



International Civil Aviation Organization

**MIDANPIRG Communication Navigation and Surveillance
Sub-Group (CNS SG)**

Fifth Meeting
(Cairo, Egypt, 11 – 13 December 2012)

Agenda Item 4: Developments related to CNS

AMENDMENT TO ANNEX 10 Volume 1

(Presented by the Secretariat)

SUMMARY

This paper provides information on proposals for amendment to Annex 10, and the State letter sent 10 April 2012.

Action by the meeting is in Paragraph 2.

1. INTRODUCTION

1.1 Amendment 87, which affects Volume I of Annex 10, arises from the work undertaken by the Secretariat with the assistance of the Navigation Systems Panel (NSP).

1.2 The objective of the amendment to the Standards and Recommended Practices (SARPs) is to address a number of issues associated with the technical requirements concerning global navigation satellite system (GNSS). The State Letter is at **Appendix A** to this information Paper.

2. ACTION BY THE MEETING

2.1 Note the information in this information paper and its Appendix.



International
Civil Aviation
Organization

Organisation
de l'aviation civile
internationale

Organización
de Aviación Civil
Internacional

Международная
организация
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авиации

منظمة الطيران
المدني الدولي

国际民用
航空组织

Tel.: +1 514-954-8219 ext. 6712

Ref.: AN 7/1.1.47-12/7

10 April 2012

Subject: Adoption of Amendment 87 to Annex 10

Action required: a) Notify any disapproval before 16 July 2012; b) Notify any differences and compliance before 15 October 2012; c) Consider the use of the Electronic Filing of Differences System (EFOD) for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 87 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 195th Session on 7 March 2012. 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>).

2. When adopting the amendment, the Council prescribed 16 July 2012 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 87, to the extent it becomes effective, will become applicable on 15 November 2012.

3. Amendment 87, which affects Volume I of Annex 10, arises from the work undertaken by the Secretariat with the assistance of the Navigation Systems Panel (NSP).

4. The subjects of the amendment are shown in the amendment to the Forewords of Annex 10, Volumes I, II, III, IV and V, a copy of which is in Attachment A. The objective of the amendment to the Standards and Recommended Practices (SARPs) is to address a number of issues associated with the technical requirements concerning global navigation satellite system (GNSS).

5. In accordance with the decision of the 26th Session of the Assembly, I would like to bring to your attention the Organization's long-standing practice of providing documentation to States

upon request. In this regard, I wish to refer you to the ICAO-NET website (<http://portal.icao.int>) where you can access all relevant documentation. The practice of dispatching printed copies of such documentation has now been discontinued.

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

- a) that before 16 July 2012 you inform me if there is any part of the adopted SARPs amendments in Amendment 87 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. Moreover, the documents referred to herein provide guidance on technical methodologies for means of compliance with the Standards but are not intended to represent the exclusive methods for compliance;
- b) that before 15 October 2012 you inform me of the following, using the form in Attachment C for this purpose:
 - 1) any differences that will exist on 15 November 2012 between the national regulations or practices of your Government and the provisions of the whole of Annex 10, as amended by all amendments up to and including Amendment 87, and thereafter of any further differences that may arise; and
 - 2) 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 87.

7. With reference to the request in paragraph 6 a) above, it should be noted that a registration of disapproval of Amendment 87 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 paragraph 6 b) 1). 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.

8. With reference to the request in paragraph 6 b) above, it should be also noted that the Council, at the fourth 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.

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

10. 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.

11. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 6 b) above, to the ICAO Regional Director accredited to your Government.

12. As soon as practicable after the amendment becomes effective, on 16 July 2012, replacement pages incorporating Amendment 87 will be forwarded to you.

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

A handwritten signature in black ink, appearing to read 'R. Benjamin', is centered on a light blue rectangular background.

Raymond Benjamin
Secretary General

Enclosures:

- A — Amendment to the Forewords of Annex 10, Volumes I, II, III, IV and V
- B — Form on notification of disapproval of all or part of Amendment 87 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 7/1.1.47-12/7

**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:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Adopted/Approved Effective Applicable</i>
87	Navigation Systems Panel (NSP)	a) changes to satellite-based augmentation system (SBAS) received signal power requirements; b) introduction of two new SBAS service provider identifiers; c) changes to the encoding of the runway number field in the final approach segment (FAS) data block; and d) changes to GNSS antenna gain requirements.	7 March 2012 16 July 2012 15 November 2012

**VOLUME II
(Sixth Edition)**

Add the following at the end of Table A:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Adopted/Approved Effective Applicable</i>
87		No change.	

VOLUME III
(Second Edition)

Add the following at the end of Table A:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Adopted/Approved Effective Applicable</i>
87		No change.	

VOLUME IV
(Fourth Edition)

Add the following at the end of Table A:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Adopted/Approved Effective Applicable</i>
87		No change.	

VOLUME V
(Second Edition)

Add the following at the end of Table A:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Adopted/Approved Effective Applicable</i>
87		No change.	

ATTACHMENT B to State letter AN 7/1.1.47-12/7

**NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF
AMENDMENT 87 TO ANNEX 10**

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

(State) _____ hereby wishes to disapprove the following parts of
Amendment 87 to Annex 10:

Signature _____

Date _____

NOTES

- 1) If you wish to disapprove all or part of Amendment 87 to Annex 10, please dispatch this notification of disapproval to reach ICAO Headquarters by 16 July 2012. 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 87, 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.

ATTACHMENT C to State letter AN 7/1.1.47-12/7

**NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES FROM ANNEX 10
(including all amendments up to and including Amendment 87)**

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 87.

2. The following differences will exist on _____ between the regulations and/or practices of **(State)** _____ and the provisions of Annex 10, including Amendment 87. (Please see Note 3) below.)

a) Annex Provision (Please give exact paragraph reference)	b) Difference Category (Please indicate A, B, or C)	c) Details of Difference (Please describe the difference clearly and concisely)	d) Remarks (Please indicate reasons for the difference)
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(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 87 for which differences have been notified in 2 above.

a) Annex Provision (Please give exact paragraph reference)	b) Date	c) Comments
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(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 15 October 2012.
- 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 Director accredited to your Government.

**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 15 October 2012 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 87*

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 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 made 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;
- 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.

* 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).

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. 87

TO THE

**INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

**AERONAUTICAL
TELECOMMUNICATIONS**

ANNEX 10

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

**VOLUME I
(RADIO NAVIGATION AIDS)**

AMENDMENT NO. 87

TO THE

**INTERNATIONAL STANDARDS
AND RECOMMENDED PRACTICES**

The amendment to Annex 10, Volume I, contained in this document was adopted by the Council of ICAO on **7 March 2012**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **16 July 2012** will become effective on that date and will become applicable on **15 November 2012** as specified in the Resolution of Adoption. (State letter AN 7/1.1.47-12/7 refers.)

MARCH 2012

INTERNATIONAL CIVIL AVIATION ORGANIZATION

**AMENDMENT 87 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 7 March 2012 Amendment 87 to the International Standards and Recommended Practices contained in the document entitled *International Standards and Recommended Practices and Procedures for Air Navigation Services, Aeronautical Telecommunications* which for convenience is designated Annex 10 to the Convention;
2. *Prescribes* 16 July 2012 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 15 November 2012;
4. *Requests the Secretary General:*
 - a) to notify each Contracting State immediately of the above action and immediately after 16 July 2012 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 15 November 2012 between its national regulations or practices and the provisions of the Standards in the Annex as hereby amended, such notification to be made before 15 October 2012, and thereafter to notify the Organization of any further differences that arise;
 - 2) to notify the Organization before 15 October 2012 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 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:

- a) ~~Text to be deleted is shown with a line through it.~~ text to be deleted
- b) **New text to be inserted is highlighted with grey shading.** new text to be inserted
- c) ~~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 87 TO THE
INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES**

ANNEX 10 – AERONAUTICAL TELECOMMUNICATIONS

**VOLUME I
(RADIO NAVIGATION AIDS)**

...

CHAPTER 3. SPECIFICATIONS FOR RADIO NAVIGATION AIDS

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3.7.3.4.4.3 *Signal power level.*

3.7.3.4.4.3.1 Each SBAS satellite shall broadcast navigation signals with sufficient power such that, at all unobstructed locations near the ground from which the satellite is observed at an elevation angle of 5 degrees or higher, the level of the received RF signal at the output of a 3 dBi linearly polarized antenna is within the range of -161 dBW to -153 dBW for all antenna orientations orthogonal to the direction of propagation.

3.7.3.4.4.3.2 Each SBAS satellite placed in orbit after 31 December 2013 shall broadcast navigation signals with sufficient power such that, at all unobstructed locations near the ground from which the satellite is observed at or above the minimum elevation angle for which a trackable GEO signal needs to be provided, the level of the received RF signal at the output of the antenna specified in Appendix B, Table B-87, is at least -164.0 dBW.

3.7.3.4.4.3.2.1 *Minimum elevation angle.* The minimum elevation angle used to determine GEO coverage shall not be less than 5 degrees for a user near the ground.

3.7.3.4.4.3.2.2 The level of a received SBAS RF signal at the output of a 0 dBic antenna located near the ground shall not exceed -152.5 dBW.

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APPENDIX B. TECHNICAL SPECIFICATIONS FOR THE GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS)

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Table B-27. SBAS service provider identifiers

Identifier	Service provider
0	WAAS
1	EGNOS
2	MSAS
3	GAGAN
4	SDCM
5 to 13	Spare
14, 15	Reserved

...

Table B-66. Final approach segment (FAS) data block

Data content	Bits used	Range of values	Resolution
Operation type	4	0 to 15	1
SBAS provider ID	4	0 to 15	1
Airport ID	32	—	—
Runway number	6	0 to 36	1
Runway letter	2	—	—
Approach performance designator	3	0 to 7	1
Route indicator	5	—	—
Reference path data selector	8	0 to 48	1
Reference path identifier	32	—	—
LTP/FTP latitude	32	$\pm 90.0^\circ$	0.0005 arcsec
LTP/FTP longitude	32	$\pm 180.0^\circ$	0.0005 arcsec
LTP/FTP height	16	-512.0 to 6 041.5 m	0.1 m
Δ FPAP latitude	24	$\pm 1.0^\circ$	0.0005 arcsec
Δ FPAP longitude	24	$\pm 1.0^\circ$	0.0005 arcsec
Approach TCH (Note-2)	15	0 to 1 638.35 m or 0 to 3 276.7 ft	0.05 m or 0.1 ft
Approach TCH units selector	1	—	—
GPA	16	0 to 90.0°	0.01°
Course width (Note-1)	8	80 to 143.75 m	0.25 m
Δ Length offset	8	0 to 2 032 m	8 m
Final approach segment CRC	32	—	—

Note 1.— When the runway number is set to 0, then the course width field is ignored and the course width is 38 metres.

Note 2.— Information can be provided in either feet or metres as indicated by the approach TCH unit selector.

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3.6.4.5.1 *FAS data block.* The FAS data block shall contain the parameters that define a single precision approach or APV. The FAS path is a line in space defined by the landing threshold point/fictitious threshold point (LTP/FTP), flight path alignment point (FPAP), threshold crossing height (TCH) and glide path angle (GPA). The local level plane for the approach is a plane perpendicular to the local vertical passing through the LTP/FTP (i.e. tangent to the ellipsoid at the LTP/FTP). Local vertical for the approach is normal to the WGS-84 ellipsoid at the LTP/FTP. The glide path intercept point (GPIP) is where the final approach path intercepts the local level plane. FAS data block parameters shall be as follows:

...

Runway number: the approach runway number.

Coding: 0 ——— = heliport
1 to 36 = runway number

Note.— For heliport and point-in-space operations, the runway number value is the integer nearest to one tenth of the final approach course, except when that integer is zero, in which case the runway number is 36.

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3.7.1 PERFORMANCE OBJECTIVES

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Note 5.— The signal levels specified in this section are defined at the antenna port. include a minimum standard antenna gain above 5 degree elevation angle of -4.5 dBic. Assumed maximum aircraft antenna gain in the lower hemisphere is -10 dBic. For non-standard antennas with a different minimum gain above 5 degree elevation angle, the signal interference levels can be adjusted accordingly as long as the relative interference to signal level is maintained.

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3.8.2 *Antenna gain.* The minimum antenna gain shall not be less than that shown in Table B-87 for the specified elevation angle above the horizon. The maximum antenna gain shall not exceed +7+4 dBic for elevation angles above 5 degrees.

...

Table B-88. Minimum antenna gain — GPS/SBAS and GLONASS GPS, GLONASS and SBAS

Elevation angle degrees	Minimum gain dBic
0	-7.5 -7
5	-4.5 -5.5
10	-3 -4
15 to 90	-2 -2.5

Note.— The -5.5 dBic gain at 5 degrees elevation angle is appropriate for an L1 antenna. A higher gain may be required in the future for GNSS signals in the L5/E5 band.

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ATTACHMENT D. INFORMATION AND MATERIAL FOR GUIDANCE IN THE APPLICATION OF THE GNSS STANDARDS AND RECOMMENDED PRACTICES

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6.2.2 ~~Figure D-1*~~ shows the initial coverage areas and approximated initial service areas for three SBASs: Satellite-based augmentation services are provided by the Wide Area Augmentation System (WAAS) (North America), the European Geostationary Navigation Overlay Service (EGNOS) (Europe and Africa) and the Multifunction Transport Satellite (MTSAT) Satellite-based Augmentation System (MSAS) (Japan). The GPS-aided Geo-augmented Navigation (GAGAN) (India) and the System of Differential Correction and Monitoring (SDCM) (Russia) are also under development to provide these services.

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Replace the existing paragraph 6.4.1 with the following new text:

6.4.1 *Minimum GEO signal power level.* The minimum aircraft equipment (e.g. RTCA/DO-229D) is required to operate with a minimum signal strength of -164 dBW at the input of the receiver in the presence of non-RNSS interference (Appendix B, 3.7) and an aggregate RNSS noise density of -173 dBm/Hz. In the presence of interference, receivers may not have reliable tracking performance for an input signal strength below -164 dBW (e.g. with GEO satellites placed in orbit prior to 2014). A GEO that delivers a signal power below -164 dBW at the output of the standard receiving antenna at 5-degree elevation on the ground can be used to ensure signal tracking in a service area contained in a coverage area defined by a minimum elevation angle that is greater than 5 degrees (e.g. 10 degrees). In this case, advantage is taken from the gain characteristic of the standard antenna to perform a trade-off between the GEO signal power and the size of the service area in which a trackable signal needs to be ensured. When planning for the introduction of new operations based on SBAS, States are expected to conduct an

* All figures are located at the end of the attachment.

assessment of the signal power level as compared to the level interference from RNSS and non-RNSS sources. If the outcome of this analysis indicates that the level of interference is adequate to operate, then operations can be authorized.

End of new text

...

Table D-1. SBAS FAS data block

Data content	Bits used	Range of values	Resolution
Operation type	4	0 to 15	1
SBAS provider ID	4	0 to 15	1
Airport ID	32	—	—
Runway number (Note 1)	6	01 to 36	1
Runway letter	2	—	—
Approach performance designator	3	0 to 7	1
Route indicator	5	—	—
Reference path data selector	8	0 to 48	1
Reference path identifier	32	—	—
LTP/FTP latitude	32	± 90.0°	0.0005 arcsec
LTP/FTP longitude	32	± 180.0°	0.0005 arcsec
LTP/FTP height	16	−512.0 to 6 041.5 m	0.1 m
ΔFPAP latitude	24	± 1.0°	0.0005 arcsec
ΔFPAP longitude	24	± 1.0°	0.0005 arcsec
Approach threshold crossing height (TCH) (Note 21)	15	0 to 1 638.35 m (0 to 3 276.7 ft)	0.05 m (0.1 ft)
Approach TCH units selector	1	—	—
Glide path angle (GPA)	16	0 to 90.0°	0.01°
Course width at threshold (Note 1)	8	80.0 to 143.75 m	0.25 m
ΔLength offset	8	0 to 2 032 m	8 m
Horizontal alert limit (HAL)	8	0 to 50.8 m	0.2 m
Vertical alert limit (VAL) (Note 32)	8	0 to 50.8 m	0.2 m
Final approach segment CRC	32	—	—

Note 1.—When the runway number is set to 00, then the course width field is ignored and the course width is 38 m.

Note 21.—Information can be provided in either feet or metres as indicated by the approach TCH unit selector.

Note 32.—VAL of 0 indicates that the vertical deviations are not to be used (i.e. a lateral guidance only approach).

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Table D-9. Example of a Type 4 message

In Table D-9, *replace* “0 to 36” with “1 to 36” in the Runway number rows of FAS Data Block 1 and FAS Data Block 2

...

Replace Figure D-1, including its caption, with the following new text

Figure D-1. *Reserved*

End of new text

...

— END —