AERONAUTICAL INFORMATION SERVICES-AERONAUTICAL INFORMATION MANAGEMENT STUDY GROUP (AIS-AIMSG)

FIRST MEETING

Montréal, 2 to 4 December 2008

SUMMARY OF DISCUSSIONS

1. HISTORICAL

1.1 The first meeting of the Aeronautical Information Services-Aeronautical Information Management Study Group (AIS-AIMSG) was held at the International Civil Aviation Organization (ICAO) Headquarters in Montréal, Canada, 2 to 4 December 2008.

1.2 The meeting was opened by Dr. Olli M. Turpeinen, Chief, Meteorology and Aeronautical Information Management Section (MET/AIM) on behalf of the Director of the Air Navigation Bureau of ICAO who welcomed the group to Montréal. He briefed the group on the ICAO Annex amendment process and on the working methods and responsibilities of ICAO study groups.

1.3 The names and addresses of the participants are listed in Appendix A. Mr. Paul Bosman was elected Chairman of the meeting. It was suggested that the chairmanship of future meetings be rotated through the members of the various regions represented. The meeting was served by the Secretary of the AIS-AIMSG, David Lewtas, Chief, Aeronautical Information Unit (C/AINF), MET/AIM, of the Air Navigation Bureau (ANB) who was assisted by Jean-Michel Galais, Technical Officer, AINF.

1.4 The meeting considered the following agenda items.

Agenda Item 1: **Opening of the meeting**

Agenda Item 2: **Election of Chairman**

Agenda Item 3: **Adoption of working arrangements**

Agenda Item 4: **Adoption of the agenda**

Agenda Item 5: **Review of the tasks of the study group**

Agenda Item 6: **AIS to AIM transition roadmap**

Agenda Item 7: **Annex amendment proposals**

7.1 Terrain and obstacle data and airport mapping data bases

7.2 AICM/AIXM

7.3 eAIP

7.4 Quality

7.5 Miscellaneous

Agenda Item 8: Guidance material

8.1 Terrain and obstacle data and airport mapping data bases

8.2 AICM/AIXM

8.3 eAIP

8.4 Training

8.5 Quality

8.6 Miscellaneous

Agenda Item 9: Legal and institutional issues

Agenda Item 10: Interoperability with meteorological products and services

Agenda Item 11: Future work programme of the group

Agenda Item 12: Any other business

1.5 A list of study notes and information papers issued for the meeting is given at Appendix B.

2. AGENDA ITEMS 1 TO 4: OPENING OF THE MEETING ELECTION OF CHAIRMAN; ADOPTION OF WORKING ARRANGEMENTS; ADOPTION OF THE AGENDA

2.1 These items are covered under Section 1: Historical.

3. AGENDA ITEM 5: REVIEW OF THE TASKS OF THE STUDY GROUP

3.1 The group noted that the ANC had tasked the Secretariat to progress the following issues with the assistance of the AIS-AIMSG:

a) a global strategy/roadmap for the transition from AIS to AIM;

b) Standards and Recommended Practices (SARPs) and guidance material related to the provision of a standard aeronautical information conceptual model and standard aeronautical information exchange model to enable the global exchange of data in digital format; and definition of a means to allow the further evolution of these models in a managed and supportable manner;

c) SARPs and guidance material related to an appropriate presentation of digital aeronautical information to the end user, including eAIP, electronic charts and use of geographic information systems (GIS) within the context of AIM;

d) guidance material and further development of SARPs related to the quality system to support AIM;

e) review of SARPs and guidance material related to electronic terrain and obstacle data to determine if refinement of SARPs or additional guidance material is necessary;

f) guidance and training material related to staffing and training for the transition from AIS to AIM; and

g) development of a proposed work plan to consider key legal and institutional issues raised during the Worldwide Symposium on Enabling the Net-Centric Information Environment (Montreal, 2 to 4 June 2008).

3.2 The group was aware that timelines for these tasks would need to be developed to meet target dates for upcoming and future amendments to Annex 15 — *Aeronautical Information Services* and Annex 4 — *Aeronautical Charts* in 2010 and 2013.

4. AGENDA ITEM 6: AIS TO AIM TRANSITION ROADMAP

4.1 One of the most urgent tasks of the group was to develop a roadmap for the transition from AIS to AIM. The roadmap is intended to provide a framework for States to use in their evolution towards AIM, and to clarify the purpose and scope of the transition. It was emphasized that the purpose of the roadmap was to define a general road ahead and areas of work.

4.2 No comments were received on draft roadmap which was distributed in advance of the meeting on 12 November 2008. Additional general information was provided in a study note related to including AIM in Annex 15.

4.3 The group considered that the draft roadmap provided a good starting point. The following improvements were proposed:

a) that the term "AIM" be defined in the roadmap, along the lines of the definition for ATM in the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444), as follows:

The dynamic, integrated management of aeronautical information services — safely, economically and efficiently — through the provision and exchange of quality assured digital aeronautical data in collaboration with all parties.

b) that a diagram with timelines be included which clearly shows the two dimensions of the transition, one being the development of SARPs and the other the implementation of those SARPs;

c) that Part 2 would explain States' responsibilities and the consequences to States of not implementing the transition;

d) that Part 2 would be reviewed, replacing the term “projects” with the term “areas of activities” and put in an appropriate context;

e) that Part 3 would include background on the applicability dates of the transiton;

f) that the future AIM take into account the performance-based approach of ATM;

g) that a diagram clarifying the positioning of AIM as a central enabler of the future ATM network be included;

h) that the draft roadmap be reviewed to ensure consistent use of the terms “information” and “data”;

i) that the role of AIM be better defined in the roadmap in relation to the other ATM components;

j) that a diagram showing the four models of the enterprise architecture framework (performance goal, business service, information exchange and standards) be included; and

k) that the draft roadmap include the principle that SARPs will not be predicated on specific technology.

4.3.1 The group then agreed to the following actions:

Action agreed 1/1 — Draft Roadmap for the Transition from AIS to AIM

That the draft *Roadmap for the Transition from AIS to AIM*, together with the amendments agreed during the meeting, be endorsed by the group.

Action agreed 1/2 — Finalization of the Roadmap for the transition from AIS to AIM

That:

a) further comments on the revised roadmap be provided by 19 December 2008 through correspondence; and;

b) these comments be incorporated by the Secretariat for final review by the group before submission to the Air Navigation Commission in February 2009.

4.4 The group discussed how the roadmap would be distributed to States. Subsequent to consideration of the roadmap by the Air Navigation Commission in February 2009, it was intended that the roadmap be placed on the ICAO public website in English. At the same time, the roadmap should be sent for translation in ICAO languages for future inclusion on the ICAO public website.

4.5 The group discussed the enterprise architecture framework. Elements related to the roadmap agreed by the group are covered in paragraph 4.3 above. The following action was agreed:

Action agreed 1/3 — Consideration of the ATM operational concept

That the group endorse the concept of a systematic assessment of the global ATM operational concept to ensure all AIM requirements are included in the future amendments to Annex 15.

5. AGENDA ITEM 7: ANNEX AMENDMENT PROPOSALS

5.1 Agenda Item 7.1: Annex amendment — Terrain and obstacle data and airport mapping data bases

5.1.1 The group was made aware of the content and need for aerodrome mapping data, generally referred to as AMDB, including applications that are dependent on accurate, reliable and up-to-date AMDB data. The group considered that consistent AMDB for multiple applications required common industry standards, which have been developed by the joint EUROCAE/RTCA Committee WG44 / SC193 (currently SC217). It was noted that specifications for AMDBs have also been introduced into AIXM version 5 and that there was close, however, not complete compatibility between the above standards.

5.1.2 The group considered that it would be appropriate to tie the recommendations for the generation of AMDB data to provisions related to eTOD in Chapter 10 of Annex 15, especially since Area 3 requirements were closely linked to the AMDB requirements. It was proposed to make the provision of AMDB non-mandatory. However, in cases where the opportunity existed for States to provide AMDBs, such provision should then be compliant with the SARPs related to AMDB.

5.1.3 It was envisaged that changes may be applicable to Annex 14 — *Aerodromes*, including insertion of the AMDB specifications into a new paragraph in Chapter 2 — *Aerodrome Data*, and in aeronautical industry standard ED 99/DO 272 essential requirements. AMDB Application Schema were to be considered in a new Appendix to Annex 14 (ED 119/DO 291).

5.1.4 It was considered that changes to Annex 15 may involve insertion of a new paragraph in Chapter 10 of Annex 15 to explain the objectives, the link to eTOD and reference the specifications of Annex 14. Meanwhile, changes to Annex 4 may relate to the insertion of a reference in Chapter 13 (Aerodrome Chart) which would refer to the specifications in Annex 14. The following action was agreed by the group:

Action agreed 1/4 — Aerodrome mapping databases

That **Stéphane (Rapporteur)**:

a) act as a liaison with the joint EUROCAE/RTCA Committee WG44/SC217 to develop a draft proposal to integrate aerodrome mapping databases into Annexes 4, 14 and 15 provisions while maintaining compatibility with the AIXM; and

b) submit the draft proposed for consideration by the group at the AIS-AIMSG/2 meeting.

5.1.5 The group noted that Amendment 33 to Annex 15 introduced requirements for States to provide terrain and obstacle data. The group also noted that given constraining time frames (2008-2010),

the lack of resources and survey equipment, fragmented responsibilities, ambiguities in requirements and the costs for compliance, the requirements had caused significant concern in States and raised the possibility of a lack of compliance.

5.1.6 Information was provided on seven terrain and obstacle data working group (TOD WG) meetings which were facilitated by EUROCONTROL and that developed a proposed Annex 15 amendment for consideration by the group. The group noted that the proposal was not a complete package relating to eTOD as there had not been agreement in the TOD WG meetings on how to address difficulties with Area 2. The group considered that it was preferable to address all four areas at once. The group was informed in a later discussion that consensus had been reached at the eighth TOD WG meeting on a possible way to address the difficulties with implementing Area 2 requirements, and that this consensus would be confirmed by a six-month consultation process in Europe and extended to the members of the group.

5.1.7 Rather than wait until this consultation process has been completed (sometime in May 2009) and follow this with a proposal to be included in Amendment 37 to Annex 15, the group considered that the matter was of sufficient urgency that States needed to be formally informed by ICAO about possible changes necessary to terrain and obstacle requirements. The group agreed to create an ad hoc group to develop a proposal for inclusion in Amendment 36 to Annex 15 based on information that would have become available through the European consultation process. The State letter that would accompany Amendment 36 would mention this ongoing consultation process and indicate that changes to Area 2 would be anticipated and would likely be reflected on States' comments.

5.1.8 The group noted that both the European consultation process and the ICAO State letter consultation process would seek input from the industry and users. The group also noted the possibility that a possible outcome of the consultation with Contracting States would be that the applicability date of the eTOD provisions in Annex 15, Chapter 10 might be delayed.

5.1.9 The matter of informing States as soon as possible was considered of such importance in view of the financial implications related to the implementation of eTOD, that the group volunteered to assist, in any way possible (i.e. through their respective website, AIS Agora, the eTOD Discussion Forum and through their participation in other groups) to raise awareness of the possible changes.

5.1.10 The following action was agreed by the group:

Action agreed 1/5 — Draft Amendment 36 to Annex 15: Electronic terrain and obstacle data

That:

a) members comment, by 5 January 2009, on the proposal to amend Chapter 10 of Annex 15 related to Areas 1, 3 and 4; and

b) an ad hoc group comprised of **David (Rapporteur), Benoit, Gregory, John, Manfred, Stéphane, Steve and Takashi** develop a draft proposal for inclusion in Amendment 36 to Annex 15 by 15 January 2009.

5.2 Agenda Item 7.2: Annex amendment — AICM/AIXM

5.2.1 It was recalled that important tasks of the group were to develop SARPs and guidance material related to the provision of a standard aeronautical information conceptual model and standard

aeronautical information exchange model to enable the global exchange of data in digital format, and to define a means to allow the further evolution of these models in a managed and supportable manner.

5.2.2 The group considered that a restructuring of Annex 15 to separate "data" from "publications" and "services" would be required in the future. However, this task was not practicable for Amendment 36 to Annex 15 and would be the subject of future development by the group (Action agreed 1/16 refers).

5.2.3 Nevertheless, the group considered it important to send a signal that the transition to AIM had begun and that the introduction of automation enabling digital data exchange needed to be starting in States. A high-level Annex amendment supported by guidance material on the conceptual and data models was considered appropriate for Amendment 36 to Annex 15.

5.2.4 Accordingly text to introduce a requirement in Annex 15 to enable data exchange through the following action was agreed:

Action agreed 1/6 — Draft Amendment 36 to Annex 15: Automation enabling digital data exchange

That the following text be included in Amendment 36 to Annex 15:

3.6.5 Use of automation

~~Recommendation.~~ — Automation enabling digital data exchange ~~in AIS should~~ shall be introduced, in a progressive manner, with the objective of improving the speed, ~~accuracy,~~ quality, efficiency and cost-effectiveness of aeronautical information services.

Note.— Guidance material on an aeronautical conceptual and data exchange model for the development of databases and the establishment of data exchange services is contained in the Aeronautical Information Services Manual (Doc 8126).

5.3 Agenda Item 7.3: Annex amendment — eAIP

5.3.1 The group noted that the transition from AIS to AIM would involve transition from paper-based products towards automated data processing and digital services. In this new environment, end users will increasingly visualize AIS information on computer screens.

5.3.2 The group stressed clear provisions and guidance were necessary to prevent proliferation of eAIP formats. It was noted that a standard look and feel would simplify access by users. The following action was agreed:

Action agreed 1/7 — Draft Amendment 36 to Annex 15: Electronic AIP (eAIP)

That the following text be included in Amendment 36 to Annex 15:

4.6 Electronic AIP (eAIP)

4.6.1 **Recommendation**.— *The AIP, AIP AMDT, AIP SUP and AIC should also be published in a format that allows for displaying on a computer screen.*

Note 1.— This composite electronic document is named "Electronic AIP" (eAIP).

Note 2.— Guidance material for the production and provision of the eAIP is contained in the Aeronautical Information Services Manual (Doc 8126).

4.6.2 When provided, the information content of the eAIP and the structure of chapters, sections and sub-sections shall follow the content and structure of the paper AIP. The eAIP shall include files that allow for printing a paper AIP.

4.6.3 **Recommendation**.— *When provided, the eAIP should be available on a physical distribution media (CD, DVD, etc.) and online on the Internet.*

Note.— Guidance on the use of the Internet is found in Doc 9855 — Guidelines on the Use of the Public Internet for Aeronautical Applications.

5.4 Agenda Item 7.4: Annex amendment — Quality

5.4.1 The group reviewed a draft proposal to amend Annex 15 which had been endorsed by EANPG/49. It was considered that the upgrading of current paragraph 3.2.2 from a Recommend Practice to a Standard may pose problems in States where government agencies are not subject to certification by an ISO 9000 accredited certification body. On the other hand, such an upgrade would ensure wide implementation of ISO 9000 which is a framework that has successfully contributed to quality in many States. The problem of certification was addressed by maintaining, as a Recommended Practice, the certification element of the provision.

5.4.2 A concern was raised that the upgraded paragraph 3.2.2 would impose ISO 9000 certification on the next intended users and the data originators. It was stated that the relationship with external users is not unique to AIS, and that this concern is addressed in the ISO 9000-2000 specifications.

5.4.3 The group noted that the new provision related to the CRC-32Q algorithm with respect to the term "interoperability" was included because the designation of a specific algorithm ensures that different systems are capable of exchanging data.

5.4.4 The group discussed the proposal to upgrade existing paragraph 3.6.5 to a Standard. Concern was expressed that since no specific action was identified, States would not be capable of demonstrating measurable improvements. While it was recognized that some States may encounter difficulties introducing automation enabling digital data exchange, it was noted that the Standard would allow them to introduce this in a progressive manner. Furthermore, the Standard would fully support the objectives of the roadmap and serve as a key enabling provision for the transition to AIM, as well as indicate the way forward. It was agreed that it was incumbent upon the group to commit to the provision of adequate and appropriate guidance material on automation to assist States with the implementation of this Standard. (Action 1/7 refers.)

5.4.5 Finally, the group agreed to maintain the wording proposed in Action 1/6 for inclusion in Amendment 36 to Annex 15 and to the following action:

Action agreed 1/8 — Draft Amendment 36 to Annex 15: Quality

That the proposed amendments in Appendix C be included in Amendment 36 to Annex 15.

5.4.6 The group discussed inserting into Annex 15 a reference to guidance material (yet to be developed) which would assist States in improving quality and integrity of data. While it was generally accepted that this would be useful, it was noted that the guidance material was not yet available to the group for review. It was therefore agreed that the guidance material be developed (Action 1/19 refers) and that a note referring to that guidance material be included in Annex 15 in Amendment 37 as proposed in the following action:

Action agreed 1/9 — Draft Amendment 37 to Annex 15: Reference to guidance material related to Chain solutions

That a note referring to guidance material on data supply chain management be included in Amendment 37 to Annex 15.

5.5 Agenda Item 7.5: Annex amendment — Miscellaneous

5.5.1 The current Standard in Annex 15 related to the NOTAM format allows for a future date to be inserted in Item B) (date/time) in NOTAMR (replacing). The group noted that this created a situation in which the recipient could not discern whether the NOTAM to be replaced must be replaced immediately or if it remained valid until the date/time that appears in Item B).

5.5.2 Furthermore, when a future effective date was indicated in a NOTAMR or a NOTAMC (cancelling), the Standard did not allow for promulgation of a further change which may occur after the NOTAMR or NOTAMC was issued but before the future effective date of that NOTAMR or NOTAMC had been reached.

5.5.3 A simple solution to both of these issues was agreed by the group as proposed in the following action:

Action agreed 1/10 — Draft Amendment 36 to Annex 15: NOTAM date and time

That Amendment 36 to Annex 15 include the following change to Appendix 6:

5. Item B)

For date-time group use a ten-figure group, giving year, month, day, hours and minutes in UTC. This entry is the date-time at which the NOTAMN~~, NOTAMR OR NOTAMC~~ comes into force. In the cases of NOTAMR and NOTAMC, the date-time group is the actual date and time of the NOTAM origination.

5.5.4 The group discussed the benefits of adding a note in Annex 15 which would indicate to States that guidance material is available that supports the implementation of the provisions related of NOTAM, SNOWTAM, ASHTAM and pre-flight information bulletins (PIB). It was agreed that text be included in Annex 15 as proposed in the following action:

Action agreed 1/11 — Draft Amendment 36 to Annex 15: Reference to guidance material on NOTAM

That Amendment 36 to Annex 15 include the following changes:

. . .

5.2.2 Text of NOTAM shall be composed of the significations/uniform abbreviated phraseology assigned to the ICAO NOTAM Code complemented by ICAO abbreviations, indicators, identifiers, designators, call signs, frequencies, figures and plain language.

Note.— Detailed guidance material covering NOTAM, SNOWTAM, ASHTAM and PIB production is contained in Doc 8126.

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APPENDIX 2. SNOWTAM FORMAT

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1. *General*

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Note.— Detailed guidance material covering NOTAM, SNOWTAM, ASHTAM and PIB production is contained in Doc 8126.

2. *Item A* — Aerodrome location indicator (four-letter location indicator).

. . .

APPENDIX 3. ASHTAM FORMAT

1. *General*

. . .

Note.— Detailed guidance material covering NOTAM, SNOWTAM, ASHTAM and PIB production is contained in Doc 8126.

2. *Abbreviated heading*

. . .

APPENDIX 6. NOTAM FORMAT

1. *General*

The qualifier line (Item Q) and all identifiers (Items A) and G) inclusive) each followed by a closing parenthesis, as shown in the format, shall be transmitted unless there is no entry to be made against a particular identifier.

Note.— Detailed guidance material covering NOTAM, SNOWTAM, ASHTAM and PIB production is contained in Doc 8126.

. . .

5.5.5 The group discussed the problem of postponement of effective dates of major and significant changes and the consequences on efficient operations and safety. It was considered that including a Recommended Practice in Annex 15, Chapter 6, recommending that postponement of effective dates should be avoided would highlight the problem and help AIS raise awareness among data originators. Acknowledging that the text of the Recommended Practice would be reviewed by the Secretary, the group agreed to take the following action:

Action agreed 1/12 — Draft Amendment 36 to Annex 15: AIRAC late postponement

That Amendment 36 to Annex 15 include the following changes to Chapter 6:

. . .

6.1.4 Implementation dates other than AIRAC effective dates shall not be used for pre-planned operationally significant change requiring cartographic work and/or for updating of navigation databases.

6.1.5 **Recommendation.—** *In the interest of efficient operations and safety the postponement of major or significant changes listed in Appendix 4, Part 1 and 3 less than 20 days before the effective date in circumstances where the reinstatement of the old situation before change is required should be avoided.*

~~6.1.5~~ 6.1.6 **Recommendation.—** *The use of the date in the AIRAC cycle which occurs between 21 December and 17 January inclusive should be avoided as an effective date for the introduction of significant changes under the AIRAC system.*

. . .

5.5.6 The group noted that a joint Committee EUROCAE WG 76/RTCA SC 206 had been established with the purpose of identifying the AIS and MET data link services that are envisaged to be implemented within the next decade and developing the necessary documentation (standards). The group was informed of past amendments to ICAO Annexes regarding data link and the current reformation of the ICAO OPLINK Panel. It was considered that a further, high-level amendment to provisions in Annex 15, Chapter 9 may be appropriate. It was noted that the Secretariat would provide coordination between the AIS-AIMSG and the OPLINKP. However, coordination between the AIS-AIMSG and joint Committee EUROCAE WG 76 / RTCA SC 206 was also necessary. The group acknowledged that individual members should undertake to coordinate with their national counterparts on the OPLINK Panel. Accordingly the group agreed to the following action:

Action agreed 1/13 — AIS-MET data link services

That **Stéphane (Rapporteur)** act as a liaison with the joint EUROCAE WG76/ RTCA SC 206 Committee regarding the possible inclusion in ICAO Annexes of high-level SARPs related to AIS-MET data link services and report back to the group on developments at the AIS-AIMSG/2 meeting.

6. AGENDA ITEM 8: GUIDANCE MATERIAL

6.1 Agenda Item 8.1: Guidance material — Terrain and obstacle data and airport mapping data bases

6.1.1 The group recalled that the *Guidelines for Electronic Terrain, Obstacle and Aerodrome Mapping Information* (Doc 9881) provided guidance on aerodrome mapping data bases (AMDBs). However, with regard to aerodrome mapping databases, this document only addressed the contents and format of AMDBs. It was proposed to develop a new ICAO document ("The AMDB Guidance Manual") that would encompass both the information included in the current Doc 9881 (limited to the aerodrome mapping considerations) and the contents of the existing regional document "data generation guidance material", as well as any other relevant material that may be available. The group discussed whether it was preferable to develop a new ICAO document or amend Doc 9881. It was considered that an evaluation of the available material was necessary to make a decision. Accordingly the group agreed to the following action:

Action agreed 1/14 — Guidance material for aerodrome mapping data bases

That **Stephane (Rapporteur)** and **Paul** provide draft guidance material on aerodrome mapping data bases (AMDBs) for consideration by the AIS-AIMSG/2 meeting.

6.2 Agenda Item 8.2: Guidance material — AICM/AIXM

6.2.1 The group learned that some of the guidance material to support the implementation of AIXM as a standard data exchange model was already well advanced, in particular on issues related to the data catalogue. The group agreed to the following action:

Action agreed 1/15 — Guidance material on AIXM

That **Paul (Rapporteur)** and **Gregory** provide draft guidance material on digital data exchange based on AIXM for review by the AIS-AIMSG/2 meeting.

6.2.2 The group discussed the restructuring of Annex 15 to accommodate the introduction of AIM. It was suggested that Annex 15 be divided into two parts, one dealing with the existing provisions and the other with the future AIM provisions. This would align with the consolidation phase of the roadmap. Another option considered was to group all existing and future data quality requirements into a new chapter while all current AIS documents would be regrouped into a single chapter. A new chapter for AIM digital services would be developed. It was agreed that these options be considered by an ad-hoc group.

6.2.3 It was noted that, in connection with AIM, the term "digital" is redundant as its digital nature is implied in the new definition of AIM.

6.2.4 The number of changes that would be required for a complete review of the SARPs in order to separate data from publication and to introduce the notion of services was considered to be substantial. It would require considerable development of new text and reformulation of existing text. Therefore, the following action was proposed:

Action agreed 1/16 — Ad-hoc group on including AIM in Annex 15 SARPs

That an ad-hoc group consisting of **Steven (Rapporteur), Charity, Gregory, Paul, Stéphane** and **Tony** be tasked to:

a) consider the restructuring of Annex 15 to introduce the notion of services and separate data from publication;

b) develop a digital AIM services manual; and

c) submit draft proposals to the AIS-AIMSG/2 meeting.

6.2.5 The group discussed the need to maintain the evolution of the aeronautical data exchange model in a managed and supportable manner and agreed to the following action:

Action agreed 1/17 — Future evolution of the data exchange model

That the group act as the primary body for reviewing and endorsing the evolution of the model at the global level based on mature proposals emanating from regional and multi-national agreements.

6.3 Agenda Item 8.3: Guidance material — eAIP

6.3.1 The group discussed the importance of providing States with appropriate guidance material that would ensure a harmonized approach to development of eAIPs, particularly with respect to the use of databases to derive the eAIP content. The group agreed that such material should be included in Doc 8126 and aligned with the existing guidance on AIP, specifically to the DONLON Specimen AIP. It was noted that the guidance material should not be predicated on specific technology. It was also noted that the guidance material should indicate that it would be one of many means for producing an eAIP. The group agreed to the following action:

Action agreed 1/18 — Guidance material on electronic AIP (eAIP)

That **Manfred** prepare draft guidance material on the provision of electronic AIP, aligned with the existing guidance on AIP in Doc 8126, for comment by the study group at the AIS-AIMSG/2 meeting.

6.4 Agenda Item 8.4: Guidance material — Training

6.4.1 The group addressed the need for guidance material on AIS/AIM training. It learned that the *Procedures for Air Navigation Services — Training* (PANS-TRG, Doc 9868) were founded on a performance-based approach to training focussing on required skills and competencies. The general provisions for competency-based training and assessment contained in the PANS-TRG had been used by the Secretariat to develop a competency framework for the multi-crew pilot license (MPL). This framework which was generic enough to be applied in a wide range of contexts, but explicit enough to guide the development of performance-based assessments. The group learned that the PANS-TRG was intended to evolve into an inventory of aviation-related competencies for safety-critical functions.

6.4.2 In addition to the PANS-TRG, the group considered that EUROCONTROL's *Common AIS Staff Profiling* (CASP) and *AIS Training Development Guidelines* would be valuable documents on which to base a future AIS/AIM training manual. It was noted that a possible way to proceed would be to create a template that would align the competencies in the EUROCONTROL documents with the principles outlined in the PANS-TRG. It was noted that CASP was based on AIS and that a future AIS/AIM training manual would evolve in parallel with developments in AIM. The group considered that other known sources on AIS training should also be consulted, particularly the online AIXM training package.

6.4.3 The group agreed that ICAO guidance material on training was necessary and agreed to the following action:

Action agreed 1/19 — Guidance material on AIS training

That an ad-hoc group, consisting of **David (Rapporteur)**, **Manfred, Benoit*** and **Augustin,** be formed which would:

a) create a plan, by 1 February 2009, for the development of an AIS training manual, taking into account available material on AIS training and aligning with the principles in the PANS-TRG;

b) ensure, during development of the AIS training manual, coordination with Secretariat members responsible for the PANS-TRG; and

c) present a draft of the AIS training manual to the AIS-AIMSG/2 meeting.

** Indicates participation in the group is to be confirmed.*

6.5 Agenda Item 8.5: Guidance material — Quality

6.5.1 The group noted that Annex 15*,* paragraph 3.2.1 required that each State shall take all necessary measures to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each function stage of an aeronautical information service. Annexes 4, 11 and 14 also contained provisions related to the quality of aeronautical information. The group considered that guidance material for an AIS quality manual was required as soon as possible to support the consistent implementation of quality systems in accordance with the above-mentioned Annex provision.

6.5.2 The point was raised that, in order to meet the requirements in Annex 15 related to data integrity, States would also require clear guidance on the means to measure integrity throughout the data supply chain. It was noted that while work was underway on data assurance levels, the results of this work would not necessarily resolve this issue.

6.5.3 The group learned that documentation on CHAIN Principles of Quality Management was available and would be useful to include an a future AIS/AIM quality manual. In a later discussion (see Action agreed 1/29), it was noted that the AIS Data Process (ADP) and Static Data Procedures (SDP) had also proven useful in the quality systems in some States.

6.5.4 It was considered that inclusion of "AIM" in the title of this document would be premature. The group noted that the fundamental structure of the *Manual on the Quality Management System for the Provision of Meteorological Service to International Air Navigation* (Doc 9873) was

suitable as a framework for development, since it was based on ISO 9000. Members were also encouraged to provide examples of national quality manuals currently in use in the AIS field. The group agreed that the following documents may be used as resources for a new AIS quality manual:

a) *Manual on the Quality Management System for the Provision of Meteorological Service to International Air Navigation* (Doc 9873);

b) *World Geodetic System — 1984 (WGS-84) Manual* (Doc 9674), Chapters 2 and 6;

c) *Quality Assurance Manual for Flight Procedure Design* (Doc 9906);

d) Draft ICAO AIS Quality Manual;

e) CHAIN Principles of Quality Management;

f) AIS Data Process (ADP) and Static Data Procedures (SDP); and

g) States' AIS quality manuals.

6.5.5 Accordingly the group agreed to the following agreed action:

Action agreed 1/20 — AIS quality manual

That:

a) group members provide, to the Rapporteur of the group in b) below, examples of AIS quality manuals in use in States;

b) an ad hoc group, consisting of **Susumu (Rapporteur)**, **Greg, Manfred, Charity, Augustin** and **Tony*** develop a plan, to be completed by 1 March 2009, for the production of a new AIS quality manual to be based on the fundamental structure of the *Manual on the Quality Management System for the Provision of Meteorological Service to International Air Navigation* (Doc 9873);

** Indicates participation in the group is to be confirmed.*

c) the ad hoc group provide a draft AIS quality manual for review by the AIS-AIMSG/2 meeting; and

d) the ad-hoc group develop guidance material on the means for measuring integrity to be included in the AIS quality manual.

6.5.6 The group took note of the EUROCONTROL CHAIN programme deliverables as an example of guidance material that could be adapted to help States realize improvements in data quality and data integrity. The group confirmed that this would be beneficial to States and agreed that concrete proposals for inclusion of this material in the AIM quality manual be developed and reviewed by at the AIS-AIMSG/2 meeting.

Action agreed 1/21 — Guidance material on CHAIN solutions

That **Manfred** supply guidance material on data supply CHAIN management to be integrated in the AIS quality manual for review by the ad-hoc group referred to in Action agreed 1/20 on the AIS quality manual.

6.6 Agenda Item 8.6: Guidance material — Miscellaneous

OPADD

6.6.1 The group noted that the EUROCONTROL document *Operating Procedures for AIS Dynamic Data (OPADD)* contained European Civil Aviation Conference (ECAC) States' approved guidelines for the handling of dynamic data. These guidelines complemented SARPs as defined by Annex 15 and guidance material in Doc 8126. With respect to the chapter on specific European arrangements, it may need to be amended to reflect a global applicability. The scope of the OPADD details were mainly procedures related to NOTAM. It also covered examples of SNOWTAM and ASHTAM as well as specific guidance for harmonization of these messages. The group learned that a new version of this document was under preparation as OPADD 3.0 which would, for the first time, contain a chapter presenting guidelines covering the retrieval and provision of pre-flight information bulletins (PIB). The group considered that this represented valuable guidance material for States and accordingly agreed to the following action:

Action agreed 1/22 — Guidance material on NOTAM

That guidance material on NOTAM in Doc 8126 be harmonized with OPADD 3.0 by the Secretariat as part of Amendment No. 2 to Doc 8126.

Integrated briefing

6.6.2 The group considered the inclusion of the service of integrated briefing into Annex 15 and Doc 8126 to assist States in the definition and provision of enhanced briefing services. Note was taken of information on the ICAO EUR Doc 010 — *Harmonized access to AIS and MET services relating to pre-flight planning* (Second edition — 2003) as published by the ICAO European and North Atlantic Regional Office. As a review of the available material was necessary to develop further proposals, the group agreed to the following action:

Action agreed 1/23 — Integrated briefing

That:

a) an ad-hoc group, consisting of **John (Rapporteur)** and **Manfred** develop guidance material on the provision of integrated briefing by 1 June 2009; and

b) the Secretariat prepare a Study Note for the AIS-AIMSG/2 meeting based on the guidance material provided.

AIRAC

6.6.3 The group discussed possible improvements to guidance material related to the timely provision of aeronautical information and other methods to improve the adherence with AIRAC in States' AIS. Consideration was given to:

a) the web availability of a set of frequently asked questions on AIRAC to clearly explain related ICAO requirements;

b) the availability of a web-based application ("pTracker" tool) to assist AIS to measure their performance for the timely delivery of products; and

c) AIRAC related guidance material contained in aeronautical industry standards ED 77/DO 201A and the *Manual on Required Navigation Performance (RNP)* (Doc 9613).

6.6.4 Accordingly the group agreed to the following action:

Action agreed 1/24 — Frequently asked questions (FAQ) on AIRAC adherence

That:

a) the Secretariat post frequently asked questions (FAQ) on AIRAC adherence on the AIM website; and

b) members enable wider use of the FAQ by creating links from other websites.

Action agreed 1/25 — Evaluation of pTracker Tool

That the Secretary evaluate the "pTracker tool" and determine how to disseminate it for use by States and users.

Action agreed 1/26 — Guidance material on AIRAC adherence

That the Secretary evaluate the use of AIRAC related paragraphs in aeronautical industry standards ED 77/DO201A and the *Manual on Required Navigation Performance (RNP)* (Doc 9613) in Doc 8126.

NOTAM Selection Criteria

6.6.5 The group agreed that urgent revision of the NOTAM Selection Criteria in Doc 8126 was needed to improve the quality of briefing services and to align with other provisions (e.g. new NOTAM Codes introduced for global navigation surveillance systems (GNSS)).

6.6.6 The group was briefed that substantial material identifying the problems and proposing solutions were considered at EANPG/47 and that the consideration of this material would greatly facilitate the implementation of the required improvement in the SARPs and guidance material. The group noted that, through the participation of IATA and IFALPA at the AIS-AIMSG, feedback would be obtained concerning system output, in particular on the briefing elements.

6.6.7 The group agreed to the following action:

Action agreed 1/27 — Update of NOTAM Selection Criteria

That the Secretary:

a) update the NOTAM Selection Criteria (NSC) in Doc 8126 to reflect new NOTAM Codes introduced in the *Procedures for Air Navigation Services — ICAO Abbreviations and Codes* (PANS-ABC, Doc 8400) and;

b) analyze the reports submitted by the EANPG (EANPG Conc. 47/42 refers) to progress the changes needed to clarify and improve the use of NSC for NOTAM in Annex 15, Doc 8400 and Doc 8126.

6.6.8 The group noted that Amendment No. 2 to Doc 8126 would be of considerable scope and complexity and agreed to the following action:

Action agreed 1/28 — Progress report on Amendment No. 2 to Doc 8126

That the Secretary provide a progress report on Amendment No. 2 to Doc 8126 at the AIS-AIMSG/2 meeting.

AIS Data Process (ADP) and Static Data Procedures (SDP)

6.6.9 The group was briefed on the availability of EUROCONTROL documentation related to AIS Data Process and Static Data Procedures. Several members had already used this documentation and found it an excellent basis on which to base the development of their own internal processes and procedures. It was therefore agreed that these documents would be valuable information to provide as guidance material related to quality. The group agreed to the following actions:

Action agreed 1/29 — Data process and procedures in the AIS quality manual

That the ad-hoc group created to address the AIS quality manual in Action agreed 1/20 use the EUROCONTROL AIS Data Process and Static Data Procedures documentation provided by **Paul** as examples to be included in the manual.

Action agreed 1/30 — Identify data process and procedures that would be required for the provision of new datasets

That **Manfred** identify, for review by the AIS-AIMSG/2 meeting, the new data process and procedure requirements, related to the future provision of new datasets, in addition to the current paper or text products.

Aeronautical Chart Manual **(Doc 8697)**

6.6.10 The group considered that the *Aeronautical Chart Manual* (Doc 8697) required updating, particularly with respect to cartographic techniques, reproduction, and the preparation of en-route and instrument procedure charts to reflect the latest PBN requirements. A chapter was also required to provide guidance on the new Aerodrome Terrain and Obstacle Chart-ICAO (Electronic) which becomes applicable in November 2010. The group noted that there were currently very limited resources within the

Secretariat to update Doc 8697. At the same time, the document was very much needed, especially to help States transition to electronic chart production and for the standardization of instrument procedure charts that reflect PBN requirements. It was noted that work on Doc 8697 would be coordinated with the Instrument Flight Procedure Panel (IFPP) through the Secretariat. The group learned that the *European Action Plan for the Prevention of Runway Incursions* and the *European Action Plan for the Prevention of Airspace Infringement* contained recommendations of charting issues that should be taken into account when developing guidance material for the Doc 8697.

6.6.11 The group considered that Doc 8697 represented valuable guidance material for States and that improvements to the charts, which were based on the DONLON Specimen AIP, would result in parallel improvements to Doc 8126. Accordingly, the group agreed to the following action:

Action agreed 1/31 — *Aeronautical Chart Manual* (Doc 8697)

That an ad hoc group, consisting of **David (rapporteur), Charity, Bill, Raul, Greg*, Paul*** and **Augustin*** develop a plan, to be completed by 1 May 2009, for the development of a new edition of the *Aeronautical Chart Manual* (Doc 8697).

** Indicates participation in the group is to be confirmed.*

7. AGENDA ITEM 9: LEGAL AND INSTITUTIONAL ISSUES

7.1.1 The group was briefed on guidance in Doc 9082 — *ICAO's Policies on Charges for Airports and Air Navigation Services* and Doc 9161 — *Manual on Air Navigation Services Economics* related to AIS.

7.1.2 The group considered that it was important to establish the minimum regulatory requirements for data provision by States, and that these requirements should be clearly distinguishable from commercial value-added products or services. The current scope of core data necessary for safe, regular and efficient air transport was defined by the integrated aeronautical information package, but the future scope needed to be clearly identified. Any expansion of the core data set should be justified by the need to serve agreed requirements. It was also noted that third parties would need a clear definition of the boundaries between regulatory provision and value-added services where competition rules apply.

7.1.3 The group learned that should paragraph 3.5 of Annex 15 related to cost recovery be upgraded to a Standard, this would create a unique AIS requirement which would not be in line with many other related provisions and policies in other domains.

7.1.4 The group discussed that it may be valuable to develop a checklist of issues to be verified whenever new provisions were included for the definition of AIM. One of the important issues to consider for the transition to AIM was that the evolution to data provision may imply investments that would need to be funded. The group agreed to the following action:

Action agreed 1/32 — Legal and institutional issues

That an ad hoc group, consisting of **Eugene (Rapporteur)**, **Bill**, **Stéphane**, **Steven** and **Paul**, be tasked with:

a) consolidating all available information related to cost recovery, copyright and liabilities for AIS; and

b) developing a list of current and future institutional and legal issues to be considered in the context of current AIS and future AIM.

8. AGENDA ITEM 10: INTEROPERABILITY WITH METEOROLOGICAL PRODUCTS AND SERVICES

8.1.1 The group noted that ongoing work related to NextGen and SESAR continued to develop the concept of associating meteorological information with the aeronautical information management framework. The group was made aware that the majority of the meteorological information concerned was highly dynamic in nature and that some additional considerations would be necessary in order to include such information. The group noted that active consideration of the codes to be used for the exchange and dissemination of aeronautical meteorological information by the World Meteorological Organization (WMO) was underway and that it was likely that XML would be utilized to migrate to table-driven code forms. The group was also made aware of EUROCONTROL activities in the domain of meteorological information management and noted the need for coordination of possible future options for maintaining and improving the mutual components of AIS and MET data models. The group noted that generic ISO standards for exchanging AIS and MET information were being used and showed promise.

8.1.2 In order to ensure a harmonized and consistent development of key mutual components of AIS and MET data models, the group considered that WMO be invited to nominate a member to the group. It was noted that, at this stage of AIM development, WMO experts would not necessarily have to attend AIS-AIMSG meetings, but be included in the group with a view to maintaining and open dialog. In addition, the group deemed that the Secretary of the AIS-AIMSG and the Secretaries of the ICAO MET study groups and operations groups should regularly consult one another on developments. Furthermore, the group considered that members should ensure that appropriate MET expertise was available to them. It was noted that, at this stage of AIM development, WMO experts and MET experts acting as advisors to members would not necessarily have to attend AIS-AIMSG meetings, but be included in the group with a view to maintaining an open dialog. Accordingly the meeting agreed to the following actions:

Action agreed 1/33 — Expertise on the inclusion of meteorological information in the data-centric environment

With a view to coordinating synergies, preventing duplicated/conflicting requirements, and discovering other areas, besides data modelling, for cooperation which may benefit from a joint MET-AIM approach, that:

a) the Secretary invite the WMO to nominate a member to the group;

b) the Secretary coordinate with the Secretaries of ICAO MET study groups and operations groups; and

c) members ensure that expertise be made available on the inclusion of meteorological information in the data-centric environment for future meetings of the group and for the work of the group, as necessary.

9. AGENDA ITEM 11: FUTURE WORK PROGRAMME OF THE GROUP

9.1 Tasks to be undertaken

9.1.1 It was emphasized that the success of the work of a study group depended critically on the input of its members. Therefore, it was considered essential that members take an active role in carrying out the tasks assigned to them.

9.1.2 The group noted that the future work programme of the group was based on the actions agreed during the meeting and the resultant tasks to be undertaken. The group considered that tasks which had an impact on Amendment 36 to Annex 15 and the development of associated guidance material should be given the highest priority. It was noted that the Secretary would provide a follow-up table listing ad-hoc groups formed during the meeting with respective tasks and timelines on the AIS-AIMSG website.

9.2 Next meeting

9.2.1 The group considered that the second meeting of the AIS-AIMSG should be planned to be convened at in Montréal from 10 to 13 November 2009. Members were advised to periodically check the meetings page of the ICAO web site at: http://www.icao.int/icao/en/conf/ should they wish to attend other ICAO meetings possibly scheduled in Montréal immediately before or after the AIS-AIMSG/2 meeting.

9.2.2 It was agreed that Rapporteurs of ad hoc groups would advance work on assigned tasks through e-mail or fax correspondence, but should also make use of Internet and teleconferencing as a means of communicating and meeting to progress tasks. It was also pointed out that opportunities to meet and discuss group work may arise through attendance at other meetings.

10. AGENDA ITEM 12: ANY OTHER BUISNESS

10.1 No items for any other business were identified.

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APPENDIX A

LIST OF PARTICIPANTS

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The meeting was assisted by the following members of the ICAO Secretariat:

- Dr. Olli Turpeinen, Chief, MET/AIM Section, Air Navigation Bureau
- Mr. David Lewtas, Chief, Aeronautical Information Unit, MET/AIM Section
- Mr. Jean-Michel Galais, Technical Officer, MET/AIM Section
- Ms. Donna Lane, Editorial Assistant, MET/AIM Section
- Mr. Chris Dalton, Technical Officer, Air Traffic Management (ATM Systems), Air Traffic Management Section, Air Navigation Bureau
- Mrs. Nicole Barrette-Sabourin, Technical Officer, Aviation Training Policy and Standards Unit, Flight Safety Section, Air Navigation Bureau
- Mr. Julian de la Camara, Economist, Economic Policy and Infrastructure Management Section, Air Transport Bureau.

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APPENDIX B

LIST OF DOCUMENTATION

SN No.	Presented by	Title	Agenda Item
1	Secretary	Provisional Agenda	4
2	Secretary	Review of the Tasks of the Study Group	5
3	Secretary	Review of the Draft *Roadmap for the Transition from AIS to AIM*	6
4	Secretary	Quality Management	7.4
5	Secretary	AIM Quality Manual	8.5
6	Secretary	AIM Training Manual	8.4
7	Secretary	Proposal to Amend Annex 15 — Effective Date of NOTAM	7.5
8	Secretary	Inclusion of MET information in the AIM Framework	10
9	Paul Bosman Stephane Dubet	Aerodrome Mapping Data Bases	7.1
10	Paul Bosman Stephane Dubet	Aerodrome Mapping Data Bases — Guidance Material	8.1
11	Paul Bosman Gregory Pray	Development of SARPs for Aeronautical Information Conceptual and Data Exchange Model Based on AIXM Version 5	7.2
12	Paul Bosman	New Recommended Practices for the Provision of Electronic AIP	7.3, 8.3
13	Paul Bosman Jim Manning Gregory Pray	Including AIM in Annex 15	6
14	Paul Bosman	Data Quality and Integrity in the Data Supply Chain — Chain Solutions	7.4, 8.5
15	Paul Bosman	Information Management for ATM	10
16	Paul Bosman	Human AIM	8.4
17	Paul Bosman	Change Proposals to NOTAM Selection Criteria	8.5
18	Paul Bosman	Integrated Briefing	7.5, 8.6
19	Paul Bosman	Operating Procedures for AIS Dynamic Data	7.5, 8.6
20	Paul Bosman	AIS Data Process (ADP) and Static Data Procedures (SDP)	8.5
21	Paul Bosman	eTOD Implementation	7.1
22	Paul Bosman	Proposal for Improvement of ICAO Guidance Material related to the Timely Provision of Aeronautical Information/Data	7.5, 8.6
23	Stephane Dubet	AIS-MET Data-Link Services	7.5
24	Secretary	Legal and institutional issues	9
25	Secretary	Chart Manual	8.6

LIST OF INFORMATION PAPERS

IP No.	Presented by	Title	Agenda Item
1	Secretary	Arrangements for the meeting	3
2	Jim Manning	Future AIM — Some Notes on Institutional Issues	9
3	Paul Bosman	Business Case for Global Implementation	8.3
4	Paul Bosman	Digital NOTAM	7.5
5	Paul Bosman Gregory Pray	Training required for AIM Staff in Relation with AIXM	8.4
6	Paul Bosman	Legal and Institutional Issues related to EAD IPR, Liability and Charging	9
7	Eugene Hoeven	Transition of AIS to AIM — The ANSP Perspective	9

LIST OF FLIMSIES

IP No.	Presented by	Title	Agenda Item
1	Paul Bosman	Related to SN/21 — eTOD Implementation	7.1
2	Paul Bosman	Related to SN/18 — Integrated Briefing	7.5
3	Stephane Dubet	Related to SN/3 — AIM Definition	6
4	Paul Bosman	Related to SN/22 — Amendment to Annex 15, Chapter 6: AIRAC	7.5

PART II — LIST OF STUDY NOTES AND INFORMATION PAPERS IN ORDER OF AGENDA ITEM

Agenda Item	WP No.
3	IP/1
4	SN/1
5	SN/2
6	SN/3 (and Flimsy No. 3), SN/13
7.1	SN/9, SN/21 (and Flimsy No. 1)
7.2	SN/11
7.3	SN/12
7.4	SN/4, SN 14
7.5	SN/7, SN/18 (and Flimsy No. 2), SN/19, SN/22, SN/23, SN/25, IP/4
8.1	SN/10
8.3	SN/12, IP/3
8.4	SN/6, SN/16, IP/5
8.5	SN/5, SN/14, SN/17, SN/20
8.6	SN/18, SN/19, SN/22 (and Flimsy No. 4)
9	SN/24, IP/2, IP/6, IP/7
10	SN/8, SN/15

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APPENDIX C

DRAFT PROPOSED AMENDMENT TO ANNEX 15

RELATED TO ACTION AGREED 1/8

NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT

The text of the amendment is arranged to show deleted text with a line through it and new text highlighted with grey shading, as shown below:

1. ~~Text to be deleted is shown with a line through it.~~	text to be deleted
2. New text to be inserted is highlighted with grey shading.	new text to be inserted
3. ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.	new text to replace existing text

TEXT OF A PROPOSED AMENDMENT TO THE

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

AERONAUTICAL INFORMATION SERVICES

ANNEX 15

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

. . .

CHAPTER 3. GENERAL

. . .

3.2 Quality management system

3.2.1 Each Contracting State shall ~~take all necessary measures to introduce a properly organized quality system containing procedures, processes and resources necessary to implement quality management at each function stage~~ ensure that quality management systems are implemented and maintained encompassing all functions of an aeronautical information service, as outlined in 3.1.7 ~~above~~. The execution of such quality management systems shall be made demonstrable for each function stage, when required.

3.2.2 **Recommendation.**— *The quality management system should evolve to be applicable to the whole data supply chain from data origination to distribution to the next intended user, taking into consideration the intended use of data.*

~~3.2.2~~ 3.2.3 ~~**Recommendation.** —~~ The quality management system established in accordance with 3.2.1 ~~should be in conformity with~~ shall follow the International Organization for Standardization (ISO) 9000 series of quality assurance standards ~~and certified by and accredited certification body~~.

3.2.4 **Recommendation.** An ISO 9000 certificate, issued by an accredited certification body should be considered as a sufficient means of compliance.

~~*Note.*~~ *Note 1.— International Organization for Standardization (ISO) 9000 series of quality assurance standards provide a basic framework for the development of a quality assurance programme and defines the term "accredited certification body". The details of a successful programme are to be formulated by each State and in most cases are unique to the State organization.*

Note 2.— Supporting material in respect to the processing of aeronautical data is contained in RTCA Document DO-200A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-76 — Standards for Processing Aeronautical Data*. These standards support the development and application of aeronautical databases.*

3.2.4 The quality management system shall include policies, processes and procedures designed to verify and assure that all functions of an aeronautical information service, as outlined in 3.1.7 are

conducted in accordance with applicable requirements and standards, including the relevant standards of this Annex.

~~3.2.3~~ 3.2.5 Within the context of ~~a~~ the established quality management system, the skills and knowledge required for each function shall be identified and personnel assigned to perform those functions shall be appropriately trained. States shall ensure that personnel possess the skills and competencies required to perform specific assigned functions, and appropriate records shall be maintained so that the qualifications of personnel can be confirmed. Initial and periodic assessments shall be established that require personnel to demonstrate the required skills and competencies. Periodic assessments of personnel shall be used as a means to detect and correct shortfalls.

~~3.2.4~~ 3.2.6 States shall ensure that ~~established procedures exist in order that aeronautical data at any moment is traceable to its origin so as to allow any data anomalies or errors, detected during the production/maintenance phases or in operational use, to be corrected~~ the quality management system includes the necessary policies, processes and procedures to assure and verify that aeronautical data is traceable to its origin so as to allow any data anomalies or errors detected in use to be identified by root cause, corrected and communicated to affected users.

~~3.2.5~~ 3.2.7 The established quality management system shall provide users with the necessary assurance and confidence that distributed aeronautical information/data ~~satisfy stated requirements for data quality~~ is adequate for its intended use and of required quality (accuracy, resolution and integrity) ~~and for data traceability by the use of appropriate procedures in every stage of data production or data modification process~~. The system shall also provide assurance of the applicability period of intended use of aeronautical data as well as that the agreed distribution dates will be met.

3.2.8 States shall take all necessary measures to monitor compliance with the quality management system in place.

~~3.2.6~~ 3.2.9 The order of accuracy for aeronautical data, based upon a 95 per cent confidence level, shall be as specified in Annex 11, Chapter 2, and Annex 14, Volumes I and II, Chapter 2. In that respect, three types of positional data shall be identified: surveyed points (runway thresholds, navigation aid positions, etc.), calculated points (mathematical calculations from the known surveyed points of points in space/fixes) and declared points (e.g. flight information region boundary points).

~~3.2.7~~ 3.2.10 States shall ensure that the order of publication resolution of aeronautical data shall be that as specified in Appendices 1 and 7.

~~3.2.8~~ 3.2.11 Contracting States shall ensure that the integrity of aeronautical data is maintained throughout the data process from survey/origin to distribution to the next intended user (the entity that receives the aeronautical information from the aeronautical information service provider). Aeronautical data integrity requirements shall be based upon the potential risk resulting from the corruption of data and upon the use to which the data item is put. Consequently, the following classifications and data integrity levels shall apply:

a) critical data, integrity level 1×10^{-8}: there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe;

b) essential data, integrity level 1×10^{-5}: there is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe; and

c) routine data, integrity level 1×10^{-3}: there is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

Note 1.— Distribution to the next intended user will differ in the delivery method applied which may either be:

Physical distribution. *The means by which aeronautical information/data distribution is achieved through the delivery of a physical package, such as postal services.*

or

Direct electronic distribution. *The means by which aeronautical information/data distribution is achieved automatically through the use of a direct electronic connection between the AIS and the next intended user).*

Note 2.— Different delivery methods and data media may require different procedures to ensure the required data quality.

~~3.2.9~~ 3.2.12 Aeronautical data quality requirements related to classification and data integrity shall be as provided in Tables A7-1 to A7-5 of Appendix 7 and Tables A8-1 and A8-2 of Appendix 8.

~~3.2.10~~ 3.2.13 Protection of electronic aeronautical data while stored or in transit shall be ~~totally~~ monitored by the cyclic redundancy check (CRC). To achieve protection of the integrity level of critical, ~~and~~ essential and routine aeronautical data as classified in ~~3.2.8~~ 3.2.11, a 32~~- or 24-~~bit CRC algorithm shall apply ~~respectively~~.

~~3.2.11 **Recommendation.—** *To achieve protection of the integrity level of routine aeronautical data as classified in 3.2.8, a 16-bit CRC algorithm should apply.*~~

3.2.14 **Recommendation.—** *In order to improve the interoperability of the systems and the electronic exchange of aeronautical data, the CRC-32Q algorithm should be used.*

Note 1.— The CRC-32Q algorithm sufficiently covers the integrity protection of most of the aeronautical data strings that need to be CRC wrapped. However, a large quantity of data may require multiple CRCs to be utilized.

Note 2.— Guidance material on the 32-bit CRC is found in Annex 10, Volume I, Attachment B and RTCA DO-229 — Minimum Operational Performance Standards for Global Positioning System/ Wide Area Augmentation System Airborne Equipment.

~~3.2.12~~ 3.2.15 Material to be issued as part of the Integrated Aeronautical Information Package shall be thoroughly checked and coordinated with the services responsible ~~services~~ before it is submitted to the aeronautical information service, in order to make certain that all necessary information has been included and that it is correct in detail prior to distribution. Validation and verification procedures shall be

established which ensure that quality requirements (accuracy, resolution, integrity) and traceability of aeronautical data are met.

Note.— Guidance material on the liaison with other related services is contained in the Aeronautical Information Services Manual *(Doc 8126).*

~~3.2.13~~ 3.2.16 Demonstration of compliance of the quality system applied shall be by audit. If nonconformity is identified, initiating action to correct its cause shall be determined and taken. All audit observations and remedial actions shall be evidenced and properly documented.

Note.— Guidance material on the aeronautical data quality requirements (accuracy, resolution, integrity, protection and traceability) is contained in the World Geodetic System — 1984 (WGS-84) Manual *(Doc 9674). Supporting material in respect of the provisions of Appendices 1 and 7 related to publication resolution and integrity of aeronautical data is contained in RTCA Document DO-201A and European Organization for Civil Aviation Equipment (EUROCAE) Document ED-77 —* Industry Requirements for Aeronautical Information.

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3.6 General specifications

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3.6.5 Use of automation

~~Recommendation.—~~ Automation enabling digital data exchange ~~in AIS should~~ shall be introduced, in a progressive manner, with the objective of improving the speed, ~~accuracy,~~ quality, efficiency and cost-effectiveness of aeronautical information services.

Note.— Guidance material on an aeronautical conceptual and data exchange model for the development of databases and the establishment of data exchange services is contained in the Aeronautical Information Services Manual (Doc 8126).

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3.6.7 Human Factors considerations

3.6.7.1 The organization of the aeronautical information services as well as the design, contents, processing and distribution of aeronautical information/data shall take into consideration Human Factors principles which facilitate their optimum utilization.

3.6.7.2 Due consideration shall be given to the integrity of information where human interaction is required and mitigating steps taken where risks are identified. This may be accomplished through the design of systems, through operating procedures or through improvements in the operating environment.

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3.8 Metadata

3.8.1 Each Contracting State shall collect metadata for aeronautical data/information processes and/or exchange points. This metadata collection shall be applied throughout the data supply chain, from survey/origin to distribution to the next intended user by the aeronautical information service.

Note.— ISO Standard 19115 specifies requirements for geographic information metadata.

3.8.2 The metadata to be collected shall include, as a minimum:

the name of the organization or entity performing the function;

d) the function performed; and

e) the date and time of operation.

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CHAPTER 6. AERONAUTICAL INFORMATION REGULATION AND CONTROL (AIRAC)

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6.2 Provision of information in paper copy form

6.2.1 In all instances, information provided under the AIRAC system shall be published in paper copy form and shall be distributed by the ~~AIS~~ aeronautical information service unit at least 42 days in advance of the effective date with the objective of reaching recipients at least 28 days in advance of the effective date.

6.2.2 **Recommendation.—** *Whenever major changes are planned and where advance notice is desirable and practicable, a publication date of at least 56 days in advance of the effective date should be used. This should be applied to the establishment of, and premeditated major changes in, the circumstances listed in Appendix 4, Part 3, and other major changes if deemed necessary.*

Note.— Guidance on what constitutes a major change is included in Doc 8126.

6.3 Provision of information in electronic form

6.3.1 States that have established an aeronautical database shall, when updating its contents concerning the circumstances listed in Appendix 4, Part 1, ensure that the effective dates of data coincide with the established AIRAC effective dates used for the provision of information in paper copy form.

6.3.2 Information provided in electronic form, concerning the circumstances listed in Appendix 4, Part 1, shall be distributed/made available by the AIS unit so as to reach recipients at least 28 days in advance of the AIRAC effective date.

6.3.3 **Recommendation.—** *Whenever major changes are planned and where advance notice is desirable and practicable, information provided in electronic form should be distributed/made available at least 56 days in advance of the effective date. This should be applied to the establishment of, and premeditated major changes in, the circumstances listed in Appendix 4, Part 3, and other major changes if deemed necessary.*

Note.— Guidance on what constitutes a major change is included in Doc 8126.

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CHAPTER 8. PRE-FLIGHT AND POST-FLIGHT INFORMATION/DATA

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8.2 Automated aeronautical information systems

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8.2.1 ~~Where the~~ The civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with 3.1.1 c) ~~uses~~ shall use automated pre-flight information systems to make aeronautical information/data available to operations personnel including flight crew members for self-briefing, flight planning and flight information service purposes. ~~, the~~ The information/data made available shall comply with the provisions of 8.1.2 and 8.1.3.

~~8.2.4~~ 8.2.2 Self-briefing facilities of an automated pre-flight information system shall provide for access by operations personnel, including flight crew members and other aeronautical personnel concerned, to consultation as necessary with the aeronautical information service by telephone or other suitable telecommunications means. The human/machine interface of such facilities shall ensure easy access in a guided manner to all relevant information/data.

~~8.2.5~~ 8.2.3 ~~**Recommendation.—**~~ Automated pre-flight information systems for the supply of aeronautical information/data for self-briefing, flight planning and flight information service ~~should~~ shall:

provide for continuous and timely updating of the system database and monitoring of the validity and quality of the aeronautical ~~information~~ data stored;

f) permit access to the system by operations personnel including flight crew members, aeronautical personnel concerned and other aeronautical users through suitable telecommunications means;

g) ensure provision, in paper copy form, of the aeronautical information/data accessed, as required;

h) use access and interrogation procedures based on abbreviated plain language and ICAO location indicators, as appropriate, or based on a menu-driven user interface or other appropriate mechanism as agreed between the civil aviation authority and operator concerned; and

i) provide for rapid response to a user request for information.

Note.— ICAO abbreviations and codes and location indicators are given respectively in the Procedures for Air Navigation Services — ICAO Abbreviations and Codes (*PANS-ABC, Doc 8400*) *and* Location Indicators (*Doc 7910*).

~~8.2.2~~ 8.2.4 **Recommendation.—** *Automated pre-flight information systems providing a harmonized, common point of access by operations personnel, including flight crew members and other aeronautical personnel concerned, to aeronautical information in accordance with 8.2.1 and meteorological information in accordance with 9.5.1 of Annex 3 —* Meteorological Service for International Air Navigation*, should be established by an agreement between the civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with 3.1.1 c) and the relevant meteorological authority.*

~~8.2.3~~ 8.2.5 Where automated pre-flight information systems are used to provide the harmonized, common point of access by operations personnel, including flight crew members and other aeronautical personnel concerned, to aeronautical information/ data and meteorological information, the civil aviation authority or the agency to which the authority to provide service has been delegated in accordance with 3.1.1 c) shall remain responsible for the quality and timeliness of the aeronautical information/ data provided by means of such a system.

Note.— The meteorological authority concerned remains responsible for the quality of the meteorological information provided by means of such a system in accordance with 9.5.1 of Annex 3.

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APPENDIX 4. INFORMATION TO BE NOTIFICED BY AIRAC

PART 1

1. The establishment~~,~~ and withdrawal of, and premeditated significant changes (including operational trials) to:

1.1 Limits (horizontal and vertical), regulations and procedures applicable to:

flight information regions;

j) control areas;

k) control zones;

l) advisory areas;

m) ATS routes;

n) permanent danger, prohibited and restricted areas (including type and periods of activity when known) and ADIZ;

o) permanent areas or routes or portions thereof where the possibility of interception exists.

1.2 Positions, frequencies, call signs, identifiers, known irregularities and maintenance periods of radio navigation aids, ~~and~~ communication and surveillance facilities.

1.3 Holding and approach procedures, arrival and departure procedures, noise abatement procedures and any other pertinent ATS procedures.

1.4 Transition levels, transition altitudes and minimum sector altitudes.

~~1.4~~ 1.5 Meteorological facilities (including broadcasts) and procedures.

~~1.5~~ 1.6 Runways and stopways.

1.7 Taxiways and aprons.

1.8 Aerodrome ground operating procedures (including low visibility procedures).

1.9 Approach and runway lighting.

1.10 Aerodrome operating minima if published by a State.

PART 2

2. The establishment and withdrawal of, and premeditated significant changes to:

2.1 Position, height and lighting of navigational obstacles.

~~2.2 Taxiways and aprons.~~

~~2.3~~ 2.2 Hours of service~~:~~ of aerodromes, facilities and services.

~~2.4~~ 2.3 Customs, immigration and health services.

~~2.5~~ 2.4 Temporary danger, prohibited and restricted areas and navigational hazards, military exercises and mass movements of aircraft.

~~2.6~~ 2.5 Temporary areas or routes or portions thereof where the possibility of interception exists.

PART 3

3. The establishment of, and premeditated major changes to:

3.1 New aerodromes certified for international IFR operations.

3.2 New runways certified for IFR operations at international aerodromes.

3.3 Design and structure of the air traffic services route network.

3.4 Design and structure of a set of terminal procedures (including change of procedure bearings due to magnetic variation change).

3.5 Circumstances listed in Part 1 if the entire State or any portion thereof is affected or if cross-border coordination is required.

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APPENDIX 7. AERONAUTICAL DATA QUALITY REQUIREMENTS

Table A7-1. Latitude and longitude

Latitude and longitude	Publication resolution	Integrity Classification
. . .		
Runway end ~~(flight path alignment point)~~.....	1/100 sec	1×10^{-8} Critical
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