



MEMORANDUM CIRCULAR NO.: 020-17

TO : ALL CONCERNED

FROM : DIRECTOR GENERAL

SUBJECT : AMENDMENT TO PHILIPPINE CIVIL AVIATION REGULATIONS - AIR NAVIGATION SERVICES (CAR-ANS) PART 6 INCORPORATING AMENDMENT 87 TO ICAO ANNEX 10 VOLUME 1

REFERENCE:

1. Philippine Civil Aviation Regulations- Air Navigation Services Part 6
2. ICAO Annex 10 Volume 1; Amendment 87
3. Regulations Amendment Procedures
4. Board Resolution No. 2012-054 dated 28 September 2012

Pursuant to the powers vested in me under the Republic Act 9497, otherwise known as the Civil Aviation Authority Act of 2008 and in accordance with the Board Resolution No.: 2012-054 dated 28 September 2012, I hereby approve the incorporation of ICAO Annex 10 Volume 1 Amendment No. 87 to the Philippine Civil Aviation Regulations – Air Navigation Services (CAR-ANS) Part 6.

ORIGINAL REGULATION SUBJECT FOR REVIEW AND REVISION:

CAR-ANS Part 6

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6. SPECIFICATIONS FOR RADIO NAVIGATION AIDS

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6.3.7.3.4.4.3 *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)

Table B-27. SBAS service provider identifiers

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

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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	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 TCH (Note)	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	8	80 to 143.75 m	0.25 m
ΔLength offset	8	0 to 2 032 m	8 m
Final approach segment CRC	32	-	-

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

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

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

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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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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	0 1 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 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	-	-
Glide path angle (GPA)	16	0 to 90.0°	0.01°
Course width at threshold (Note 1)	8	80 to 143.75 m	0.25 m
ΔLength offset	8	0 to 2 032 m	8 m
Horizontal alert limit (HAL)	8	0 to 50.8m	0.2 m
Vertical alert limit (VAL) (Note 2)	8	0 to 50.8m	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 2 1.— Information can be provided in either feet or metres as indicated by the approach TCH unit selector.

Note 3.2.— 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

DATA CONTENT DESCRIPTION	BITS USED	RANGE OF VALUES	RESOLUTION	VALUES	BINARY REPRESENTATION (NOTE 1)
...
FAS Data Block 1					
...
Runway number	6	0- 1 to 36	1	15	00 1111
...

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DATA CONTENT DESCRIPTION	BITS USED	RANGE OF VALUES	RESOLUTION	VALUES	BINARY REPRESENTATION (NOTE 1)
...
FAS Data Block 2					
...
Runway number	6	0 1 to 36	1	33	10 0001
...

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AMENDED REGULATION AFTER REVISION:

CAR-ANS PART 6:

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6. SPECIFICATIONS FOR RADIO NAVIGATION AIDS

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6.3.7.3.4.4.3 Signal power level

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6.3.7.3.4.4.3.2 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.

6.3.7.3.4.4.3.2.1 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.

6.3.7.3.4.4.3.2.2 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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Runway number	6	1 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	-	-
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Note.— Information can be provided in either feet or metres as indicated by the approach TCH unit selector.

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Note 5.— The signal levels specified in this section are defined at the antenna port.

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Reference path identifier	32	-	-
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LTP/FTP longitude	32	$\pm 180.0^\circ$	0.0005 arcsec
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Note 2.— VAL of 0 indicates that the vertical deviations are not to be used (i.e. a lateral guidance only approach).

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...
DATA CONTENT DESCRIPTION	BITS USED	RANGE OF VALUES	RESOLUTION	VALUES	BINARY REPRESENTATION (NOTE 1)
...
FAS Data Block 2					
...
Runway number	6	1 to 36	1	33	10 0001
...

...

— END —

- i. **Separability Clause.** - If, for any reason, any provision of this Memorandum Circular is declared invalid or unconstitutional, the other part or parts thereof which are not affected thereby shall continue to be in full force and effect.
- ii. **Repealing Clause.** - All orders, rules, regulations and issuances, or parts thereof which are inconsistent with this Memorandum Circular are hereby repealed, superseded or modified accordingly.
- iii. **Determination of changes.** - To highlight the amendments and/or revisions in the Memorandum Circular, the deleted text shall be shown with strikethrough and the new inserted text shall be highlighted with grey shading, as illustrated below:
 1. Text deleted: ~~Text to be deleted is shown with a line through it.~~
 2. New text inserted: New text is highlighted with grey shading.
 3. New text replacing existing text: ~~Text to be deleted is shown with a line through it~~ followed by the replacement text which is highlighted with grey shading.

- iv. **Effectivity Clause.** - This Memorandum Circular shall take effect fifteen (15) days after publication in a requisite single newspaper of general circulation or the Official Gazette and a copy filed with the U.P. Law Center - Office of the National Administrative Register.

So Ordered. Signed this 17 day of JUL 2017, at the Civil Aviation Authority of the Philippines, MIA Road, Pasay City, Metro Manila, 1301.


CAPTAIN JIM C. SYDIONGCO