0.25 m surveyed	critical
Taxiway centre line/parking guidance line points	1 m surveyed	essential
Obstacles in Area 2 (the part within the aerodrome boundary)	3 m surveyed	essential
Obstacles in Area 3	0.5 m surveyed	essential
Distance measuring equipment/precision (DME/P)	3 m surveyed	essential

Table 2 – Elevation/Altitude/Height

Declination/variation	**Accuracy Data type**	**Integrity Classification**

VHF Navaid Station Declination	1 degree surveyed	essential
Aerodrome magnetic variation	1 degree surveyed	essential
ILS localizer antenna magnetic variation	1 degree surveyed	essential
MLS azimuth antenna magnetic variation	1 degree surveyed	essential

Table 3 – Declination and magnetic variation

Bearing	**Accuracy** **Data type**	**Integrity** **Classification**
ILS localizer alignment	1/100 degree surveyed	essential
MLS zero azimuth alignment	1/100 degree surveyed	essential
Runway bearing (True)	1/100 degree surveyed	routine

Table 4 - Bearing

Length/distance/dimension	**Accuracy** **Data type**	**Integrity** **Classification**
Runway length	1 m surveyed	critical
Runway width	1 m surveyed	essential
Displaced threshold distance	1 m surveyed	routine
Stopway length and width	1 m surveyed	critical
Clearway length and width	1 m surveyed	essential
Landing distance available	1 m surveyed	critical
Take-off run available	1 m surveyed	critical
Take-off distance available	1 m surveyed	critical
Accelerate-stop distance available	1 m surveyed	critical
Runway shoulder width	1 m surveyed	essential

~~Taxiway width~~	~~1 m surveyed~~	~~essential~~
~~Taxiway shoulder width~~	~~1 m surveyed~~	~~essential~~
~~ILS localizer antenna-runway end, distance~~	~~3 m calculated~~	~~routine~~
~~ILS glide slope antenna-threshold, distance along centre line~~	~~3 m calculated~~	~~routine~~
~~ILS marker-threshold distance~~	~~3 m calculated~~	~~essential~~
~~ILS DME antenna-threshold, distance along centre line~~	~~3 m calculated~~	~~essential~~
~~MLS azimuth antenna-runway end, distance~~	~~3 m calculated~~	~~routine~~
~~MLS elevation antenna-threshold, distance along centre line~~	~~3 m calculated~~	~~routine~~
~~MLS DME/P antenna-threshold, distance along centre line~~	~~3 m calculated~~	~~essential~~

~~Table 5 – Length/distance/dimension~~

~~(c) Accuracy requirements for aeronautical data should be based upon a 95 % confidence level and, in that respect, three types of positional data should be identified: surveyed points (e.g. runway threshold), calculated points (mathematical calculations from the known surveyed points of points in space, fixes) and declared points (e.g. flight information region boundary points).~~

~~(d)~~

~~(g) Protection of electronic aeronautical data while stored or in transit, should be totally monitored by the cyclic redundancy check (CRC). To achieve protection of the integrity level of critical, and essential aeronautical data as classified in (a)(1) and (a)(2) above, a 32- or 24-bit CRC algorithm should apply respectively.~~

~~(h) To achieve protection of the integrity level of routine aeronautical data as classified in (a)(3) above, a 16-bit CRC algorithm should apply.~~

~~(i)~~(a) The aerodrome operator should implement the procedures to:

(1) monitor data relevant to the aerodrome and available services originating from the aerodrome operator, and promulgated by the relevant air traffic services providers;

(2) notify the relevant aeronautical information services, and air traffic services providers of any changes necessary to ensure correct and complete data relevant to the aerodrome, and available services.

~~(j)~~(b) Where processes or parts of processes used in the origination, production, storage, handling, processing, transfer and distribution of aeronautical data and aeronautical information are subject to automation they should be:

(1) automated to a level commensurate with the context of the data process;

(2) automated to optimise the allocation and interaction of human and machine to achieve a high degree of safety and quality benefits of the process;

(3) designed to avoid the introduction of data errors; and

(4) designed to detect errors in received/input data.

4. AMC2 ADR.OPS.A.010 is amended as follows:

AMC2 ADR.OPS.010 Data quality requirements
FORMAL ARRANGEMENTS

(…)

(b) Content of formal arrangements

Such formal arrangements should include the following minimum content:

(1) the ~~scope of~~ aeronautical data ~~or aeronautical information~~ to be provided;

(2) the quality requirements for each data item supplied according to the aeronautical data catalogue;

(3) the ~~required~~ method(s) for demonstrating that the data provided conforms with the specified requirements;

(4) the ~~nature of~~ action to be taken in the event of discovery of a data error or inconsistency in any data provided;

(5) the following minimum criteria for notification of data changes:

(i) criteria for determining the timeliness of data provision based on the operational or safety significance of the change;

(ii) any prior notice of expected changes; and

(iii) the means to be adopted for notification;

(6) the party responsible for documenting data changes;

(7) ~~the means to resolve any potential ambiguities caused where different formats are used to~~ data exchange details such as format or format change processes ~~aeronautical data or aeronautical information~~;

(8) any limitations on the use of data;

(9) requirements for the production of data origination quality reports ~~by data providers to facilitate verification of data quality by the data users;~~

(10) metadata to be provided ~~requirements~~; and

(11) contingency requirements concerning the continuity of data provision.

(…)

5. AMC3 ADR.OPS.A.010 is inserted as follows:

AMC3 ADR.OPS.010 Data quality requirements
CONTRACTED ACTIVITIES

In case of contracted activities to external organisations for the origination of aeronautical data and aeronautical information, data origination requirements for such organisations are to be found in ATM/ANS.OR.085 of Annex III of Commission Implementing Regulation (EU) 2017/373.

6. GM2 ADR.OPS.A.010 is inserted as follows:

GM2 ADR.OPS.A.010 Data quality requirements
DISTRIBUTION OF AERONAUTICAL INFORMATION

The obligation to comply with the relevant provisions of ADR.OPS.A.010 (Data quality requirements) shall not inhibit the urgent distribution of aeronautical information necessary to ensure the safety of flight. It is recognised that, in this case, it is not always possible to comply with all the relevant provisions. However, it is also not possible to determine a priori in all cases where this exception may apply, hence this shall be dependent on a case by case individual assessment made by competent staff.

7. GM1 ADR.OPS.A.020(a) is inserted as follows:

GM1 ADR.OPS.A.020(a) Common reference systems
HORIZONTAL REFERENCE SYSTEM — WGS-84

A reference system provides a definition of a co-ordinate system in terms of the position of an origin in space, the orientation of an orthogonal set of Cartesian axes, and a scale. A terrestrial reference system defines a spatial reference system in which positions of points anchored on the Earth's solid surface have coordinates. Examples are: WGS-84, ITRS/European Terrestrial Reference System (ETRS) and national reference systems.

WGS-84 defines, inter alia, a conventional terrestrial reference system, a reference frame and a reference ellipsoid. WGS-84 is currently the reference system ICAO requires for geo-referencing aeronautical information.

Further explanation and guidance may be found in Annex B (Horizontal reference systems) to EUROCONTROL Specifications for the Origination of Aeronautical Data, Volume 2: Guidance material (EUROCONTROL-SPEC-154, Edition 1.0 of 04/02/2013).

8. GM2 ADR.OPS.A.020(a) is inserted as follows:

GM2 ADR.OPS.A.020(a) Common reference systems
TEMPORARY NON-COMPLIANCE OF GEOGRAPHICAL CO-ORDINATES

In those particular cases where geographical co-ordinates have been transformed into WGS-84 coordinates by mathematical means and whose accuracy of original field work does not meet the applicable requirements contained in the aeronautical data catalogue, they should be identified until the time when they can be compliant.

9. AMC1 ADR.OPS.A.020(b) is inserted as follows:

AMC1 ADR.OPS.A.020(b) Common reference systems
VERTICAL REFERENCE SYSTEM

(a) An aerodrome operator should use the Earth Gravitational Model — 1996 (EGM-96), as the global gravity model.

(b) When a geoid model other than the EGM-96 model is used, a description of the model used, including the parameters required for height transformation between the model and EGM-96, should be provided in the AIP.

10. GM1 ADR.OPS.A.020(b) is inserted as follows:

GM1 ADR.OPS.A.020(b) Common reference systems
VERTICAL REFERENCE SYSTEM

Further explanation and guidance may be found in Annex C (Vertical reference systems) to EUROCONTROL Specifications for the Origination of Aeronautical Data, Volume 2 (EUROCONTROL-SPEC-154, Edition 1.0 of 04/02/2013).

11. GM2 ADR.OPS.A.020(b) is inserted as follows:

GM2 ADR.OPS.A.020(b) Common reference systems
MEAN SEA LEVEL

(a) The geoid globally most closely approximates MSL. It is defined as the equipotential surface in the gravity field of the Earth which coincides with the undisturbed MSL extended continuously through the continents.

(b) Gravity-related heights (elevations) are also referred to as 'orthometric heights', while distances of points above the ellipsoid are referred to as 'ellipsoidal heights'.

(c) Global and local geoids differ in their origin: global geoids consider only the long- and middle-wave part of the Earth's gravity field, whilst local geoids also consider the short-wave part of the gravity field. Global geoids are used when consistent orthometric heights, over long distances (continent or earth surveying), are required. Currently, the world's best global geoid model is EGM 200846. It was determined using satellite tracking, gravity anomalies and satellite altimetry. Its accuracy is in the range of ± 0.05 m (oceans) and ± 0.5 m (on land). This accuracy is higher in flat regions than in topographically mountainous terrain, such as the Alps.

(d) For local engineering applications and cadastre-surveying, global geoids are not as accurate as needed. For such applications, local geoid models are calculated. These can only be developed using local field measurements. They offer centimetre accuracy over several hundred kilometres, with a high resolution. Local geoids are not suitable for height comparison over large distances since they are based on different origins and reference heights (different equipotential levels).

Further explanation and guidance may be found in Annex C (Vertical reference systems) to EUROCONTROL Specifications for the Origination of Aeronautical Data, Volume 2: Guidance material (EUROCONTROL-SPEC-154, Edition 1.0 of 04/02/2013).

12. GM1 ADR.OPS.A.020(c) is inserted as follows:

GM1 ADR.OPS.A.020(c) Common reference systems
TEMPORAL REFERENCE SYSTEM

(a) A value in the time domain is a temporal position measured relative to a temporal reference system.

(b) ISO Standard 8601 specifies the use of the Gregorian calendar and 24-hour local or UTC for information interchange, while ISO Standard 19108 prescribes the Gregorian calendar and UTC as the primary temporal reference system for use with geographic information.

13. GM1 ADR.OPS.A.025 is inserted as follows:

GM1 ADR.OPS.A.025 Data error detection and authentication
DEFINING DATA SECURITY REQUIREMENTS

(a) Transmission of data via electronic/digital means (e.g. file transfer protocol (FTP) sites, web downloads, or email) may be subject to malicious attack that can corrupt the integrity of data for its intended use. Provision of means to mitigate the intentional corruption of digitally transmitted data may already exist within the organisational construct and operating procedures of participating entities. This section provides requirements to address data security.

(b) The objective of data security is to ensure that data is received from a known source and that there is no intentional corruption during processing and exchange of data.

(c) Records shall be maintained to show what data security provisions have been implemented.

(d) Provisions supporting this objective may include:

(1) implementation of technical data security measures to provide authentication and prevent intentional corruption during exchange of data (e.g. secure hashes, secure transmissions, digital signatures); and

(2) Implementation of organisational data security measures to protect processing resources and prevent intentional corruption during processing of data.

14. GM2 ADR.OPS.A.025 is inserted as follows:

GM2 ADR.OPS.A.025 Data error detection and authentication
DATA PROCESSING

More explanation and guidance may be found in Appendix C (Guidance on compliance with data processing requirements) of EUROCAE ED-76A.

15. GM1 ADR.OPS.A.030 is inserted as follows:

GM1 ADR.OPS.A.030 Aeronautical Data Catalogue
GENERAL

The aeronautical data catalogue presents the scope of data that can be collected and maintained by the aeronautical information services providers and provides a common terminology that can be used by data originators and service providers.

16. AMC1 ADR.OPS.A.035 is inserted as follows:

AMC1 ADR.OPS.A.035 Data verification and validation
GENERAL

(a) The processes should define the means used to:

(1) confirm that the data has been received without corruption;

(2) ensure that stored data is protected from corruption; and

(3) confirm that originated data has not been corrupted prior to being stored.

(b) The processes should define the:

(1) actions to be taken when data fails a verification or validation check;

(2) tools required for the verification and validation process;

(3) methods used to verify received data;

(4) methods by which data quality is preserved;

17. GM1 ADR.OPS.A.035 is inserted as follows:

GM1 ADR.OPS.A.035 Data verification and validation
DATA PROCESSING

(a) Validation

(1) Validation is the activity where a data element is checked as having a value that is fully applicable to the identity ascribed to the data element, or where a set of data elements are checked as being acceptable for their intended use.

(2) The application of validation techniques considers the entire aeronautical data chain. This includes the validation performed by prior data chain participants and any requirements levied on the data supplier.

(3) Examples of validation techniques include:

(i) Validation by application

One method of validation is to apply data under test conditions. In certain cases, this may not be practical. Validation by application is considered to be the most effective form of validation. For example, flight inspection of final approach segment data prior to publication can be used to ensure that the published data is acceptable.

(ii) Logical consistency

Logical consistency validates by comparing two different data sets or elements and identifying inconsistencies between values based on operative rules (e.g. business rules).

(iii) Semantic consistency

Semantic consistency validates by comparing data to an expected value or range of values for the data characteristics.

(iv) Validation by sampling

Validation by sampling evaluates a representative sample of data and applies statistical analysis to determine the confidence in the data quality.

(b) Verification

(1) Verification is a process for checking the integrity of a data element whereby the data element is compared to another source, either from a different process or from a different point in the same process. While verification cannot ensure that the data is correct, it can be effective to ensure that the data has not been corrupted by the data process.

(2) The application of verification techniques considers only the portion of the aeronautical data chain controlled by the organisation. Yet, verification techniques may be applied at multiple phases of the data processing chain.

(3) Examples of verification techniques include:

(i) Feedback

Feedback testing is the comparison between the output and input state of a data set.

(ii) Independent redundancy

Independent redundancy testing involves processing the same data through two or more independent processes and comparing the data output of each process.

(iii) Update comparison

Updated data can be compared to its previous version. This comparison can identify all data elements that have changed. The list of changed elements can then be compared to a similar list generated by the supplier. A problem can be detected if an element is identified as changed on one list and not on the other.

18. GM2 ADR.OPS.A.035 is inserted as follows:

GM2 ADR.OPS.A.035 Data verification and validation
DATA PROTECTION

(a) Protection of electronic aeronautical data while stored or in transit, should be totally monitored by the cyclic redundancy check (CRC).

(b) To achieve protection of the integrity level of critical, and essential aeronautical data as classified in (a)(1) and (a)(2) above, a 32- or 24-bit CRC algorithm should apply respectively.

(c) To achieve protection of the integrity level of routine aeronautical data as classified in (a)(3) above, a 16-bit CRC algorithm should apply.

19. GM1 ADR.OPS.A.040 is inserted as follows:

GM1 ADR.OPS.A.40 Error handling requirements
GENERAL

(a) The term 'error' is understood as being defective, degraded, lost, misplaced or corrupted data elements, or data elements not meeting stated quality requirements.

(b) Guidance on how to detect, identify, report and address/resolve aeronautical data errors may be found in EUROCAE ED-76A, 'Standards for processing aeronautical data', June 2015.

20. GM1 ADR.OPS.045 is added as follows:

GM1 ADR.OPS.045 Meta data
IDENTIFICATION

[Placeholder]