Subject: Adoption of Amendment 88 to Annex 10


Sir/Madam,

1. I have the honour to inform you that Amendment 88 to the International Standards and Recommended Practices, Aeronautical Telecommunications (Annex 10 to the Convention on International Civil Aviation) was adopted by the Council at the fifth meeting of its 198th Session on 27 February 2013. Copies of the Amendment and the Resolution of Adoption are available as attachments to the electronic version of this State letter on the ICAO-NET (http://portal.icao.int) where you can access all other relevant documentation.

2. When adopting the amendment, the Council prescribed 15 July 2013 as the date on which it will become effective, except for any part concerning which a majority of Contracting States have registered their disapproval before that date. In addition, the Council resolved that Amendment 88, to the extent it becomes effective, will become applicable on 14 November 2013.

3. Amendment 88 arises from the work of the Secretariat supported by the Aeronautical Communications Panel (ACP), the Approach Classification Task Force (ACTF) in coordination with the Aerodromes Panel (AP), the Instrument Flight Procedure Panel (IFPP), the Navigation Systems Panel (NSP) and the Operations Panel (OPSP):

4. The proposed amendment to Annex 10, Volume I is consequential to the corresponding amendment to Annex 6 introducing a new approach classification scheme, and provides a mapping of Annex 10 system performance requirements to the new approach classification in Annex 6.
5. The proposed amendments to Annex 10, Volumes III and V encourage migration from ATN/OSI to ATN/IPS based systems and bring the affected Standards and Recommended Practices (SARPs) in line with previous updates to Annex 10, Volume III and the ITU Radio Regulations.

6. Additionally the proposed amendments bring Annex 10, Volume V further in line with current editorial practices for SARPs, as described in Assembly Resolution A37-15, Appendix A. Frequency assignment planning in the Regions will be performed in a more harmonious manner through use of the comprehensive frequency assignment planning material contained in the associated new Volume II of the ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies (Doc 9718).

7. It should be noted that regarding the amendments relating to approach classification as contained in Appendix A, the time between the effective date and the applicability date is longer than usual. The reason for this is the multi-disciplinary nature of the proposal and the resulting need for distributing an information package as part of a roll-out plan to ensure that all disciplines are aligned towards a seamless implementation.

8. In conformity with the Resolution of Adoption, may I request:

   a) that before 15 July 2013 you inform me if there is any part of the adopted Standards and Recommended Practices (SARPs) amendments in Amendment 88 concerning which your Government wishes to register disapproval, using the form in Attachment B for this purpose. Please note that only statements of disapproval need be registered and if you do not reply it will be assumed that you do not disapprove of the amendment;

   b) that before 14 October 2013 you inform me of the following, using the form in Attachment C for this purpose:

      1) any differences that will exist on 14 November 2013 between the national regulations or practices of your Government and the provisions of Annex 10, Volumes III and V, as amended by all amendments up to and including Amendment 88, and thereafter of any further differences that may arise;

      2) any differences that will exist on 13 November 2014 between the national regulations or practices of your Government and the provisions of Annex 10, Volume I, as amended by all amendments up to and including Amendment 88, and thereafter of any further differences that may arise; and

      3) the date or dates by which your Government will have complied with the provisions of the whole of Annex 10, as amended by all amendments up to and including Amendment 88.

9. With reference to the request in paragraph 8 a) above, it should be noted that a registration of disapproval of Amendment 88 or any part of it in accordance with Article 90 of the Convention does not constitute a notification of differences under Article 38 of the Convention. To comply with the latter provision, a separate statement is necessary if any differences do exist, as requested in paragraphs 8 b) 1) and 2). It is recalled in this respect that international Standards in Annexes have a conditional binding force, to the extent that the State or States concerned have not notified any difference thereto under Article 38 of the Convention.

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1 13 October 2014 for Volume I, Chapter 1—Definitions, Note 3.
10. With reference to the request in paragraph 8 b) above, it should be also noted that the Council, at the third meeting of its 192nd Session on 4 March 2011, agreed that pending the development of a concrete policy and operational procedures governing the use of EFOD, this system be used as an alternative means for filing of differences to all Annexes, except for Annex 9 — Facilitation and Annex 17 — Security — Safeguarding International Civil Aviation against Acts of Unlawful Interference. EFOD is currently available on the USOAP restricted website (http://www.icao.int/usoap) which is accessible by all Member States (AN 1/1-11/28 refers) and you are invited to consider using this for notification of compliance and differences.

11. Guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in Attachment D.

12. Please note that a detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

13. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 8 b) above, to the ICAO Regional Office accredited to your Government.

14. As soon as practicable after the amendment becomes effective, on 15 July 2013, replacement pages incorporating Amendment 88 will be forwarded to you.

Accept, Sir/Madam, the assurances of my highest consideration.

Raymond Benjamin
Secretary General

Enclosures:
A — Amendment to the Foreword of Annex 10
B — Form on notification of disapproval of all or part of Amendment 88 to Annex 10
C — Form on notification of compliance with or differences from Annex 10
D — Note on the Notification of Differences
**ATTACHMENT A** to State letter AN 7/1.1.48-13/12

**AMENDMENT TO THE FOREWORD OF ANNEX 10**

**AMENDMENT TO THE FOREWORDS OF ANNEX 10 — AERONAUTICAL TELECOMMUNICATIONS, VOLUMES I, II, III, IV AND V**

**VOLUME I**
(Sixth Edition)

*Add* the following at the end of Table A:

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Source(s)</th>
<th>Subject</th>
<th>Adopted/Approved Effective Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>88</td>
<td>Secretariat supported by the Approach Classification Task Force (ACTF) in coordination with the Aerodromes Panel (AP), the Instrument Flight Procedure Panel (IFPP), the Navigation Systems Panel (NSP) and the Operations Panel (OPSP)</td>
<td>Mapping of Annex 10 system performance requirements to the new approach classification in Annex 6.</td>
<td>27 February 2013 15 July 2013 13 November 2014</td>
</tr>
</tbody>
</table>

**VOLUME II**
(Sixth Edition)

*Add* the following at the end of Table A:

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Source(s)</th>
<th>Subject</th>
<th>Adopted/Approved Effective Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>88</td>
<td></td>
<td>No change.</td>
<td></td>
</tr>
</tbody>
</table>
Add the following at the end of Table A:

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Source(s)</th>
<th>Subject</th>
<th>Adopted/Approved Effective Applicable</th>
</tr>
</thead>
</table>
| 88        | Air Navigation Commission;                    | Alignment of VDL SARPs, mainly to reflect recent updates to the ITU Radio Regulations;  
|           | Fourth meeting of the Aeronautical Communications Panel (ACP), Working Group of the Whole (WG-W/4) | Provisions added to encourage implementation of ATN/IPS, while indicating that ATN/OSI remains a supported standard. | 27 February 2013 15 July 2013 14 November 2013 |

Add the following at the end of Table A:

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Source(s)</th>
<th>Subject</th>
<th>Adopted/Approved Effective Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>88</td>
<td>No change</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Add the following at the end of Table A:

<table>
<thead>
<tr>
<th>Amendment</th>
<th>Source(s)</th>
<th>Subject</th>
<th>Adopted/Approved Effective Applicable</th>
</tr>
</thead>
</table>
| 88        | Air Navigation Commission;                    | Alignment of SARPs with prior updates to the ITU Radio Regulations and Annex 10 Volume III.  
|           | Aeronautical Communications Panel (ACP) Working Group F (frequency) | Revision of VHF frequency assignment planning provisions. | 27 February 2013 15 July 2013 14 November 2013 |
NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF AMENDMENT 88 TO ANNEX 10

To: The Secretary General
    International Civil Aviation Organization
    999 University Street
    Montreal, Quebec
    Canada H3C 5H7

(State) __________________________________________ hereby wishes to disapprove the following parts of Amendment 88 to Annex 10:

Signature _______________________________________

Date _______________________

NOTES

1) If you wish to disapprove all or part of Amendment 88 to Annex 10, please dispatch this notification of disapproval to reach ICAO Headquarters by 15 July 2013. If it has not been received by that date it will be assumed that you do not disapprove of the amendment. **If you approve of all parts of Amendment 88, it is not necessary to return this notification of disapproval.**

2) This notification should not be considered a notification of compliance with or differences from Annex 10. Separate notifications on this are necessary. (See Attachment C.)

3) Please use extra sheets as required.
NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES FROM
ANNEX 10
(Including all amendments up to and including Amendment 88)

To: The Secretary General
International Civil Aviation Organization
999 University Street
Montreal, Quebec
Canada H3C 5H7

1. No differences will exist on ______________________________________ between the national regulations and/or practices of (State) ______________________________________ and the provisions of Annex 10, including all amendments up to and including Amendment 88.

2. The following differences will exist on ______________________________________ between the regulations and/or practices of (State) ______________________________________ and the provisions of Annex 10, including Amendment 88 (Please see Note 3 below.)

<table>
<thead>
<tr>
<th>a) Annex Provision</th>
<th>b) Difference Category</th>
<th>c) Details of Difference</th>
<th>d) Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Please give exact paragraph reference)</td>
<td>(Please indicate A, B, or C)</td>
<td>(Please describe the difference clearly and concisely)</td>
<td>(Please indicate reasons for the difference)</td>
</tr>
</tbody>
</table>

(Please use extra sheets as required)
3. By the dates indicated below, (State) will have complied with the provisions of Annex 10, including all amendments up to and including Amendment 88 for which differences have been notified in 2 above.

<table>
<thead>
<tr>
<th>a) Annex Provision</th>
<th>b) Date</th>
<th>c) Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Please give exact paragraph reference)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Please use extra sheets as required)

Signature ___________________________ Date _______________________

NOTES

1) If paragraph 1 above is applicable to you, please complete paragraph 1 and return this form to ICAO Headquarters. If paragraph 2 is applicable to you, please complete paragraphs 2 and 3 and return the form to ICAO Headquarters.

2) Please dispatch the form to reach ICAO Headquarters by 14 October 20131.

3) A detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

4) Guidance on the notification of differences from Annex 10 is provided in the Note on the Notification of Differences at Attachment D.

5) Please send a copy of this notification to the ICAO Regional Office accredited to your Government.

       — — — — — — — — — —

1 13 October 2014 for Volume I, Chapter 1— Definitions, Note 3.
NOTE ON THE NOTIFICATION OF DIFFERENCES TO ANNEX 10 AND FORM OF NOTIFICATION

(Prepared and issued in accordance with instructions of the Council)

1. Introduction

1.1 The Assembly and the Council, when reviewing the notification of differences by States in compliance with Article 38 of the Convention, have repeatedly noted that the state of such reporting is not entirely satisfactory.

1.2 With a view to achieving a more comprehensive coverage, this note is issued to facilitate the determination and reporting of such differences and to state the primary purpose of such reporting.

1.3 The primary purpose of reporting of differences is to promote safety and efficiency in air navigation by ensuring that governmental and other agencies, including operators and service providers, concerned with international civil aviation are made aware of all national regulations and practices in so far as they differ from those prescribed in the ICAO Standards.

1.4 Contracting States are, therefore, requested to give particular attention to the notification before 14 October 2013 of differences with respect to Standards in Annex 10. The Council has also urged Contracting States to extend the above considerations to Recommended Practices.

1.5 Contracting States are asked to note further that it is necessary to make an explicit statement of intent to comply where such intent exists, or where such is not the intent, of the difference or differences that will exist. This statement should be made not only to the latest amendment but to the whole Annex, including the amendment.

1.6 If previous notifications have been made in respect of this Annex, detailed repetition may be avoided, if appropriate, by stating the current validity of the earlier notification. States are requested to provide updates of the differences previously notified after each amendment, as appropriate, until the difference no longer exists.

2. Notification of differences to Annex 10, including Amendment 88

2.1 Past experience has indicated that the reporting of differences to Annex 10 has in some instances been too extensive since some appear merely to be a different manner of expressing the same intent.

2.2 Guidance to Contracting States in the reporting of differences to Annex 10 can only be given in very general terms. Where the national regulations of States call for compliance with procedures that are not identical but essentially similar to those contained in the Annex, no difference should be reported since the details of the procedures existing are the subject of notification through the medium of aeronautical information publications. Although differences to Recommended Practices are not notifiable under Article 38 of the Convention, Contracting States are urged to notify the Organization of the differences between their national regulations and practices and any corresponding Recommended

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1 13 October 2014 for Volume I, Chapter 1—Definitions, Note 3.
Practices contained in an Annex. States should categorize each difference notified on the basis of whether the corresponding national regulation is:

a) **More exacting or exceeds the ICAO Standard or Recommended Practice (SARP) (Category A).** This category applies when the national regulation is more demanding than the corresponding SARP, or imposes an obligation within the scope of the Annex which is not covered by a SARP. This is of particular importance where a State requires a higher standard which affects the operation of aircraft of other Contracting States in and above its territory;

b) **Different in character or other means of compliance (Category B)**. This category applies when the national regulation is different in character from the corresponding ICAO SARP, or when the national regulation differs in principle, type or system from the corresponding SARP, without necessarily imposing an additional obligation; and

c) **Less protective or partially implemented/not implemented (Category C).** This category applies when the national regulation is less protective than the corresponding SARP; or when no national regulation has been promulgated to address the corresponding SARP, in whole or in part.

2.3 When a Contracting State deems an ICAO Standard concerning aircraft, operations, equipment, personnel, or air navigation facilities or services to be not applicable to the existing aviation activities of the State, notification of a difference is not required. For example, a Contracting State that is not a State of Design or Manufacture and that does not have any national regulations on the subject, would not be required to notify differences to Annex 8 provisions related to the design and construction of an aircraft.

2.4 For States that have already fully reported differences from Annex 10 or have reported that no differences exist, the reporting of any further differences occasioned by the amendment should be relatively straightforward; however, attention is called to paragraph 1.5 wherein it is indicated that this statement should be not only to the latest amendment but to the whole Annex, including the amendment.

3. **Form of notification of differences**

3.1 Differences should be notified in the following form:

a) **Reference:** The number of the paragraph or subparagraph in Annex 10 as amended which contains the Standard or Recommended Practice to which the difference relates;

b) **Category:** Indicate the category of the difference as A, B or C in accordance with paragraph 2.2 above;

* The expression “different in character or other means of compliance” in b) would be applied to a national regulation which achieves, by other means, the same objective as that of the corresponding ICAO SARPs and so cannot be classified under a) or c).
c) Description of the difference: Clearly and concisely describe the difference and its effect; and

d) Remarks: Under “Remarks” indicate reasons for the difference and intentions including any planned date for implementation.

3.2 The differences notified will be recorded in a Supplement to the Annex, normally in the terms used by the Contracting State when making the notification. In the interest of making the supplement as useful as possible, please make statements as clear and concise as possible and confine remarks to essential points. Comments on implementation, in accordance with paragraph 4 b) 2) of the Resolution of Adoption, should not be combined with those concerning differences. The provision of extracts from national regulations cannot be considered as sufficient to satisfy the obligation to notify differences. General comments that do not relate to specific differences will not be published in Supplements.

— END —
AMENDMENT No. 88

TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AERONAUTICAL
TELECOMMUNICATIONS

ANNEX 10

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME I
(RADIO NAVIGATION AIDS)

The amendment to Annex 10, Volume I, contained in this document was adopted by the Council of ICAO on 27 February 2013. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before 15 July 2013 will become effective on that date and will become applicable on 13 November 2014 as specified in the Resolution of Adoption. (State letter AN 7/1.1.48-13/12 refers.)

MARCH 2013

INTERNATIONAL CIVIL AVIATION ORGANIZATION
AMENDMENT 88 TO THE INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES AND PROCEDURES FOR AIR NAVIGATION SERVICES

AERONAUTICAL TELECOMMUNICATIONS

RESOLUTION OF ADOPTION

The Council

Acting in accordance with the Convention on International Civil Aviation, and particularly with the provisions of Articles 37, 54 and 90 thereof,

1. Hereby adopts on 27 February 2013 Amendment 88 to the International Standards and Recommended Practices contained in the document entitled International Standards and Recommended Practices, Aeronautical Telecommunications which for convenience is designated Annex 10 to the Convention;

2. Prescribes 15 July 2013 as the date upon which the said amendment shall become effective, except for any part thereof in respect of which a majority of the Contracting States have registered their disapproval with the Council before that date;

3. Resolves that the said amendment or such parts thereof as have become effective shall become applicable on 13 November 2014;

4. Requests the Secretary General:

a) to notify each Contracting State immediately of the above action and immediately after 15 July 2013 of those parts of the amendment which have become effective;

b) to request each Contracting State:

1) to notify the Organization (in accordance with the obligation imposed by Article 38 of the Convention) of the differences that will exist on 13 November 2014 between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 13 October 2014, and thereafter to notify the Organization of any further differences that arise;

2) to notify the Organization before 13 October 2014 of the date or dates by which it will have complied with the provisions of the Standards in the Annex as hereby amended;

c) to invite each Contracting State to notify additionally any differences between its own practices and those established by the Recommended Practices, when the notification of such differences is important for the safety of air navigation, following the procedure specified in subparagraph b) above with respect to differences from Standards.
NOTES ON THE PRESENTATION OF THE AMENDMENT TO ANNEX 10, VOLUME I

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 AMENDMENT 88 TO THE
INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

ANNEX 10 — AERONAUTICAL TELECOMMUNICATIONS

VOLUME I — RADIO NAVIGATION AIDS

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

CHAPTER 1. DEFINITIONS

Note 1.— All references to “Radio Regulations” are to the Radio Regulations published by the International Telecommunication Union (ITU). Radio Regulations are amended from time to time by the decisions embodied in the Final Acts of World Radiocommunication Conferences held normally every two to three years. Further information on the ITU processes as they relate to aeronautical radio system frequency use is contained in the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including statement of approved ICAO policies (Doc 9718).

Note 3.— The terminology used in this Annex to refer to instrument approach operations is based on a previous version of the Annex 6 classification of instrument approach and landing operations. It can be mapped to the Annex 6 definitions as follows:

<table>
<thead>
<tr>
<th>Performance requirements in support of instrument approach operations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annex 10 system performance</strong></td>
</tr>
<tr>
<td>Non-precision approach (NPA)</td>
</tr>
<tr>
<td>Approach with vertical guidance (APV)</td>
</tr>
<tr>
<td>Category I, DH equal to or greater than 75 m (250 ft)</td>
</tr>
<tr>
<td>Category I, DH equal to or greater than 60 m (200 ft) and less than 75 m (250 ft)</td>
</tr>
<tr>
<td>Category II</td>
</tr>
<tr>
<td>Category III</td>
</tr>
</tbody>
</table>

(1) Without vertical guidance;
(2) With barometric or SBAS vertical guidance.
(3) With ILS, MLS, GBAS or SBAS vertical guidance.

— END —
AMENDMENT No. 88

TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AERONAUTICAL
TELECOMMUNICATIONS

ANNEX 10

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME III
COMMUNICATION SYSTEMS
(Part I — Digital Data Communication Systems
Part II — Voice Communication Systems)

The amendment to Annex 10, Volume III, contained in this document was adopted by the Council of ICAO on 27 February 2013. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before 15 July 2013 will become effective on that date and will become applicable on 14 November 2013 as specified in the Resolution of Adoption. (State letter AN 7/1.48-13/12 refers.)

MARCH 2013

INTERNATIONAL CIVIL AVIATION ORGANIZATION
AMENDMENT 88 TO THE INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES AND
PROCEDURES FOR AIR NAVIGATION SERVICES

AERONAUTICAL TELECOMMUNICATIONS

RESOLUTION OF ADOPTION

The Council

Acting in accordance with the Convention on International Civil Aviation, and particularly with the provisions of Articles 37, 54 and 90 thereof,

1. Hereby adopts on 27 February 2013 Amendment 88 to the International Standards and Recommended Practices contained in the document entitled *International Standards and Recommended Practices, Aeronautical Telecommunications* which for convenience is designated Annex 10 to the Convention;

2. Prescribes 15 July 2013 as the date upon which the said amendment shall become effective, except for any part thereof in respect of which a majority of the Contracting States have registered their disapproval with the Council before that date;

3. Resolves that the said amendment or such parts thereof as have become effective shall become applicable on 14 November 2013;

4. Requests the Secretary General:

   a) to notify each Contracting State immediately of the above action and immediately after 15 July 2013 of those parts of the amendment which have become effective;

   b) to request each Contracting State:

     1) to notify the Organization (in accordance with the obligation imposed by Article 38 of the Convention) of the differences that will exist on 14 November 2013 between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 14 October 2013, and thereafter to notify the Organization of any further differences that arise;

     2) to notify the Organization before 14 October 2013 of the date or dates by which it will have complied with the provisions of the Standards in the Annex as hereby amended;

   c) to invite each Contracting State to notify additionally any differences between its own practices and those established by the Recommended Practices, when the notification of such differences is important for the safety of air navigation, following the procedure specified in subparagraph b) above with respect to differences from Standards.

   — — — — — — — —
NOTES ON THE PRESENTATION OF THE AMENDMENT TO ANNEX 10, VOLUME III

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
3.4 GENERAL REQUIREMENTS

3.4.1 The ATN shall either use International Organization for Standardization (ISO) communication standards for open systems interconnection (OSI) or use the Internet Society (ISOC) communications standards for the Internet Protocol Suite (IPS).

Note 1.— ATN/IPS implementation is preferred for ground/ground networks. While ATN/OSI continues to be supported in air/ground networks, particularly when using VDL Mode 2, it is expected that future air/ground implementations will use the ATN/IPS.

Note 2.— Interoperability between interconnecting OSI/IPS networks is expected to be arranged prior to implementation.

Note 23.— Guidance material on interoperability between ATN/OSI and ATN/IPS is contained in Doc 9896.

6.3.5.3.1 After 1 January 2002, the receiving function of all new installations of VDL shall satisfy the specified error rate with a desired signal field strength of not more than 40 microvolts per metre (minus 114 dBW/m²) and with an undesired VHF DSB-AM, D8PSK or GFSK signal at least 60 dB higher than the desired signal on any assignable channel 100 kHz or more away from the assigned channel of the desired signal.
Note.— This level of interference immunity performance provides a receiver performance consistent with the influence of the VDL RF spectrum mask as specified in 6.3.4 with an effective isolation transmitter/receiver isolation of 69 dB. Better transmitter and receiver performance could result in less isolation required. Guidance material on the measurement technique is included in Annex 10, Volume V, Attachment A, section 7, the ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies (Doc 9718).

6.9.2 VDL Mode 4 radio channels

6.9.2.1 VDL MODE 4 STATION FREQUENCY RANGE

6.9.2.1.1 Transmitter/receiver tuning range. A VDL Mode 4 transmitter/receiver shall be capable of tuning to any of the 25 kHz channels from 117.975–112 MHz through to 137 MHz. The transmitter shall have a means for the tuning range to be restricted to a narrower range.

Note.— Operational conditions or certain applications may require the equipment to be operated in a narrower frequency range.

6.9.2.1.2 Recommendation.— A VDL Mode 4 transmitter/receiver should be capable of tuning to any of the 25 kHz channels from 108 to 117.975 MHz.

Note.— The band 108–117.975 MHz may be utilized in accordance with the relevant provisions of the ITU Radio Regulations.

6.9.2.1.3 Simultaneous reception. A VDL Mode 4 station shall be capable of receiving two channels simultaneously.

6.9.2.1.4 Recommendation.— A VDL Mode 4 station should be capable of receiving additional channels simultaneously as required by operational services.

6.9.3 System capabilities

6.9.3.1 ATN compatibility. The VDL Mode 4 system shall support ATN/IPS-compliant subnetwork services for surveillance applications.

Note.— VDL Mode 4 provides a seamless transfer of data between ATN/IPS ground networks and ATN/IPS aircraft networks. Interoperability with ATN/OSI networks, where required, is expected to be arranged prior to implementation. VDL Modes 2 and 3 provide ATN/OSI compliant subnetworks.

Delete Table 6-5 in its entirety and renumber the subsequent table accordingly.

— END —
AMENDMENT No. 88

TO THE

INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AERONAUTICAL
TELECOMMUNICATIONS

ANNEX 10

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME V
(AERONAUTICAL RADIO FREQUENCY SPECTRUM UTILIZATION)

The amendment to Annex 10, Volume V, contained in this document was adopted by the Council of ICAO on 27 February 2013. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before 15 July 2013 will become effective on that date and will become applicable on 14 November 2013 as specified in the Resolution of Adoption. (State letter AN 7/1.1.48-13/12 refers.)

MARCH 2013

INTERNATIONAL CIVIL AVIATION ORGANIZATION
AMENDMENT 88 TO THE INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES

AERONAUTICAL TELECOMMUNICATIONS

RESOLUTION OF ADOPTION

The Council

Acting in accordance with the Convention on International Civil Aviation, and particularly with the provisions of Articles 37, 54 and 90 thereof,

1. Hereby adopts on 27 February 2013 Amendment 88 to the International Standards and Recommended Practices contained in the document entitled International Standards and Recommended Practices, Aeronautical Telecommunications which for convenience is designated Annex 10 to the Convention;

2. Prescribes 15 July 2013 as the date upon which the said amendment shall become effective, except for any part thereof in respect of which a majority of the Contracting States have registered their disapproval with the Council before that date;

3. Resolves that the said amendment or such parts thereof as have become effective shall become applicable on 14 November 2013;

4. Requests the Secretary General:

   a) to notify each Contracting State immediately of the above action and immediately after 15 July 2013 of those parts of the amendment which have become effective;

   b) to request each Contracting State:

      1) to notify the Organization (in accordance with the obligation imposed by Article 38 of the Convention) of the differences that will exist on 14 November 2013 between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 14 October 2013, and thereafter to notify the Organization of any further differences that arise;

      2) to notify the Organization before 14 October 2013 of the date or dates by which it will have complied with the provisions of the Standards in the Annex as hereby amended;

   c) to invite each Contracting State to notify additionally any differences between its own practices and those established by the Recommended Practices, when the notification of such differences is important for the safety of air navigation, following the procedure specified in subparagraph b) above with respect to differences from Standards.
NOTES ON THE PRESENTATION OF THE AMENDMENT TO ANNEX 10, VOLUME V

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 AMENDMENT 88 TO THE INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

ANNEX 10 — AERONAUTICAL TELECOMMUNICATIONS

VOLUME V
(AERONAUTICAL RADIO FREQUENCY SPECTRUM UTILIZATION)

CHAPTER 1. DEFINITIONS

... 

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

Note.— The classification of emissions and information relevant to the portion of the frequency spectrum appropriate for a given type of transmission (bandwidths) are specified in the Radio Regulations, Article 82 and Appendix 81.

... 

CHAPTER 2. DISTRESS FREQUENCIES

Introduction

Note.— The ITU Radio Regulations Article S30 provides general conditions for distress and safety communications for all mobile services. Appendix S13 designates the frequencies to be used for these situations. The aeronautical mobile service is also permitted under Appendix S13, Part A1, Section I, Article 30, Section III, No. 30.9 to conform to special arrangements between governments where these have been agreed. ICAO Annexes constitute such agreements.

... 

The frequency 2 182 kHz also offers possibilities for communication between aircraft and stations of the maritime mobile service. The ITU Radio Regulations specify in Appendix S13, Part A2, Article 30, Section III, No. 30.11 that the frequency 2 182 kHz is the international distress frequency for radiotelephony to be used for that purpose emergency communications by ship, aircraft and survival craft stations using frequencies in the authorized bands between 1 605 kHz and 4 000 kHz when requesting assistance from, or communicating with, the maritime service.

With respect to emergency locator transmitters (ELTs) designed to be detected and located by satellite, the Radio Regulations authorize the use of these devices, which are referenced in ITU as satellite emergency position indicating radio beacons (EPIRBs). Radio Regulations Appendix S13, Part A2, Article 31, Section I, No. 31.1 specifies that the band 406 – 406.1 MHz is used exclusively by satellite emergency position indicating radio beacons in the earth-to-space direction.
The frequency 4 125 kHz is also authorized by the ITU to enable communications between stations in the maritime mobile service and aircraft stations in distress. The current ITU Radio Regulations (RR §5.130 and Appendix S13 Articles 31 and 32) state that the carrier frequency 4 125 kHz may be used by aircraft stations to communicate with stations of the maritime mobile service for distress and safety purposes. The aeronautical mobile (R) service frequencies 3 023 kHz and 5 680 kHz may be employed for coordinated search and rescue operations with the maritime mobile service under RR §5.115.

Similarly, the frequency 500 kHz (RR §5.83) is the international distress frequency for Morse radiotelegraphy to be used for that purpose by ship, aircraft and survival craft stations using frequencies in the bands between 415 kHz and 535 kHz when requesting assistance from the maritime service (RR Appendix S13, Part A2).

With respect to survival craft stations, the Radio Regulations provide for the use of the frequency(ies) 500 kHz, 8 364 kHz, 2 182 kHz, 121.500 MHz and 243 MHz, if the survival craft is capable of operating in the bands 415 – 535 kHz, 4 000 – 27 500 kHz, 1 605 – 2 850 kHz, 117.975 – 137.000 MHz and 235 – 328.6 MHz respectively (RR Articles 31 and 32 Appendix S13, Part A2).

2.1 Frequencies for emergency locator transmitters (ELTs) for search and rescue

2.1.1 Until 1 January 2005 emergency locator transmitters carried in compliance with Standards of Annex 6, Parts I, II and III shall operate either on both 406 MHz and 121.5 MHz or on 121.5 MHz.

2.1.2 All emergency locator transmitters installed on or after 1 January 2002 and carried in compliance with Standards of Annex 6, Parts I, II and III shall operate on both 406 MHz and 121.500 MHz.

2.1.3 From 1 January 2005, emergency locator transmitters carried in compliance with Standards of Annex 6, Parts I, II and III shall operate on both 406 MHz and 121.5 MHz.

Note 1.— ITU Radio Regulations (§5.256 and Appendix S13) provide for the use of 243 MHz in addition to the above frequencies.

Note 2.— Specifications for ELTs are found in Annex 10, Volume III, Part II, Chapter 5 and the ITU Radio Regulations, Article 34, Section I, No. 34.1.

CHAPTER 3. UTILIZATION OF FREQUENCIES BELOW 30 MHz

Introduction

High frequency bands allocated to the aeronautical mobile (R) service

The frequency bands between 2.8 MHz and 22 MHz allocated to the aeronautical mobile (R) service are given in Article §5.256 of the ITU Radio Regulations. The utilization of these bands must be in accordance with the relevant provisions of the Radio Regulations and in particular Appendix 27 to the Radio Regulations. Prior to 1 September 1979, the provisions are contained in the Final Acts of the ITU Extraordinary Administrative Radio Conference (Geneva 1966). On 1 September 1979, revised provisions came into force, details of which are contained in the Final Acts of the World Administrative Radio
Conference for the Aeronautical Mobile (R) Service (Geneva 1978) and Appendix 27 Aer2 to the Radio Regulations, except the Frequency Allotment Plan which entered into force at 0001 hours UTC, 1 February 1983. In the Radio Regulations, 1998 version, based on the World Administrative Radio Conference for the Mobile Services (1987), Appendix S27 now incorporates editorial amendments to Appendix 27 Aer2. In the utilization of these bands, States’ attention is drawn to the possibility of harmful radio interference from non-aeronautical sources of radio frequency energy and the need to take appropriate measures to minimize its effects.

3.1 Method of operations

3.1.1 In the aeronautical mobile service, single channel simplex shall be used in radiotelephone communications utilizing radio frequencies below 30 MHz in the bands allocated exclusively to the aeronautical mobile (R) service.

3.1.2 Assignment of single sideband channels

3.1.2.1 Single sideband channels shall be assigned in accordance with Volume III, Part II, Chapter 2, 2.4.

3.1.2.2 For the operational use of the channels concerned administrations shall take into account the provisions of S27/19 27/19 of Appendix S27 27 of the ITU Radio Regulations.

3.1.2.3 Recommendation.— The use of aeronautical mobile (R) frequencies below 30 MHz for international operations should be coordinated as specified in Appendix S27 27 of the ITU Radio Regulations as follows:

S27/19 27/19 The International Civil Aviation Organization (ICAO) co-ordinates radio-communications of the aeronautical mobile (R) service with international aeronautical operations and this Organization should be consulted in all appropriate cases in the operational use of the frequencies in the Plan.

3.1.2.4 Recommendation.— Where international operating requirements for HF communications cannot be satisfied by the Frequency Allotment Plan at Part 2 of Appendix S27 27 to the Radio Regulations, an appropriate frequency may be assigned as specified in Appendix S27 27 by the application of the following provisions:

S27/20 27/20 It is recognized that not all the sharing possibilities have been exhausted in the Allotment Plan contained in this Appendix. Therefore, in order to satisfy particular operational requirements which are not otherwise met by this Allotment Plan, administrations may assign frequencies from the aeronautical mobile (R) bands in areas other than those to which they are allotted in this Plan. However, the use of the frequencies so assigned must not reduce the protection to the same frequencies in the areas where they are allotted by the Plan below that determined by the application of the procedure defined in Part I, Section II B of this Appendix.

Note.— Part I, Section II B of Appendix S27 27 relates to Interference Range Contours, and application of the procedure results in a protection ratio of 15 dB.
When necessary to satisfy the needs of international air operations administrations may adapt the allotment procedure for the assignment of aeronautical mobile (R) frequencies, which assignments shall then be the subject of prior agreement between administrations affected.

The co-ordination described in No. S27/21 shall be effected where appropriate and desirable for the efficient utilization of the frequencies in question, and especially when the procedures of No. S27/19 are unsatisfactory.

3.1.2.5 The use of classes of emission J7B and J9B shall be subject to the following provisions of Appendix S27:

For radiotelephone emissions the audio frequencies will be limited to between 300 and 2 700 Hz and the occupied bandwidth of other authorized emissions will not exceed the upper limit of J3E emissions. In specifying these limits, however, no restriction in their extension is implied in so far as emissions other than J3E are concerned, provided that the limits of unwanted emissions are met (see Nos. S27/73 and S27/74).

On account of the possibility of interference, a given channel should not be used in the same allotment area for radiotelephony and data transmissions.

The use of channels derived from the frequencies indicated in S27/18 for the various classes of emissions other than J3E and H2B will be subject to special arrangements by the administrations concerned and affected in order to avoid harmful interference which may result from the simultaneous use of the same channel for several classes of emission.

Assignment of frequencies for aeronautical operational control communications

3.1.3.1 Worldwide frequencies for aeronautical operational control communications are required to enable aircraft operating agencies to meet the obligations prescribed in Annex 6, Part I. Assignment of these frequencies shall be in accordance with the following provisions of Appendix S27:

A worldwide allotment area is one in which frequencies are allotted to provide long distance communications between an aeronautical station within that allotment area and aircraft operating anywhere in the world.

The worldwide frequency allotments appearing in the tables at No. S27/213 and Nos. S27/218 to S27/231, except for carrier (reference) frequencies 3 023 kHz and 5 680 kHz, are reserved for assignment by administrations to stations operating under authority granted by the administration concerned for the purpose of serving one or more aircraft operating agencies. Such assignments are to provide communications between an appropriate aeronautical station and an aircraft station anywhere in the world for exercising control over regularity of flight and for safety of aircraft. Worldwide frequencies are not to be assigned by administrations for MWARA, RDARA and VOLMET purposes. Where the operational area of an aircraft lies wholly

---

6 The type of communications referred to in S27/9 may be regulated by administrations.
within a RDARA or sub-RDARA boundary, frequencies allotted to those RDARAs and sub-RDARAs shall be used.

Note 1.— Tables S27/213 27/213 and S27/218 27/218 to S27/231 27/231 appearing in Appendix S27 27 to the ITU Radio Regulations refer to, respectively, the Frequency Allotment Plan, listing frequencies by areas, and the Frequency Allotment Plan, listing frequencies in numerical order.

Note 2.— Guidance material on the assignment of worldwide frequencies is contained in Attachment CB.

3.2 NDB frequency management

3.2.1 Recommendation.— NDB frequency management should take into account the following:

a) the interference protection required at the edge of the rated coverage;

b) the application of the figures shown for typical ADF equipment;

c) the geographical spacings and the respective rated coverages;

d) the possibility of interference from spurious radiation generated by non-aeronautical sources (e.g. electric power services, power line communication systems, industrial radiation, etc.).

Note 1.— Guidance material to assist in determining the application of the foregoing is given in Attachment BA.

Note 2.— Attention is drawn to the fact that some portions of the bands available for aeronautical beacons are shared with other services.

CHAPTER 4. UTILIZATION OF FREQUENCIES ABOVE 30 MHz

Details pertaining to the allocation of spectrum to aeronautical services, including footnoted allocations and restrictions, are contained in both the ITU Radio Regulations of the International Telecommunication Union and the ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies (Doc 9718).

4.1 Utilization in the frequency band

117.975 – 137.000 MHz

Introduction

The band 118 – 132 MHz was allocated in 1947 by the Atlantic City ITU Radio Conference, and again in 1959 by the Geneva Conference, but with extension downwards to 117.975 MHz, for the exclusive use by the aeronautical mobile (R) service.
ITU Radio Conferences subsequent to 1947 also made provisions for the use of the band 132 – 136 MHz for the aeronautical mobile (R) service under conditions which vary for the different ITU Regions, countries or combination of countries. The utilization of this band has been included in the Allotment Table in this chapter. The ITU World Administrative Radio Conference (1979) made provisions for the use of the band 136 – 137 MHz by the aeronautical mobile (R) service, subject to conditions of Nos. S5.203, S5.203A and S5.203B of the Radio Regulations. The use of frequencies in the 136 – 137 MHz part of the band must take account of the conditions contained in these notes. In the utilization of these bands, States’ attention is drawn to the possibility of harmful radio interference from non-aeronautical sources of radio frequency energy and the need to take appropriate measures to minimize its effects.

This chapter Section 4.1 deals with Standards and Recommended Practices (SARPs) relating to the use of the frequency band 117.975 – 137.000 MHz and includes matters pertaining to the selection of particular frequencies for various aeronautical purposes. These Standards SARPs are introduced by the following preface, which sets out the principles upon which the utilization of VHF this frequency band on a worldwide basis with due regard to economy has been is being planned.

Preface

The utilization of VHF the frequency band 117.975 – 137.000 MHz on a worldwide basis with due regard to economy and practicability requires a plan that will take into account:

... 

d) the need for providing a global framework for the integrated coordinated development of Regional Plans;

e) the need, in certain regions, to have more detailed plans and planning criteria in addition to the provisions in this section;

Renumber remaining subparagraphs accordingly

...

4.1.1 General allotment of frequency band 117.975 – 137.000 MHz

Note.— The plan includes a general Allotment Table that subdivides the complete frequency band 117.975 – 137.000 MHz, the chief subdivisions being the frequency bands of frequencies allocated to both national and international services, and the frequency bands allocated to national services. Observance of this general subdivision should keep to a minimum the problem of coordinating national and international application.

4.1.1.1 The block allotment of the frequency band 117.975 – 137.000 MHz shall be as shown in Table 4-1.

4.1.1.2 Recommendation.— In the case of the band 136 – 137 MHz, international applications have not yet been agreed, and these frequencies should be brought into use on a regional basis where and in the manner required.
4.1.2 Frequency separation and limits of assignable frequencies

Note.— In the following text the channel spacing for 8.33 kHz channel assignments is defined as 25 kHz divided by 3 which is 8.333... kHz.

4.1.2.3\footnote{In the frequency band 117.975 – 137.000 MHz, the lowest assignable frequency shall be 118.000 MHz and the highest 136.975 MHz. [Editorial comment: This paragraph, now modified, was originally paragraph 4.1.2.3.]} In the frequency band 117.975 – 137.000 MHz, the lowest assignable frequency shall be 118.000 MHz and the highest 136.975 MHz. [Editorial comment: This paragraph, now modified, was originally paragraph 4.1.2.3.]

4.1.2.4\footnote{The minimum separation between assignable frequencies in the aeronautical mobile (R) service shall be 8.33 kHz.} The minimum separation between assignable frequencies in the aeronautical mobile (R) service shall be 8.33 kHz.

Note.— It is recognized that in some regions or areas, 100 kHz, 50 kHz or 25 kHz channel spacing provides an adequate number of frequencies suitably related to international and national air services and that equipment designed specifically for 100 kHz, 50 kHz or 25 kHz channel spacing will remain adequate for services operating within such regions or areas. It is further recognized that assignments based on 25 kHz channel spacing as well as 8.33 kHz channel spacing may continue to co-exist within one region or area.

4.1.2.2 Until at least 1 January 2005, DSB-AM equipment specifically designed for 25 kHz channel spacing shall be safeguarded with respect to its suitability for the aeronautical mobile (R) service (AM(R))S except in those regions or areas where regional agreement permits the use of equipment specifically designed for 8.33 kHz channel spacing or for VDL Mode 3 when used for air-ground voice communications.

Table 4-1. Allotment table

<table>
<thead>
<tr>
<th>Block allotment of Frequencies (MHz)</th>
<th>Worldwide utilization</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 118.000 – 121.450 inclusive</td>
<td>International and National Aeronautical Mobile Services</td>
<td>Specific international allotments will be determined in the light of regional agreement. National assignments are covered by the provisions in 4.1.4.8 and 4.1.4.9.</td>
</tr>
<tr>
<td>b) 121.500</td>
<td>Emergency frequency</td>
<td>See 4.1.3.1. In order to provide a guard band for the protection of the aeronautical emergency frequency, the nearest assignable frequencies on either side of 121.500 MHz are 121.450 MHz and 121.6 121.550 MHz, except that by regional agreement it may be decided that the nearest assignable frequencies are 121.3 MHz and 121.7 MHz.</td>
</tr>
<tr>
<td>c) 121.6 121.550 – 121.9917 inclusive</td>
<td>International and Aerodrome Surface Communications</td>
<td>Reserved for ground movement, pre-flight checking, air traffic services clearances, and associated operations.</td>
</tr>
<tr>
<td>d) 122.000 – 123.050 inclusive</td>
<td>National Aeronautical Mobile Services</td>
<td>Reserved for national allotments. National assignments are covered by the provisions of 4.1.4.8 and 4.1.4.9.</td>
</tr>
</tbody>
</table>
### Block allotment of Frequencies (MHz) worldwide utilization Remarks

<table>
<thead>
<tr>
<th>Block allotted of Frequencies (MHz)</th>
<th>Worldwide utilization</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>e) 123.100</td>
<td>Auxiliary frequency SAR</td>
<td>See 4.1.3.4. In order to provide a guard band for the protection of the aeronautical auxiliary frequency, the nearest assignable frequencies on either side of 123.100 MHz are 123.050 MHz and 123.150 MHz.</td>
</tr>
<tr>
<td>f) 123.150–123.6917 inclusive</td>
<td>National Aeronautical Mobile Services</td>
<td>Reserved for national allotments, with the exception of 123.450 MHz which is also used as the worldwide air-to-air communications channel (see g). National assignments are covered by the provisions of 4.1.4.8 and 4.1.4.9.</td>
</tr>
<tr>
<td>g) 123.450</td>
<td>Air-to-air communications</td>
<td>Designated for use as provided for in 4.1.3.2.</td>
</tr>
<tr>
<td>h) 123.700–129.6917 inclusive</td>
<td>International and National Aeronautical Mobile Services</td>
<td>Specific international allotments will be determined in light of regional agreement. National assignments are covered by the provisions in 4.1.4.8 and 4.1.4.9.</td>
</tr>
<tr>
<td>i) 129.700–130.8917 inclusive</td>
<td>National Aeronautical Mobile Services</td>
<td>Reserved for national allotments but may be used in whole or in part, subject to regional agreement, to meet the requirements mentioned in 4.1.8.1.3.</td>
</tr>
<tr>
<td>j) 130.900–136.875 inclusive</td>
<td>International and National Aeronautical Mobile Services</td>
<td>Specific international allotments will be determined in light of regional agreement. National assignments are covered by the provisions in 4.1.4.8 and 4.1.4.9. (See the introduction to 4.1 regarding the band 132–137 MHz.)</td>
</tr>
<tr>
<td>k) 136.900–136.975 inclusive</td>
<td>International and National Aeronautical Mobile Services</td>
<td>Reserved for VHF air-ground data link communications.</td>
</tr>
</tbody>
</table>

4.1.2.2.13 Requirements for mandatory carriage of equipment specifically designed for 8.33 kHz channel spacing shall be made on the basis of regional air navigation agreements which specify the airspace of operation and the implementation timescales for the carriage of equipment, including the appropriate lead time.

*Note.— No changes will be required to aircraft systems or ground systems operating solely in regions not using 8.33 kHz channel spacing.*

4.1.2.2.2 Until at least 1 January 2005, equipment specifically designed for 8.33 kHz channel spacing shall be safeguarded with respect to its suitability for the AM(R)S.

4.1.2.2.3 Requirements for mandatory carriage of equipment specifically designed for VDL Mode 2, VDL Mode 3 and VDL Mode 4 shall be made on the basis of regional air navigation agreements which specify the airspace of operation and the implementation timescales for the carriage of equipment, including the appropriate lead time.

4.1.2.2.3.1 The agreement indicated in 4.1.2.2.3 shall provide at least two years’ notice of mandatory carriage of airborne systems.
4.1.2.4 Until at least 1 January 2010, equipment specifically designed to the VDL Mode 3 and VDL Mode 4 SARPs shall be safeguarded with respect to its suitability for the AM(R)S.

4.1.2.3 In the band 117.975—137 MHz, the lowest assignable frequency shall be 118 MHz and the highest 136.975 MHz. [Editorial comment: This paragraph has been moved to 4.1.2.1.]

4.1.2.5 In regions where 25 kHz channel spacing (DSB-AM) and VHF digital link (VDL) and 8.33 kHz DSB-AM channel spacing are in operation, the publication of the assigned frequency or channel of operation shall conform to the channel contained in Table 4-1 (bis).

Note.— Table 4-1 (bis) provides the frequency channel pairing plan which retains the numerical designator of the 25 kHz DSB-AM environment and allows unique identification of a 25 kHz VDL and 8.33 kHz channel.

4.1.3 Frequencies used for particular functions

4.1.3.1 Emergency channel

4.1.3.1.1 The emergency channel (121.500 MHz) shall be used only for genuine emergency purposes, as broadly outlined in the following:

...f) to provide a common VHF channel for communication between civil aircraft and intercepting aircraft or intercept control units and between civil or intercepting aircraft and air traffic services units in the event of interception of the civil aircraft.

Note 1.— The use of the frequency 121.500 MHz for the purpose outlined in c) is to be avoided if it interferes in any way with the efficient handling of distress traffic.

Note 2.— The current ITU Radio Regulations make provisions that (RR 5.200) permit the use of the aeronautical emergency frequency 121.500 MHz may also be used by mobile stations of the maritime mobile service, using A3E emission to communicate on this frequency under the conditions laid down in Article 31 of the Radio Regulations for distress and safety purposes with stations of the aeronautical mobile service (RR S5.200 and Appendix S13, Part A2).

4.1.3.1.2 The frequency 121.500 MHz shall be provided at:

a) all area control centres and flight information centres;

b) aerodrome control towers and approach control offices serving international aerodromes and international alternate aerodromes; and

c) any additional location designated by the appropriate ATS authority.

where the provision of that frequency is considered necessary to ensure immediate reception of distress calls or to serve the purposes specified in 4.1.3.1.1.

Note.— Where two or more of the above facilities are collocated, provision of 121.500 MHz at one would meet the requirement.
4.1.3.1.3 The frequency 121.500 MHz shall be available to intercept control units where considered necessary for the purpose specified in 4.1.3.1.1 f).

4.1.3.1.4 The emergency channel shall be guarded continuously during the hours of service of the units at which it is installed.

4.1.3.1.5 The emergency channel shall be guarded on a single channel simplex operation basis.

4.1.3.1.6 The emergency channel (121.500 MHz) shall be available only with the characteristics as contained in Annex 10, Volume III, Part II, Chapter 2 (25 kHz).

4.1.3.2 Air-to-air communications channel

4.1.3.2.1 An air-to-air VHF communications channel on the frequency of 123.450 MHz shall be designated to enable aircraft engaged in flights over remote and oceanic areas out of range of VHF ground stations to exchange necessary operational information and to facilitate the resolution of operational problems.

Note.— Use of the air-to-air channel can cause interference to and from aircraft using the same frequency for air-ground communications.

4.1.3.2.2 In remote and oceanic areas out of range of VHF ground stations, the air-to-air VHF communications channel on the frequency 123.450 MHz shall be available only with the characteristics as contained in Annex 10, Volume III, Part II, Chapter 2 (25 kHz).

4.1.3.3 Common signalling channels for VDL

4.1.3.3.1 Common signalling channel VDL Mode 2. The frequency 136.975 MHz is reserved on a worldwide basis to provide a common signalling channel (CSC) to the VHF digital link Mode 2 (VDL Mode 2). This CSC uses the Mode 2 VDL modulation scheme and carrier sense multiple access (CSMA).

4.1.3.3.2 Common signalling channels VDL Mode 4. In areas where VDL Mode 4 is implemented, the frequencies 136.925 MHz and 113.250 MHz shall be provided as common signalling channels (CSC) to the VHF Digital Link Mode 4 (VDL Mode 4). These CSCs use the VDL Mode 4 modulation scheme.

4.1.3.4 Auxiliary frequencies for search and rescue operations

4.1.3.4.1 Where a requirement is established for the use of a frequency auxiliary to 121.500 MHz, as described in 4.1.3.1.1 c), the frequency 123.100 MHz shall be used.

4.1.3.4.2 The auxiliary search and rescue channel (123.100 MHz) shall be available only with the characteristics as contained in Annex 10, Volume III, Part II, Chapter 2 (25 kHz).

Note — The ITU Radio Regulations (RR 5.200) permit the use of the aeronautical auxiliary frequency 123.100 MHz by mobile stations of the maritime mobile service under the conditions laid down in Article 31 of the Radio Regulations for distress and safety purposes with stations of the aeronautical mobile service.
4.1.5.4 Provisions concerning the deployment of VHF frequencies and the avoidance of harmful interference

Note.— Protection of facilities’ service volumes in this section is meant in the sense of avoidance of harmful interference.

4.1.5.4.1 In the case of those VHF facilities providing service up to the radio horizon, the geographical separation between facilities working on the same frequency shall, except where there is an operational requirement for the use of common frequencies for groups of facilities, be such that points at the protection heights and at the limit of the functional service range of each facility are separated by distances not less than that required to provide a desired to undesired signal ratio of 14 dB. This provision shall be implemented on the basis of a regional air navigation agreement. For areas where frequency assignment congestion is not severe or is not anticipated to become severe, a 20 dB (10 to 1 distance ratio) separation criteria or radio line-of-sight (RLOS) separation criteria (whichever is smaller) may be used. The geographical separation between facilities operating on the same frequency shall, except where there is an operational requirement for the use of common frequencies for groups of facilities, be such that the protected service volume of each facility is separated from the protected service volume of the other facility by a distance not less than that required to provide a desired to undesired signal ratio of 20 dB or by a separation distance not less than the sum of the distances to associated radio horizon of each service volume, whichever is smaller.

4.1.4.2 For areas where frequency assignment congestion is severe or is anticipated to become severe, the geographical separation between facilities operating on the same frequency shall, except where there is an operational requirement for the use of common frequencies for groups of facilities, be such that the protected service volume of each facility is separated from the protected service volume of the other facility by a distance not less than that required to provide a desired to undesired signal ratio of 14 dB or by a separation distance not less than the sum of the distances to the associated radio horizon of each service volume, whichever is smaller. This provision shall be implemented on the basis of a regional air navigation agreement.

Note 1.— Guidance material relating to the establishment of the minimum separation distance based on the desired to undesired signal protection ratio of 20 dB or 14 dB and radio line-of-sight is contained in Attachment A Part II of the Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies (Doc 9718).

Note 2.— The application of the minimum separation distance based on the sum of the radio horizon distance of each facility assumes that it is highly unlikely that two aircraft will be at the closest points between and at the maximum altitude of the protected service volume of each facility.

4.1.5.2 In the case of those VHF facilities providing service beyond the radio horizon, except where there is an operational requirement for the use of common frequencies for groups of facilities, planning for co-channel operations shall be such that points at the protection heights and at the limits of the functional service area of each facility are separated by distances not less than the sum of distances from each point to its associated radio horizon.

Note 48.— The distance to the radio horizon from a station in an aircraft is normally given by the formula:

\[ D = K \sqrt{h} \]
where $D = \text{distance in nautical miles}$;
$h = \text{height of the aircraft station above earth}$;
$K = \text{(corresponding to an effective earth’s radius of 4/3 of the actual radius);}$

$= 2.22 \text{ when } h \text{ is expressed in metres; and}$
$= 1.23 \text{ when } h \text{ is expressed in feet.}$

Note 24.— In calculating the radio line-of-sight distance between a ground station and an aircraft station, the distance from the radio horizon of the aircraft station computed from Note 1 must be added to the distance from the radio horizon of the ground station. In calculating the latter the same formula is employed, taking for $h$ the height of the ground station transmitting antenna.

Note 35.— The criteria contained in 4.1.5.2, 4.1.4.1 and 4.4.1.2 is are applicable in establishing minimum geographical separation between VHF facilities, with the object of avoiding co-channel air-to-air interference. Guidance material relating to the establishment of separation distances between ground stations and between aircraft and ground stations for co-channel operations is contained in Section 3 of Attachment A. The ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies (Doc 9718). Guidance material relating to adjacent channel frequency deployment is contained in Section 2 of Attachment A.

Note 4.— Guidance material on the interpretation of 4.1.5.1 and 4.1.5.2 is contained in Attachment A.

4.1.5.4.3 The geographical separation between facilities working on adjacent channels shall be such that points at the protection heights and at the limit of the functional service range edge of the protected service volume of each facility are separated by a distance sufficient to ensure operations free from harmful interference.

Note.— Guidance material covering separation distances and related system characteristics is contained in Attachment A. The ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies (Doc 9718).

4.1.5.4.4 The protection height shall be a height above a specified datum associated with a particular facility, such that below it harmful interference is improbable.

4.1.5.4.5 The protection height to be applied to functions or to specific facilities shall be determined regionally, taking into consideration the following factors:

... 

4.1.5.4.6 Recommendation.— Where the protection heights determined are less than those operationally desirable, separation between facilities operating on the same frequency should not be less than that necessary to ensure that an aircraft at the limit upper edge of the functional service range and the operationally desirable protection height operational service volume of one facility does not come above the radio horizon with respect to emissions belonging to the service of adjacent facilities.

Note.— The effect of this recommendation is to establish a geographical separation distance below which harmful interference is probable.
4.1.5.4.7 The geographical separation between VHF VOLMET stations shall be determined regionally and, generally, shall be such that operations free from harmful interference are secured at the highest altitude flown by aircraft in the area concerned throughout the protected service volume of each VOLMET station.

Note.— Guidance material on the interpretation of 4.1.5.4.7 is contained in Attachment A of the ICAO Handbook on Radio Frequency Spectrum Requirements for Civil Aviation including Statement of Approved ICAO Policies (Doc 9718).

4.1.5.4.8 Frequencies in the aeronautical mobile VHF in the frequency band 117.975 – 137.000 MHz, the frequencies used for national services National Aeronautical Mobile Services, unless worldwide or regionally allotted to this specific purpose, shall be so deployed that minimum harmful interference is caused to facilities for the international air services in this band in the International Aeronautical Mobile Services.

4.1.5.4.9 Recommendation.— The problem of inter-State interference on frequencies allotted worldwide or on a regional basis to national services, should be resolved by consultation between the administrations States concerned.

4.1.5.4.10 The communication coverage provided by a VHF ground transmitter shall, in order to avoid harmful interference to other stations, be kept to the minimum consistent with the operational requirement for the function.

4.1.5.11 Recommendation.— For ground VHF facilities which provide service beyond the radio horizon, any spurious or harmonic radiation outside the band ±250 kHz from the assigned carrier frequency should not exceed an effective radiated power of 1 mW in any azimuth.

Delete Section 4.1.6 in its entirety

4.1.7.5 Method of operation

4.1.7.5.1 Single channel simplex operation shall be used in the VHF frequency band 117.975 – 137.000 MHz at all stations providing service for aircraft engaged in international air navigation.

4.1.7.5.2 In addition to the above, the ground-to-air voice channel associated with an ICAO standard radio navigational aid may be used, subject to regional agreement, for broadcast or communication purposes or both.

4.1.8.6 Plan of assignable VHF radio frequencies for use in the international aeronautical mobile service

Introduction

This plan designates the list of frequencies available for assignment, together with provision for the use by the aeronautical mobile (R) service of all frequencies with a channel spacing of 25 kHz, and of all frequencies with a channel width and spacing of 8.33 kHz, with the frequencies in Group A continuing to be used wherever they provide a sufficient number to meet the operational requirements.
The plan provides that the total number of frequencies required in any region would be determined regionally. The effect of this will be that frequencies assignable in any particular region may be restricted to a limited number of the frequencies in the list, the actual number being selected as outlined herein.

In order that the assignable frequencies may be coordinated between regions as far as practicable, the plan requires that, whenever the number of frequencies contained in Group A of 4.1.8.1.2 is sufficient to meet the requirements of a region, the frequencies of this Group be used in a sequence commencing with 118 MHz. This ensures that all regions will have in common the frequencies used in the region requiring the least number of frequencies and, in respect to any two regions, the region with the greater number will have in use all the frequencies used by the other.

Group A provides for frequency planning based on 100 kHz channel spacing.

Group B of the list at 4.1.8.1.2 contains the frequencies in the band 117.975 — 132 MHz ending in 50 kHz. Together with the frequencies in Group A, they provide for frequency planning based on 50 kHz channel spacing. In Group C are listed the frequency channels in the band 132 — 137 MHz based upon 50 kHz channel spacing. Group D contains the frequency channels in the band 132 — 137 MHz ending in 25 kHz, and Group E similarly lists the frequency channels in the band 117.975 — 132 MHz. The utilization of channels in Groups B, C, D and E is explained below.

Group F of the list at 4.1.8.1.2 contains the frequencies in the band 117.975 — 137 MHz when 8.33 kHz channel width is used. The utilization of the channels in this Group is explained below.

Whenever the number of frequencies required in a particular region exceeds the number in Group A, frequencies may be selected from the other Groups taking into account the provisions of 4.1.8.1 with respect to the use of channels based on 25 kHz channel spacing and, with regard to the band 132 — 137 MHz, the provisions of the Radio Regulations (see Introduction to 4.1). Although for Groups B, C, D and E a preferred order of selection is not indicated, regional planning may require a particular selection of frequencies from these Groups in order to cater for specific regional circumstances. This may apply particularly to the utilization of frequencies from the band 132 — 137 MHz for reasons of available airborne equipment and/or availability of particular frequency channels for the aeronautical mobile (R) service. It may also be found that, in a particular region, it is desirable to select frequencies from Group B first, before selecting frequencies from Groups C, D or E.

Where all the channels of Groups A, B, C, D and E of the list at 4.1.8.1.2 are insufficient to meet the requirements of a region, a part or parts of the band may be designated as containing 8.33 kHz width channels or designated as supporting VDL Mode 3. For parts of the band containing 8.33 kHz width channels, the appropriate frequencies from Group F should be used in accordance with 4.1.8.1.1.1 and 4.1.8.1.2. It should be noted that the designation of frequencies in Group F differs from that of the corresponding frequencies in Groups A to E to emphasize the difference in channel width. For part of the bands supporting VDL Mode 3, frequencies from Groups A, B, C, D and E are utilized on a random basis. A single frequency supports multiple channels, each utilizing the frequency in periodic time frames or time slots. Specific time slots for VDL Mode 3 are identified using the numeric designators of Table 4-1 (bis).

Although for Group F a preferred order of selection is not indicated, regional planning may require a particular selection of frequencies from this group in order to cater for specific regional circumstances.
In many regions particular frequencies have already been assigned for particular functions as, for instance, aerodrome or approach control. The plan does not make such assignments (except in respect to the emergency channel and ground service frequencies as provided for in 4.1.1.1), such action being taken regionally if considered desirable.

4.1.8.6.1 The frequencies in the frequency band 117.975 – 137.000 MHz for use in the aeronautical mobile (R) service shall be selected from the list in 4.1.8.6.1.2.

4.1.8.1.1 When the number of frequencies required in a particular region does not exceed the number of frequencies contained in Group A of 4.1.8.1.2, the frequencies to be used shall be selected in sequence, in so far as practicable, from those in Group A of 4.1.8.1.2.

4.1.8.1.1.1 When the number of frequencies required in a particular region exceeds those available in Groups A to E of 4.1.8.1.2, parts of the band shall be designated as containing 8.33 kHz width channels (voice) or as containing VDL Mode 3. Appropriate frequencies shall be selected from Group F of 4.1.8.1.2 for 8.33 kHz channel assignments or from Groups A to E in accordance with the time-slot assignments in accordance with Table 4-1 (bis) for VDL Mode 3. The remainder of the band shall continue to be used for 25 kHz width channels selected from the appropriate parts of Groups A to E.

Note 1.— The frequencies 121.425 – 121.575 MHz inclusive, 123.075 – 123.125 MHz inclusive and 136.500 – 136.975 MHz inclusive are not available for assignment to channels of less than 25 kHz width.

Note 2.— Services that continue operation using 25 kHz assignments will be protected in regions implementing 8.33 kHz channel spacing.

4.1.8.6.1.2 List of assignable frequencies

The list of assignable frequencies is shown in the Appendix to this chapter.

List A – assignable frequencies in regions or areas where 25 kHz frequency assignments are deployed

118.000 – 121.450 MHz in 25 kHz steps
121.550 – 123.050 MHz in 25 kHz steps
123.150 – 136.975 MHz in 25 kHz steps

List B – assignable frequencies in regions or areas where 8.33 kHz frequency assignments are deployed

118.000 – 121.450 MHz in 8.33 kHz steps
121.550 – 123.050 MHz in 8.33 kHz steps
123.150 – 136.475 MHz in 8.33 kHz steps

4.1.8.6.1.3 Recommendation.— Frequencies for operational control communications may be assigned to enable aircraft operating agencies to meet the obligations prescribed in Annex 6, Part I, in which case they should be selected from the dedicated band 128.825 – 132.025 MHz which is determined regionally. These frequencies should be chosen, in so far as practicable, from the upper end of the band and in sequential order.
Note.— It is recognized that the assignment of such frequencies and the licensing of the operation of the related facilities are matters for national determination. However, in regions where a problem exists with respect to the provision of frequencies for operational control purposes, it may be advantageous if States endeavour to coordinate the requirements of aircraft operating agencies for such channels prior to regional meetings.

4.1.8.6.2 The frequencies that may be allotted for use in the aeronautical mobile (R) service in a particular region shall be limited to the number determined as being necessary for operational needs in the region.

Note.— The number of frequencies required in a particular region is normally determined by the Council on the recommendations of Regional Air Navigation Meetings. The capabilities of VHF airborne equipment known to be widely used in the region will be taken into account in this determination.

Delete the Appendix to Chapter 4 and Attachment A in their entirety.

Renumber Attachment B to A.

ATTACHMENT CB. GUIDING PRINCIPLES FOR LONG DISTANCE OPERATIONAL CONTROL COMMUNICATIONS

4. The licences should be issued on a regular renewal basis and, pursuant to RR 4.11, should prohibit “public correspondence”, or point-to-point type traffic, or other communications traffic not meeting the definition of operational control communications.

5. VHF (general purpose or AOC channels) and not HF should be used when an aircraft is within the coverage of an appropriate VHF aeronautical station.

Note.— The specific categories of messages that may be handled on aeronautical mobile (R) service channels are prescribed in Annex 10, Volume II, Chapter 5, 5.1.8. The same chapter defines the standard communications procedures for the service including the requirements for maintaining watch in Annex 10, Volume II, Chapter 5, 5.2.2. In accordance with RR 18.6 of the ITU Radio Regulations, licences should define the purpose of the station for aeronautical operational control (as defined in Annex 6, Part I) and should specify the general characteristics in accordance with Appendix S27 of the Radio Regulations.

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