The First Joint Meeting of the Asia/Pacific Aerodrome Design and Operations Task Force (AP-ADO/TF/1) and Asia/Pacific Aerodrome Assistance Working Group (AP-AA/WG/1)

Bangkok, Thailand, 25 to 27 September 2019

Agenda Item 3: Planning, Design and Construction of Aerodromes

PROPOSALS FOR THE AMENDMENT OF ANNEX 14, VOLUME I AND CONSEQUENTIAL AMENDMENT TO PANS-AERODROMES (DOC 9981)

(Presented by the Secretariat)

SUMMARY

This paper presents information on a proposal to amend Annex 14 — Aerodromes, Volume I — Aerodrome Design and Operations and Procedures for Air Navigation Services (PANS) — Aerodromes (Doc 9981).

1. INTRODUCTION

1.1 The Air Navigation Commission at the third meeting of its 209th Session (4th October 2018) considered a preliminary review of the proposals developed by the third meeting of the Aerodrome Design and Operations Panel (ADOP/3) to amend Annex 14 — Aerodromes, Volume I — Aerodrome Design and Operations, and the Procedures for Air Navigation Services (PANS) — Aerodromes (Doc 9981).

1.2 The Commission agreed that the amendment proposals should be submitted to Member States and selected international organizations for comments. In State letter AN 4/1.1.59–18/103 dated 18 December 2018, Contracting States and appropriate international organizations have been requested for any comments on the proposals by 18 March 2019. ICAO State letter AN 4/1.1.59–18/103 dated 18 December 2018 is placed at **Attachment A** to this Working Paper.

1.3 The main features of the proposed amendments are as follows:

a) Change in definition of instrument runway;
b) Addition of master plan in Section 1.5;
c) Change of aerodrome reference code (Table 1-1);
d) All aircraft classification number (ACN) and pavement classification number (PCN) designations are replaced by aircraft classification rating (ACR) and pavement classification rating (PCR) in Section 2.6;
e) Change in width of a clearway (Section 3.6);
f) Standardized scheme for the nomenclature of taxiways (Section 3.9);
g) Runway guard lights (Section 5.3.23);
h) Some requirements concerning design of signs (Section 5.4); and
i) Sitting of equipment and installations on operational areas.

2. DISCUSSION

Final Review of Proposed Amendments to Annex 14, Volume I (ANC WP/9323)

Summary, nature and scope of replies

2.1 By 18 March 2019, 62 replies had been received from 56 States, including 15 Council Member States, and six international organizations. By 14 May 2019, 69 replies had been received from 63 States, including 18 Council Member States, and six international organizations. A summary of replies is in Appendix A. The majority of replies indicated broad support for the proposed amendments to Annex 14, Volume I, Annex 4, PANS-Aerodromes and PANS-AIM.

Secretariat review

2.2 Comments received from States and international organizations on the amendment proposals, the Secretariat's review of these comments, and the associated action proposed are provided in Appendix B to Air Navigation Commission Working Paper 9323 placed at **Attachment B**.

Applicability

2.3 The proposed amendment to Annex 14, Volume I and PANS—Aerodromes are envisaged for applicability on 5 November 2020, except for proposed amendments to Annex 14, Volume I related to airport master plan which should be indicated as 3 November 2022 and amendments to Annex 14, Volume I related to pavement rating which should be indicated as 28 November 2024.

2.4 The proposed amendment will be published as Amendment 15 to Annex 14, Volume I after approval by the ICAO Council.

3. ACTION BY THE MEETING

3.1 The meeting is invited to note the information contained in this paper.

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International Civil Aviation Organization | Organisation de l'aviation civile internationale | Organización de Aviación Civil Internacional | Международная организация гражданской авиации | منظمة الطيران المدني الدولي | 国际民用航空组织

Tel.: +1 514-954-8219 ext. 6717

Ref.: AN 4/1.1.59-18/103

18 December 2018

Subject: Proposals for the amendment of Annex 14, Volume I and consequential amendments to Annex 4, PANS-Aerodromes (Doc 9981) and PANS-AIM (Doc 10066)

Action required: Comments to reach Montréal by 18 March 2019

Sir/Madam,

1. I have the honour to inform you that the Air Navigation Commission, at the third meeting of its 209th Session held on 4 October 2018, considered proposals developed by the third meeting of the Aerodrome Design and Operations Panel (ADOP/3) to amend Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations*, Annex 4 — *Aeronautical Charts, Procedures for Air Navigation Services (PANS) — Aerodromes* (Doc 9981) and the *Procedures for Air Navigation Services (PANS) — Aeronautical Information Management* (PANS-AIM, Doc 10066). The Commission authorized their transmission to Member States and appropriate international organizations for comments.

2. Background information concerning some of the aforementioned proposals is presented in Attachment A. The proposals for amendment to Annex 14, Volume I and the consequential amendments to Annex 4, PANS-Aerodromes and PANS-AIM are contained in Attachments B, C, D, and E, respectively. A rationale box providing more information has also been included for each proposal.

3. In examining the proposed amendment, you should not feel obliged to comment on editorial aspects as such matters will be addressed by the Air Navigation Commission during its final review of the draft amendment.

4. May I request that any comments you wish to make on the amendment proposals be dispatched to reach me not later than 18 March 2019. To facilitate the processing of replies with substantive comments, I invite you to submit an electronic version in Word format to icaohq@icao.int. The Air Navigation Commission has asked me to specifically indicate that comments received after the due date may not be considered by the Commission and the Council. In this connection, should you anticipate a delay in the receipt of your reply, please let me know in advance of the due date.

999 Robert-Bourassa Boulevard
Montréal, Quebec
Canada H3C 5H7

Tel.: +1 514-954-8219
Fax: +1 514-954-6077

Email: icaohq@icao.int
www.icao.int

5. For your information, the proposed amendment to Annex 14, Volume I, and Annex 4 are envisaged for applicability on 5 November 2020, except for proposed amendments to Annex 14, Volume I and PANS-AIM related to pavement rating which are envisaged for applicability on 28 November 2024. Any comments you may have thereon would be appreciated.

6. The subsequent work of the Air Navigation Commission and the Council would be greatly facilitated by specific statements on the acceptability or otherwise of the amendment proposals.

7. Please note that for the review of your comments by the Air Navigation Commission and the Council, replies are normally classified as "agreement with or without comments", "disagreement with or without comments" or "no indication of position". If in your reply the expressions "no objections" or "no comments" are used, they will be taken to mean "agreement without comment" and "no indication of position", respectively. In order to facilitate proper classification of your response, a form has been included in Attachment F which may be completed and returned together with your comments, if any, on the proposals in Attachments B to E.

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

Fang Liu
Secretary General

Enclosures:

A — Background information
B — Proposed amendment to Annex 14, Volume I
C — Proposed amendment to Annex 4
D — Proposed amendment to PANS-Aerodromes
E — Proposed amendment to PANS-AIM
F — Response form

ATTACHMENT A to State letter AN 4/1.1.59-18/103

BACKGROUND INFORMATION CONCERNING OBSTACLE FREE ZONE (OFZ) DIMENSIONS AND THE SAINT-PETERSBURG FORMULAE

1. HISTORY

1.1 Following the conclusions reached at the third and fourth meetings of the Obstacle Clearance Panel (OCP/3 and OCP/4) in 1976, the obstacle free zone (OFZ) was introduced to protect balked landing occurring when performing a category II precision instrument approach. For this purpose, it was assumed that the precision approach instrument guidance system and the operational procedures employed would position the aircraft at the 30 m (100 ft) DH and displace it from the runway centre line by a distance not exceeding 15 m (50 ft). This could be interpreted as meaning that the cockpit would be within the red barrettes of the precision approach category II lighting system at a distance of approximately 300 m (1000 ft) from the runway threshold, if the pilot could be certain, by means of the visual cues available, that the approach could be continued. To this was added an allowance for the largest aircraft likely to carry out the operation having a wingspan of 60 m (200 ft) and a buffer area for wingtip and obstacle clearance of 15 m (50 ft) either side, making a total width of 120 m (400 ft) at origin, e.g. 60 m (200 ft) either side of the centre line. To fulfil the purpose of the OFZ, three specifications directly linked to the OFZ related to three different purposes were created [1]. The purpose of Standard 3.4.7 of Annex 14 is to prevent any obstacle on the strip within the OFZ. The purpose of footnote c. of Table 3-2 and Recommendation 3.12.8 is to constrain the location of runway and road holding positions. Standard 9.9.5 places a restriction on the installation of equipment in the OFZ, to facilitate the fulfilment of the radio altimeter operating area, and to avoid obstacles within the OFZ and objects hiding the approach light system line of sight 300 m upstream of the threshold. From this window it was further assumed that the aeroplane will continue the approach down to and along the runway such that its outer wheels would be flying over the runway edge[2]. The OFZ width was governed by the initial formula:

1) OFZ width = 30 m (allowed deviation for a category II approach after decision height) + 60 m wingspan + 30 m buffer

which was considered valid for 30m and 45m wide runways.

1.2 The OFZ dimension was not changed with the introduction of the Boeing 747-400 (wingspan 64.9 m), Lockheed Galaxy C5A (67.9 m) and Antonov 124 (73.3 m) because the assumed deviations and buffer values were considered sufficient to accommodate the increased wingspan due to the improved flying performances of these larger aeroplanes.

1.3 At OCP/11 in 1997, though no safety event had suggested the 120 m width was not appropriate, it was considered suitable to determine the OFZ width for runways intended for code F aeroplanes with the following formula, usually called “Saint-Petersburg formula”:

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[1] Reference numbers are according to the present Annex 14, Volume I, 7th edition, including amendment 13. This convention is adopted to ease the reading of the history

[2] This statement is taken from Circular 301 — *New Larger Aeroplanes-Infringement of the Obstacle Free Zone: Operational Measures and Aeronautical Study* and later led to the development of the Saint-Petersburg formula. However it is not valid as shown in Section 2 of this attachment

2) OFZ width = runway width – OMGWS (median value of the aeroplane code) + wingspan + 30m (buffer)

1.4 The principle behind the Saint-Petersburg formula was to protect an aeroplane making a balked landing in category II with its outer main gear wheel above the runway edge. This led to a 155m wide OFZ for code F aeroplanes on a 60m wide runway and to the consequential amendments to Standard 3.4.7, Table 3-2 and Recommendation 3.12.8, and Standard 9.9.5. Formula (2) was never applied to other cases. The following tables show the values in meters obtained with the two formulas in the 1999 context.

1.5 Initial formula 1

Code number	OFZ width	Code Letter A	Code Letter B	Code Letter C	Code Letter D	Code Letter E	Code Letter F
1	90	75	84	96	-	-	-
2	90	75	84	96	-	-	-
3	120	75	84	96	112	-	-
4	120	-	-	96	112	125	140

1.6 Saint-Petersburg formula 2

Code number	OFZ width	Code Letter A	Code Letter B	Code Letter C	Code Letter D	Code Letter E	Code Letter F
1	90	72.75	78.75	88.5	-	-	-
2	90	72.75	78.75	88.5	-	-	-
3	120	72.75	78.75	88.5	115.5	-	-
4	120	-	-	103.5	115.5	128.5	155

1.7 These two tables show figures giving indications on the desired values but have not been applied consistently when the wingspan have increased because of the continuously improving flying performances of modern larger aeroplanes. This is one reason why OCP, after making its recommendation to adopt a 155m wide OFZ for code F aeroplanes, initiated a study on balked landing

simulations for new larger aeroplane (NLA) operations which resulted in the release of ICAO Circular 301 — *New Larger Aeroplanes-Infringement of the Obstacle Free Zone: Operational Measures and Aeronautical Study*. This ICAO circular states that a code letter F aeroplane can be contained within the code letter E OFZ on a 45 m wide. Circular 301 was introduced in 2006 with amendment 8 to Annex 14, Volume I, in footnote e. to Table 4-1 as follows:

> "Where the code letter is F (Column (3) of Table 1-1), the width is increased to 155 m. For information on code letter F aeroplanes equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre, see Circular 301 — *New Larger Aeroplanes — Infringement of the Obstacle Free Zone: Operational Measures and Aeronautical Study.*"

The consequential amendments to Standard 3.4.7, Table 3-2 and Recommendation 3.12.8 and Standard 9.9.5 were not made, probably because of their complexity (see Section 2 below).

1.8 The present wording of footnote e. in Table 4-1, as per Amendment 14 of Annex 14, Volume I:

> "Where the code letter is F (Table 1-1), the width is increased to 140 m except for those aerodromes that accommodate a code letter F aeroplane equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre."

reflects that the standard value of 120 m is increased to 140 m for code F 45 m wide runways, based on formula (2) with an 80 m wingspan. It states clearly that according to Circular 301 — *New Larger Aeroplanes — Infringement of the Obstacle Free Zone: Operational Measures and Aeronautical Study* and Circular 345 — *New Larger Aeroplanes — Infringement of the Obstacle Free Zone: Collision Risk Model and Aeronautical Study* (currently in preparation), an OFZ width of 120 m is adopted for code letter F aeroplanes equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre when operating on a 45 m wide runway which presently covers all code F aeroplanes except the Galaxy C5A and the Antonov 124. However the present footnote e. is unclear when code letter F aeroplanes equipped with digital avionics that provide steering commands are operated with those aeroplanes on the same runway. The consequential amendments to Standard 3.4.7, Table 3-2 and Recommendation 3.12.8, and Standard 9.9.5 were not made either, probably because of their increased complexity (see Section 2 below).

2. ANALYSIS OF EXISTING ANNEX 14 SPECIFICATIONS

2.1 *Validity of the Saint-Petersburg formula for the determination of OFZ width*

2.1.1 The prime assumption upon which the Saint-Petersburg formula is based is not valid: "From this window (e.g. 15 m (50 ft) deviation plus 15 m buffer for wingtip to obstacle clearance either side of the centre line) it was further assumed that the aeroplane will continue the approach down to and along the runway such that its outer wheels would be flying over the runway edge". Firstly, because of the figures themselves (see table in paragraph 1.5, Initial formula (1) above) and secondly because the distance criteria for the OFZ are based on acceptable deviations around the centre line by an aeroplane performing a balked landing under specified conditions.

2.1.2 These acceptable deviations are determined through statistical analysis of flight technical errors around the centre line and with the red barrettes as visual cues plus a buffer (in accordance with the methodology specified in ICAO Circular 319 — *A unified framework for collision risk modelling in*

support of the manual on airspace planning methodology with further applications). They are independent of the runway width by construction and the scientific proofs upon which the OFZ dimensions are ascertained are with collision risk modelling, through simulations as with Circular 301 and 345, through trajectory analysis as per the current Obstacle Limitation Surfaces Task Force (OLSTF) work and finally through analysis of feedback of operations, notably accident analysis. Had this assumption been valid and the Saint-Petersburg formula considered fully authoritative, the OFZ width for a code C runway would have been 90 m instead of 120 m.

2.1.3 From a logical standpoint the Saint-Petersburg formula gives a distance criterion for the protection of an aeroplane at a Cat II/III holding position from an aeroplane which outer main gear overflies the edge of the runway. This is not the purpose of the OFZ and in the case of large (code E and F) aeroplanes leads to a stronger requirement (for code F aeroplanes, by several orders of magnitude). In addition, the adoption of a 30 m = 2*15 m buffer in the Saint-Petersburg formula appears overly conservative compared to the existing buffer of 24 m for a code C aeroplane on a 30 m wide runway or the buffer values of 25.1 m for the 747-400, 22.1 m for the Galaxy C5A and 16.7 m for the Antonov 124 on a 45 m wide runway, all the more, as no safety event suggested these buffers were inadequate. Furthermore the balked landing studies performed with Circular 301 showed "that the maximum distance from the runway centre line which would be found on an *(NLA)* aircraft wingtip was contained within +-50 m (164 ft) of either side of the centre line". This was confirmed with Circular 345. Initial findings of the OLSTF indicate that all large aeroplanes would be contained in the existing 120 m OFZ whatever runway width (45 or 60 m).

2.1.4 In conclusion the Saint-Petersburg formula was used in 1997 to determine a conservative 155 m OFZ width on 60 m wide runways. With Amendment 14 to Annex 14 this width is automatically reduced according to the same formula to 140 m on a 45 m wide runway that is required for a code F aeroplane. However this width is not required for modern code F aeroplanes and the Saint-Petersburg formula, including the assumed relationship between runway width and OFZ width, is highly questionable. The following section analyses the existing Standards and Recommended Practices (SARPs).

2.2 *Analysis of Annex 14, Volume I SARPS*

2.2.1 Table 4-1, footnote e.

2.2.2 The wording of footnote e. of Table 4-1 now explicitly allows a width of 120 m for OFZ of Code 3 or 4 runways using CAT II or III precision approach, at aerodromes that accommodate code letter F aeroplanes equipped with digital avionics that provide steering commands.

2.2.3 However, this wording is unclear for aerodromes hosting a mixed traffic of code letter F aeroplanes equipped with digital avionics that provide steering commands and code F aeroplanes that are not equipped. To the extent that these aerodromes continue to receive non-equipped code F aeroplanes, the reduction of the inner approach surface and balked landing surface widths to 120 m is not justified. Non-equipped code F aeroplanes are the Lockheed Galaxy C5A and the Antonov 124.

2.2.4 Both the C5A and the Antonov 124 are operated on 45 m wide runways[3] with a 120 m wide OFZ without any related safety event since 1982 (see Section 3 Safety analysis below). New code F aeroplanes will very likely be able to meet the 120m wide OFZ requirement. Hence specifying globally a wider OFZ for code F aeroplanes seems excessive as records in operations since 1982, Circ 301 and

[3] Antonov 124 are operated on about 1000 aerodromes around the world since 1982, most of them with 45 m wide runways and a 120 m OFZ.

Circ 345, US, Canadian and Australian regulations, and accidents analysis demonstrate that 120m is enough.

2.2.5 Nevertheless some States have already implemented 155 m wide OFZ on 60 m wide runways and may not be comfortable with the reduction to 120 m. Some States have already asked for clarity about the implementation of a 140 m wide OFZ on a 60 m wide runway. These are reasons why the possibility to adopt wider OFZ at specific aerodromes should be left open and guidance provided. This guidance is already provided with Circular 301, Circular 345 and provisions in Doc 9981, PANS-Aerodromes.

2.2.6 The proposed wording: "The width may be increased taking into account the actual wingspan of the aeroplanes intending to use the runway, if they are equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre or other considerations specific to the aerodrome. *Note.— See Circulars 301, 345 and Chapter 4 of PANS-Aerodromes, Part I (Doc 9981) for further information.*" removes a design constraint which proved to be unnecessary and indicates where to find guidance on how to determine the appropriate OFZ width for a given runway.

2.3 Standard 3.4.7 reads:

> "3.4.7 No fixed object, other than visual aids required for air navigation or those required for aircraft safety purposes and which must be sited on the runway strip, and satisfying the relevant frangibility requirement in Chapter 5, shall be permitted on a runway strip:
>
> a) within 77.5 m of the runway centre line of a precision approach runway category I, II or III where the code number is 4 and the code letter is F; or
>
> b) within 60 m of the runway centre line of a precision approach runway category I, II or III where the code number is 3 or 4; or
>
> c) within 45 m of the runway centre line of a precision approach runway category I where the code number is 1 or 2.
>
> No mobile object shall be permitted on this part of the runway strip during the use of the runway for landing or take-off."

2.3.1 The purpose of Standard 3.4.7 is to prevent any obstacle on the strip within the OFZ. The present wording was not updated in 2006 to account for the introduction of Circular 301, nor in 2018 with Amendment 14 to Annex 14 to account for the various cases of code F aeroplanes, equipped or not equipped and on various runways notably the ones exceeding the Annex 14 recommended width.

2.3.2 The proposed wording removes the figures which presently are dependent upon runway width, wingspan and aeroplane equipment, clarifies the safety objective of the Standard and ensures its application whatever OFZ width.

2.4 Table 3-2, footnote c. and Recommendation 3.12.8 read :

> "c. Where the code letter is F, this distance should be 107.5 m.
>
> *Note.— The distance of 107.5 m for code number 4 where the code letter is F is based on an aircraft with a tail height of 24 m, a distance from the nose to the highest part of the*

tail of 62.2 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone.

3.12.8 **Recommendation.—** *If a holding bay, runway-holding position or road-holding position for a precision approach runway code number 4 is at a greater elevation compared to the threshold, the distance of 90 m or 107.5 m, as appropriate, specified in Table 3-2 should be further increased 5 m for every metre the bay or position is higher than the threshold."*

2.4.1 The purpose of footnote c. of Table 3-2 and Recommendation 3.12.8 is to constrain the location of runway and road holding positions. The present wordings were not updated in 2006 to account for the introduction of Circular 301, nor in 2018 with Amendment 14 to Annex 14 to account for the various cases of code F aeroplanes, equipped or not equipped and on various runways, notably the ones exceeding the Annex 14 recommended width.

2.4.2 However the determination of the appropriate location for runway and road holding position is a complex issue accounting for the protection of the OFZ, the protection of navaids, existing runway-taxiway separations and, according to recommendation 3.12.7 aerodrome altitude.

2.4.3 It has to be noted that this variation of location according to altitude can only result from a variation of OFZ width which is not documented in other parts of Annex 14, notably Table 4-1. Work performed for the publication of ICAO Circular 301 (Part I, para 2.5.6) as well as initial findings of the OLSTF do not support a variation of OFZ width with altitude. However this is not a definitive conclusion and it is premature to envisage the removal of Recommendation 3.12.7.

2.4.4 In conclusion the proposed amendment consists in the removal of footnote c. in Table 3-2, in accordance with the change in Table 4-1, the deletion of figures in Recommendation 3.12.8 and the inclusion of a Note indicating that guidance on location of runway and road holding positions is provided in the Aerodrome Design Manual (Doc 9157), , Part I — Runways. This guidance will detail how to accommodate equipped and not equipped code F aeroplanes on 45 and 60 m wide runways taking into account all parameters. Though this consolidated guidance material does not exist yet, there is considerable material available, notably with Circular 301, Annex 10 — *Aeronautical Telecommunications*, and the ILS Critical Areas and Holding Points (ICAHP) ACI group which terminated its work in 2008.

2.5 Standard 9.9.5 reads:

"9.9.5 Any equipment or installation required for air navigation or for aircraft safety purposes which must be located on or near a strip of a precision approach runway category I, II or III and which:

a) is situated on that portion of the strip within 77.5 m of the runway centre line where the code number is 4 and the code letter is F; or

b) is situated within 240 m from the end of the strip and within:

1) 60 m of the extended runway centre line where the code number is 3 or 4; or

2) 45 m of the extended runway centre line where the code number is 1 or 2; or

c) penetrates the inner approach surface, the inner transitional surface or the balked landing surface;

shall be frangible and mounted as low as possible."

2.5.1 Standard 9.9.5 (as well as Standard 9.9.4) places a restriction on the installation of equipment in the OFZ to avoid obstacles within the OFZ, to facilitate the fulfilment of the Radio altimeter operating area, and to avoid objects hiding the approach light system line of sight 300 m upstream of the threshold. The present wording was not updated in 2006, to account for the introduction of Circular 301, nor in 2018 with Amendment 14 to Annex 14 to account for the various cases of code F aeroplanes, equipped or not equipped and on various runways, notably the ones exceeding the Annex 14 recommended width.

2.5.2 The proposed amendment consists in the removal of figures in Standard 9.9.5 which duplicate the requirement in the present 9.9.5 c).

2.6 The proposed amendments are fully in line with the present FAA AC 150/5300-13, Transport Canada TP 312 5th edition and Australian MOS 139 (2016) regulations which specify an OFZ width of 60 or 61 m (200 ft) and consequential specifications based on the same width.

3. SAFETY ANALYSIS

3.1 ICAO Circulars 301 and 345 demonstrate that a 120 m width OFZ is sufficient for code letter F aeroplanes equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre when operating on a 45 m wide runway. This concerns the Airbus A380 and the Boeing 747-800, and in the near future, the Boeing 777-X. Records in operations for these aeroplanes since their entry into service do not show any safety event related to OFZ width.

3.2 Since their entry into service there have been no safety events related to OFZ width for the Galaxy C5A and the Antonov 124. The Antonov 124 is operated at around 1000 aerodromes round the world and was certified CAT II commercial aircraft in 1992. It operated on 45 m wide runways with a 120 m wide OFZ until 1999 when the code F OFZ width was introduced and after 1999 continued operating on 45 m wide runways.

3.3 The only accident which may have implied an inappropriate OFZ width occurred with an Antonov 124 in Torino, Italy in 2001. The report shows that the causes of the accident cannot be related to a lack of obstacle protection during a precision approach. This was confirmed orally by a member of the accident investigation team.

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ATTACHMENT B to State letter AN 4/1.1.59-18/103

PROPOSED AMENDMENT TO ANNEX 14, VOLUME I

NOTES ON THE PRESENTATION OF THE 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:

~~Text to be deleted is shown with a line through it.~~	text to be deleted
New text to be inserted is highlighted with grey shading.	new text to be inserted
~~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

PROPOSED AMENDMENT TO

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

AERODROMES

ANNEX 14

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

VOLUME I (AERODROME DESIGN AND OPERATIONS)

INITIAL PROPOSAL 1

TABLE OF CONTENTS

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ABBREVIATIONS AND SYMBOLS
(used in Annex 14, Volume I)

Abbreviations

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AC~~N~~R	Aircraft classification ~~number~~ rating
DME	Distance measuring equipment
E	Modulus of elasticity
FOD	Foreign object debris
PC~~N~~R	Pavement classification ~~number~~ rating

….

CHAPTER 1. GENERAL

1.1 Definitions

….

Aircraft classification ~~number~~ rating (AC~~N~~R). A number expressing the relative effect of an aircraft on a pavement for a specified standard subgrade category.

….

Instrument runway. One of the following types of runways intended for the operation of aircraft using instrument approach procedures:

a) *Non-precision approach runway.* A runway served by visual aids and non-visual aid(s) ~~intended for landing operations following~~ supporting an instrument approach ~~operation type A and a visibility not less than 1 000 m~~ procedure with minima not lower than 75 m (250 ft) minimum descent height (MDH).

b) *Precision approach runway, category I.* A runway served by visual aids and non-visual aid(s) ~~intended for landing operations following~~ supporting an instrument approach ~~operation type B~~ procedure with a decision height (DH) not lower than 60 m (200 ft) ~~and either a visibility not less than 800 m or a runway visual range not less than 550 m~~.

c) *Precision approach runway, category II.* A runway served by visual aids and non-visual aid(s) ~~intended for landing operations following~~ supporting an instrument approach ~~operation type B~~ procedure with a decision height (DH) ~~lower than 60 m (200 ft) but~~ not lower than 30 m (100 ft) ~~and a runway visual range not less than 300 m~~.

d) *Precision approach runway, category III.* A runway served by visual aids and non-visual aid(s) ~~intended for landing operations following~~ supporting an instrument approach ~~operation type B~~ procedure ~~to and along the surface of the runway and:~~

~~A intended for operations~~ with a decision height (DH) lower than 30 m (100 ft), or no decision height ~~and a runway visual range not less than 175 m~~.

~~B intended for operations with a decision height (DH) lower than 15 m (50 ft), or no decision height and a runway visual range less than 175 m but not less than 50 m.~~

~~C intended for operations with no decision height (DH) and no runway visual range limitations.~~

Note 1.— Visual aids need not necessarily be matched to the scale of non-visual aids provided. The criterion for the selection of visual aids is the conditions in which operations are intended to be conducted.

~~*Note 2. Refer to Annex 6 - Operation of Aircraft for instrument approach operation types.*~~

Note 2.— For details of instrument approach operations and procedures related to the establishment of aerodrome operating minima, refer to the Manual of All-Weather Operations (Doc 9365*)*, Chapter 2.

Origin:	**Rationale:**
ADOP/3	Amendment 11B to Annex 14 Volume I introduced revised definitions of instrument and non-instrument runways. These revised definitions were consequential to Amendment 37B of Annex 6 which introduced the new instrument approach operations classification. These revised runway definitions are not fully consistent with Annex 6, notably Standard 4.2.8.3 which classifies instrument approach operations and therefore creates inconsistency and difficulties for application by States. The existing 1000 m minimum visibility constraint in the definition of "non-precision runway" is not consistent with rules pertaining to air operations, which allow instrument approaches with RVR down to 600 m on such runways, provided that they are adequately equipped. This would lead to additional unjustified constraints. Such runways would have either to upgrade their infrastructure, or to impair their accessibility by increasing RVR/visibility minima. In line with the performance-based aerodrome operating minima (PBAOM) concept, all references to visibility in the definitions are proposed to be deleted. Removal of Category III A/B/C definitions, that are outdated and no longer utilized for aircraft certification or operational authorization, will aid in international harmonization efforts, future landing minima reductions, and airspace system capacity improvements due to the implementation of performance-based operations. Future Category III operations may derive from new low visibility approach and landing technologies like enhanced vision system (EVS). The type of operations, landing minima and aircraft certification criteria for these future systems will not follow the Category III A/B/C definitions.

….

Non-instrument runway. A runway intended for the operation of aircraft using visual approach procedures or supporting an instrument approach procedure ~~to a point beyond which the approach may continue in visual meteorological conditions~~ with minima not lower than 150 m (500 ft) above aerodrome elevation.

Note.— ~~Visual meteorological conditions (VMC) are described in Chapter 3 of Annex 2 — Rules of the Air~~ Guidance for the establishment of instrument approach operations is given in the Manual of All-Weather Operations *(Doc 9365).*

Origin:	**Rationale:**
ADOP/3	Amendment 11B to Annex 14 Volume I introduced revised definitions of instrument and non-instrument runways. These revised definitions were consequential to Amendment 37B of Annex 6 which introduced the new instrument approach operations classification. In particular, the intention of the revised definition for non-instrument runways was to clarify the possibility to use instrument approach procedures into non-instrument runways. These revised runway definitions are not fully consistent with Annex 6, notably Standard 4.2.8.3 which classified instrument approach operations, and create therefore

	inconsistency and difficulties for application by Member States. Adding the VMC-criterion introduced the rules of the air instead of safety-related criteria. Safety with respect to appropriate use of runway is assured by provisions of Annex 6, PANS OPS, AWO manual and other related documents. Regarding the proposed minima of 150 m (500 ft) for instrument approaches established on non-instrument runways, this figure corresponds to the value currently in use by several States who have already begun authorizing this type of procedure. The value is considered the minimum height needed to allow sufficient time for orientation and visual alignment with the runway, given the less stringent obstacle clearance requirements needed for these types of runways. In order to enable the safe use of non-instrument runways today and in future, a rewording is necessary. Further guidance concerning the implementation of instrument approach procedures on non-instrument runways will be developed by a joint task force between ADOP, FLTOPS and IFPP, and will be made available in Doc 9365 before the envisaged applicability of the definition above.

. . .

Pavement classification ~~number~~rating (PC~~N~~R). A number expressing the bearing strength of a pavement ~~for unrestricted operations~~.

. . .

INITIAL PROPOSAL 2

1.5 Airport design and master plan

Introductory Note.— A master plan for the long-term development of an aerodrome displays the ultimate development in a phased manner and reports the data and logic upon which the plan is based. Master plans are prepared to support modernization of existing aerodromes and creation of new aerodromes, regardless of size, complexity, and role. It is important to note that a master plan does not constitute a confirmed implementation programme. It provides information on the types of improvements to be undertaken in a phased manner. Guidance on all aspects of the planning of aerodromes is contained in the Airport Planning Manual *(Doc 9184), Part 1.*

1.5.1 **Recommendation.—** *A master plan containing detailed plans for the development of aerodrome infrastructure should be established for aerodromes deemed relevant by States.*

Note 1. — A master plan represents the development plan of a specific aerodrome . It is developed by the aerodrome operator based on economic feasibility, traffic forecasts, current and future requirements provided by, among others, aircraft operators (see 1.5.3).

Note 2. — A master plan may be required when the lack of capacity at an airport, due to conditions such as, but not limited to expected traffic growth, changing weather and climatic conditions or major works to address safety or environmental concerns, would put the connectivity of a geographical area at risk or cause severe disruption to the air transport network.

Origin:	**Rationale:**
ADOP/3; APAC-AOP/WG/3; APANPIRG/26; MID RSG WG/4	Many airports currently lack a master plan or vision of the future. Consequently, their short to medium term capacity enhancement projects may be sub-optimal; restricting their ability to fulfil capacity needs. The more flexible approach proposed by APANPIRG/26 encouraging airport operators to develop a master plan is preferred. Accordingly, new provisions requiring an airport master plan should be established, initially, as a Recommendation and be reviewed at a later time for possible upgrading to a mandatory Standard. The proposed Note 2 provides guidance concerning the applicability of this provision to aerodromes deemed relevant by States (see Annex 14, Vol. I, Chapter 2). Further guidance will be made available in Doc 9184, APM Part 1.

1.5.2 **Recommendation.—** *The master plan should:*

a) contain a schedule of priorities including a phased implementation plan; and

b) be reviewed periodically to take into account current and future aerodrome traffic .

Origin:	**Rationale:**
ADOP/3	The aviation industry continues to evolve and increase in complexity with a range of business models associated with airport ownership and operation. There is a frequent need to review and potentially revise project priorities within the overall strategic development/master plan of an airport to balance capacity enhancements and ensure that the right facilities are provided at the right time within the context of overall affordability, operational efficiency and safety. No two airports are alike and each should evolve in line with business forces and agreed strategies. The pace of growth and change will influence the necessity and frequency to update and review the overall strategic direction and development priorities at individual airports.

1.5.3 **Recommendation .—** *Aerodrome stakeholders, particularly aircraft operators, should be consulted in order to facilitate the master planning process using a consultative and collaborative approach.*

Note 1. — Provision of advanced planning data to facilitate the planning process include future aircraft types, characteristics and numbers of aircraft expected to be used, the anticipated growth of aircraft movements, number of passengers and amount of cargo projected to be handled.

Note 2. — See Annex 9, Chapter 6 on the need for aircraft operators to inform aerodrome operators concerning the former's service, schedule and fleet plans to enable rational planning of facilities and services in relation to the traffic anticipated.

Note 3. — See ICAO's Policies on Charges for Airports and Air Navigation Services Doc 9082), *Section 1, regarding consultation with users concerning provision of advance planning data and protection of commercially sensitive data.*

Origin:	**Rationale:**
ADOP/3; APAC AOP/SG/1	The importance of a collaborative approach by airport owners/operators and the benefits of engagement with airlines and other stakeholders while developing the master plan was strongly emphasized in a working paper at APAC AOP/SG/1. Since decisions made by the airports will undoubtedly have an impact on airlines and passengers, there is a real danger that ineffective and inadequate collaborative consultation will result in sub-optimal functionality and possible capacity and/or safety issues. It is important that collaboration is mutual and that stakeholders actively participate and share as much information as possible. Non-disclosure agreements can often help to overcome issues arising from the potential sharing of sensitive data. The proposed inclusion of Note 3 is to draw attention to the purpose of consultation which is to ensure that the proposed developments meet current and future capacity requirements, and that users are aware of the financial implications.

1.5.~~1~~4 Architectural and infrastructure-related requirements for the optimum implementation of international civil aviation security measures shall be integrated into the design and construction of new facilities and alterations to existing facilities at an aerodrome.

~~*Note.— Guidance on all aspects of the planning of aerodromes including security considerations is contained in the* Airport Planning Manual *(Doc 9184), Part 1.*~~

1.5.~~2~~5 **Recommendation.—** *The design of aerodromes should take into account~~, where appropriate,~~ land-use and environmental control measures.*

Note.— Guidance on land-use planning and environmental control measures is contained in the Airport Planning Manual *(Doc 9184), Part 2.*

Origin:	**Rationale:**
ADOP/3	It is proposed to relocate the existing note to paragraph 1.5.1 to the introductory Note of Section 1.5 to refer to comprehensive guidance in Doc 9184, Part 1. The updated manual will include revised and up-to-date provisions concerning, inter alia, contemporary security measures to be considered during the master planning process. It is proposed to delete the word "as appropriate" in existing Recommendation 1.5.2 as it is considered superfluous since a Recommendation, by implication, is to be applied when appropriate.

INITIAL PROPOSAL 3

Table 1-1. Aerodrome reference code
(see 1.6.2 to 1.6.4)

Code element 1	
Code number	Aeroplane reference field length
1	Less than 800 m
2	800 m up to but not including 1 200 m
3	1 200 m up to but not including 1 800 m
4	1 800 m and over
Code element 2	
Code letter	Wingspan
A	Up to but not including 15 m
B	15 m up to but not including 24 m
C	24 m up to but not including 36 m
D	36 m up to but not including 52 m
E	52 m up to but not including 65 m
F	65 m up to but not including 80 m

Note 1.— Guidance on planning for aeroplanes with wingspans greater than 80 m is given in the Aerodrome Design Manual *(Doc 9157), Parts 1 and 2.*

Note 2.— Procedures on conducting aerodrome compatibility study to accommodate aeroplanes with folding wing tips spanning two code letters are given in the Procedures for Air Navigation Services Aerodromes (*PANS-Aerodromes,* Doc 9981). *Further guidance can be found in the manufacturer's aircraft characteristics for airport planning manual.*

Origin:	**Rationale:**
ADOP/3	A commercial airplane entering into service in early 2020 will be equipped with a folding wing tip (FWT) system in order to secure the aerodynamic performance benefit of the larger span in flight, yet have the benefit of aerodrome compatibility of the lower ARC on the taxiway and apron systems. Current ICAO documents, such as Annex 14, Volume I and related guidance material do not address an aeroplane that changes ARC as its configuration changes, as is the case for FWTs.

INITIAL PROPOSAL 4

CHAPTER 2. AERODROME DATA

2.6 Strength of pavements

2.6.1 The bearing strength of a pavement shall be determined.

2.6.2 The bearing strength of a pavement intended for aircraft of apron (ramp) mass greater than 5 700 kg shall be made available using the aircraft classification ~~number~~ rating – pavement classification ~~number~~ rating ~~(ACN-PCN)~~ (ACR-PCR) method by reporting all of the following information:

Origin:	**Rationale**
ADOP/3	To avoid any confusion with the current system during the transition period, the new system is designated as the aircraft classification rating – pavement classification rating (ACR-PCR). All ACN and PCN designations are replaced by ACR and PCR, repectively.

a) the pavement classification ~~number~~ rating (~~PCN~~ PCR) and numerical value;

b) pavement type for ~~ACN-PCN~~ ACR-PCR determination;

…

Note.- ~~If necessary, the PCNs may be published to an accuracy of one tenth of a whole number.~~ Guidance on reporting and publishing of PCRs is contained in the Aerodrome Design Manual *(Doc 9157, Part3).*

2.6.3 The pavement classification ~~number (PCN)~~ rating (PCR) reported shall indicate that an aircraft with an aircraft classification ~~number (ACN)~~ rating (ACR) equal to or less than the reported PCR can operate on the pavement subject to any limitation on the tire pressure, or aircraft all-up mass for specified aircraft type(s)

Note.- Different ~~PCNs~~ PCRs may be reported if the strength of the pavement is subject to significant seasonal variation

2.6.4 The ~~ACN~~ ACR of an aircraft shall be determined in accordance with the standard procedures associated with the ~~ACN-PCN~~ ACR-PCR method.

Note.- The standard procedures for determining the ~~ACN~~ ACR of an aircraft are given in the Aerodrome Design Manual *(Doc 9157), Part 3. For convenience, ~~several aircraft types currently in use have been evaluated on rigid and flexible pavements founded on the four subgrade categories in 2.6.6 b) below and the results tabulated in that manual~~ dedicated software is available on the ICAO website, for*

computing any aircraft ACRs at any mass on rigid and flexible pavements for the four standard subgrade strength categories detailed in 2.6.6 b) below.

2.6.5 For the purpose of determining the ~~ACN~~ ACR, the behaviour of a pavement shall be classified as equivalent to a rigid or flexible construction

2.6.6 Information on pavement type for ~~ACN-PCN~~ ACR-PCR determination, subgrade strength category, maximum, allowable tire pressure category and evaluation method shall be reported using the following codes:

a) Pavement type for ~~ACN-PCN~~ ACR-PCR determination:

	Code
Rigid pavement	R
Flexible pavement	F

Note.— If the actual construction is composite or non-standard, include a note to that effect (see example 2 below).

b) Subgrade strength category:

	Code
High strength: ~~characterized by K=150 MN/m^3 and representing all K values above 120 MN/m^3 for rigid pavement, and by CBR=15 and representing all CBR values above 13 for flexible pavements.~~ characterized by E=200 MPa, and representing all E values equal to or above 150 MPa for rigid and flexible pavements.	A
Medium strength: ~~characterized by K=80 MN/m^3 and representing a range of K of 60 to 120 MN/m^3 for rigid pavements, and by CBR=10 and representing a range in CBR of 8 to 13 for flexible pavements.~~ characterized by E=120 MPa and representing a range in E values equal to or above 100 MPa and strictly less than 150 MPa, for rigid and flexible pavements.	B
Low strength: ~~characterized by K=40 MN/m^3 and representing a range of K of 25 to 60 MN/m^3 for rigid pavements, and by CBR=6 and representing a range in CBR of 4 to 8 for flexible pavements.~~ characterized by E=80 MPa and representing a range in E values equal to or above 60 MPa and strictly less than 100 MPa, for rigid and flexible pavements.	C
Ultra-low strength: ~~characterized by K=20 MN/m^3 and representing all K values below 25 MN/m^3 for rigid pavements, and by CBR=3 and representing all CBR values below 4 for flexible pavements.~~ characterized by E=50 MPa and representing all E values strictly less than 60 MPa, for rigid and flexible pavements.	D

Origin	**Rationale**
ADOP/3	By adopting the layered elastic analysis (LEA) within the ICAO pavement rating system, the subgrade strength categories have to be designated with the modulus of elasticity (E modulus). The CBR for flexible pavement and the k-value (modulus of subgrade reaction) for rigid pavement are no longer applicable. However the four subgrade strength categories will still be designated with the same letters. The reporting format will not change, except for the PCR designation instead of PCN.

a) Maximum allowable tire pressure category:

	Code
Unlimited: no pressure limit	W
High: pressure limited to 1.75 MPa	X
Medium: pressure limited to 1.25 MPa	Y
Low: pressure limited to 0.50 MPa	Z

Note.— See Note 5 to 10.2.1 where the pavement is used by aircraft with tire pressures in the upper categories.

b) Evaluation method:

	Code
Technical evaluation: representing a specific study of the pavement characteristics ~~and application of pavement behaviour technology~~ and the types of aircraft which the pavement is intended to serve.	T
Using aircraft experience: representing a knowledge of the specific type and mass of aircraft satisfactorily being supported under regular use.	U

Origin:	**Rationale**
ADOP/3	The new system will be no longer be based on a "critical aircraft" basis but will consider all aircraft which are intended to serve on a given pavement with their real offset from pavement centre line. By doing so, the reported PCR will address, in a very accurate manner, the amount of damage that each aircraft produces within a mix, as a function of their operating weight, full landing gear geometry, individual tire load and pressure.

Note. – The following examples illustrate how pavement strength data are reported under ~~ACN-PCN~~ ACR-PCR method.

Example 1. – if the bearing strength of a rigid pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be ~~PCN~~ PCR 80 and there is no tire pressure limitation, then the reported information would be:

~~PCN~~ PCR 80 / R / B / W / T

Example 2. – if the bearing strength of a composite pavement, behaving like a flexible pavement and resting on a high strength subgrade, has been assessed by using aircraft experience to be PCR 50 and the maximum tire pressure allowable is 1.25 MPa, then the reported information would be:

~~PCN~~ PCR 50 / F / A / Y / U

Note. – Composite construction.

Example 3. – If the bearing strength of a flexible pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be ~~PCN~~ PCR 40 and the maximum allowable tire pressure is 0.80 MPa, then the reported information would be

~~PCN~~ PCR 40 / F / B / 0.80 MPa / T

~~*Example 4. If a pavement is subject to a B747-400 all-up mass limitation of 390 000 kg, then the reported information would include the following note.*~~

~~*Note. The reported PCN is subject to a B747-400 an all-up mass limitation of 390 000 Kg.*~~

2.6.7 **Recommendation. –** *Criteria should be established to regulate the use of a pavement by an aircraft with an ~~ACN~~ ACR higher than the ~~PCN~~ PCR reported for that pavement in accordance with 2.6.2 and 2.6.3.*

Note. – Attachment A, Section 20, details a simple method for regulating overload operations while the Aerodrome Design Manual, *(Doc 9157), Part 3, includes the descriptions of more detailed procedures for evaluation of pavements and their suitability for restricted overload operations*

2.6.8 The bearing strength of a pavement intended for aircraft of apron (ramp) mass equal to or less than 5 700 Kg shall be made available by reporting the following information:

a) maximum allowable aircraft mass; and

b) maximum allowable tire pressure.

Example: 6 500 Kg/0.60 MPa

INITIAL PROPOSAL 5

CHAPTER 3. PHYSICAL CHARACTERISTICS

….

3.4 Runway strips

….

3.4.7 No fixed object, other than visual aids required for air navigation or those required for aircraft safety purposes and which must be sited on the runway strip, and satisfying the relevant frangibility requirement in Chapter 5, shall be permitted on any part of a runway strip of a precision approach runway delineated by the lower edges of the inner transitional surfaces.

~~a) within 77.5 m of the runway centre line of a precision approach runway category I, II or III where the code number is 4 and the code letter is F; or~~

~~b) within 60 m of the runway centre line of a precision approach runway category I, II or III where the code number is 3 or 4; or~~

~~c) within 45 m of the runway centre line of a precision approach runway category I where the code number is 1 or 2.~~

No mobile object shall be permitted on this part of the runway strip during the use of the runway for landing or take-off.

Note.— See Chapter 4, section 4.1 for characteristics of inner transitional surface.

Origin:	**Rationale:**
ADOP/3	Standard 3.4.7 applies only to precision approach runways. In Annex 14, Volume I, Chapter 4, the existing Note to the inner transitional surface states : *"Note.— It is intended that the inner transitional surface be the controlling obstacle limitation surface for navigation aids, aircraft and other vehicles that must be near the runway and which is not to be penetrated except for frangible objects…."*. The present wording does not state this clearly and uses figures which are subject to changes when the OFZ width is changed. In particular it has not been modified following the adoption in Amendment 14 of the reduction of the code F OFZ width from 155m to 140m in Table 4-1. In addition the present wording does not take into account the fact that for code letter F aeroplanes equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre, an OFZ width of 120 m, as per Table 4-1, is sufficient when operating on a 45 m wide runway. The proposed wording clarifies the safety objective of the Standard and ensures its application is consistent with the various OFZ widths.

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3.6 Clearways

….

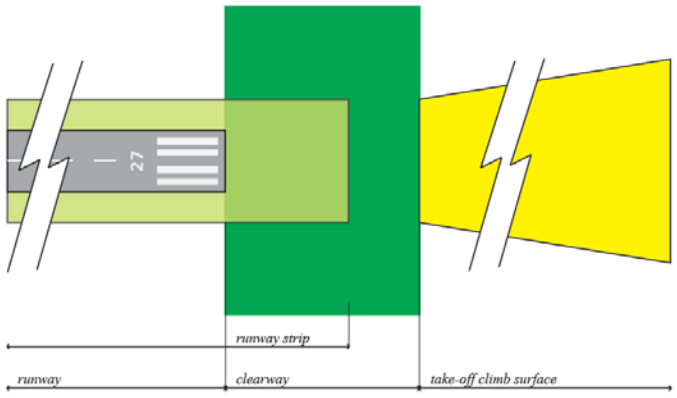
Width of clearways

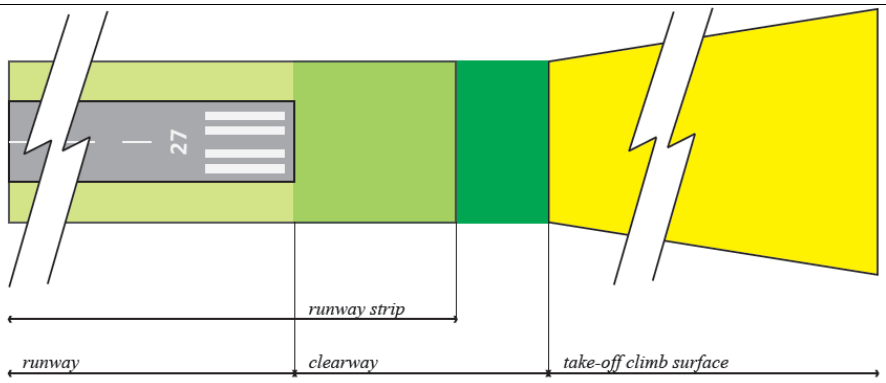
3.6.3 **Recommendation.**— *A clearway should extend laterally on each side of the extended centre line of the runway, to a distance of at least:*

a) 75 m for instrument runways; and

b) half of the width of the runway strip for non-instrument runways.

….

Origin:	**Rationale:**
ADOP/3	Annex 14, Vol. I currently specifies the width of a clearway regardless of the type and code number of the associated runway. Due to terrain or other restrictions, it may not always be possible to provide the full recommended 75 m half-width of a clearway on non-instrument runways where the code number is 1 or 2. For these types of runways, the existing recommended width of the clearway will therefore greatly exceed that of the associated runway strip (30 m and 40 m half-width, respectively) and provide a disproportionate lateral protection compared to the width of the associated runway strip as well as to the length of the inner edge of the obstacle limitation surface (OLS) according to Table 4-2, Annex 14 Vol I. To avoid a disparity between the runway strip width, the width of the inner edge of the corresponding OLS and the width of a potential clearway, the effective clearway width should correspond to the width of the associated runway strip where the runway is non-instrument. With such an amendment, the geometrical discrepancy between the width of the runway strip, the inner edge of the OLS and the clearway itself could be effectively mitigated without compromising safety. The proposed amendment is expected to result in a positive impact on safety since, as per current provisions, aircraft above the clearway area, along its outer boundaries, would not have the area available as established by the take-off surface specifications, to transition to a recognized climb profile as depicted in the figures. Furthermore, it aimed at providing a coherent approach for safety areas where obstacles are restricted. Due to the fact that the inner edge of the OLS was as wide as the width of the associated runway strip, there was no safety benefit in providing a wider clearway. Several States (e.g. Australia, Canada, Italy and United Kingdom) have already taken account of these circumstances in different ways and have implemented national regulations which are different from ICAO.  Current situation for NINST runways codes 1 and 2

	 Proposed situation for NINST runways codes 1 and 2)

….

3.9 Taxiways

Note 1.— Unless otherwise indicated, the requirements in this section are applicable to all types of taxiways.

Note 2.— See section 5.4.3 for a standardized scheme for the nomenclature of taxiways which may be used to improve situational awareness and as a part of an effective runway incursion prevention measure.

Note ~~2~~3.— See Attachment A, Section 22, for specific taxiway design guidance which may assist in the prevention of runway incursions when developing a new taxiway or improving existing ones with known runway incursion safety risks.

General

3.9.1 **Recommendation.—** *Taxiways should be provided to permit the safe and expeditious surface movement of aircraft.*

Note.— Guidance on layout and standardized nomenclature of taxiways is given in the Aerodrome Design Manual *(Doc 9157), Part 2.*

….

3.12 Holding bays, runway-holding positions, intermediate holding positions and road-holding positions

….

3.12.6 The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the centre line of a runway shall be in accordance with Table 3-2 and, in the case of a precision approach runway, such that a holding aircraft or vehicle will not interfere with the operation of radio navigation aids or penetrate the inner transitional surface.

Note.— Guidance for the positioning of runway-holding positions is given Aerodrome Design Manual (Doc 9157), Part 2 .

….

Table 3-2. Minimum distance from the runway centre line to a holding bay, runway-holding position or road-holding position

Type of runway	Code number 1	2	3	4
Non-instrument	30 m	40 m	75 m	75 m
Non-precision approach	40 m	40 m	75 m	75 m
Precision approach category I	60 m[b]	60 m[b]	90 m[a,b]	90 m[a,b,~~c~~]
Precision approach categories II and III	—	—	90 m[a,b]	90 m[a,b,~~c~~]
Take-off runway	30 m	40 m	75 m	75 m

a. If a holding bay, runway-holding position or road-holding position is at a lower elevation compared to the threshold, the distance may be decreased 5 m for every metre the bay or holding position is lower than the threshold, contingent upon not infringing the inner transitional surface.

b. This distance may need to be increased to avoid interference with radio navigation aids, particularly the glide path and localizer facilities. Information on critical and sensitive areas of ILS and MLS is contained in Annex 10, Volume I, Attachments C and G, respectively (see also 3.12.6).

Note 1.— The distance of 90 m for code number 3 or 4 is based on an aircraft with a tail height of 20 m, a distance from the nose to the highest part of the tail of 52.7 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone and not accountable for the calculation of OCA/H.

Note 2.— The distance of 60 m for code number 2 is based on an aircraft with a tail height of 8 m, a distance from the nose to the highest part of the tail of 24.6 m and a nose height of 5.2 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone.

~~c. Where the code letter is F, this distance should be 107.5 m.~~

Note ~~3~~.— ~~The~~ A distance of ~~107.5~~ 100 m ~~for code number 4 where the code letter is F~~ is based on an aircraft with a tail height of 24 m, a distance from the nose to the highest part of the tail of 62.2 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centre line, being clear of ~~the~~ a 140 m wide obstacle free zone.

Origin:	**Rationale:**
ADOP/3	Standard 3.12.6 applies to any runway including precision approach runways. In Annex 14, Volume I, Chapter 4, the existing Note to inner transition surface states: *"Note.— It is intended that the inner transitional surface be the controlling obstacle limitation surface for navigation aids, aircraft and other vehicles that must be near the runway and which is not to be penetrated except for frangible objects…."*. The present wording in 3.12.6 does not state this clearly. Table 3-2 has not been modified following the adoption in Amendment 14 of the reduction of the code F OFZ width from 155m to 140m in Table 4-1. In addition the present wording does not take into account the fact that for code letter F aeroplanes equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre, an OFZ width of 120 m, as per Table 4-1, is sufficient when operating on a 45 m wide runway. The proposed wording clarifies the safety objective of the Standard and ensures its application whatever the OFZ width. It is proposed to delete footnote c. in Table 3-2 because code F distances may vary from 90m to more than107.5m depending on the equipment and operation of the code F aeroplanes intending to use the runway, the runway width and other conditions. Recommendation 3.12.8 (see below) is thus proposed to be modified accordingly. With respect to the proposed change in the existing Note to footnote c. in Table 3-2, the current value of 107.5m is based on an OFZ half-width of 155 m ÷2 = 77.5 m plus a buffer of 30 m which satisfied the obstacle clearance requirements. With the change in Amendment 14 from 155 m to 140 m, applying the same geometric principle, provides an OFZ half-width of 70 m plus 30 m buffer, giving a value of 100 m. The three Notes in Table 3-2 are significant examples of the possible calculation to be made. *(See background information in Attachment A.)*

....

3.12.8 **Recommendation.—** *If a holding bay, runway-holding position or road-holding position for a precision approach runway code number 4 is at a greater elevation compared to the threshold, the distance ~~of 90 m or 107.5 m, as appropriate~~, specified in Table 3-2 should be further increased 5 m for every metre the bay or position is higher than the threshold.*

INITIAL PROPOSAL 6

CHAPTER 4. OBSTACLE RESTRICTION AND REMOVAL

Table 4-1. Dimensions and slopes of obstacle limitation surfaces — Approach runways

APPROACH RUNWAYS

	RUNWAY CLASSIFICATION									
	Non-instrument				Non-precision approach			Precision approach category I		Precision approach category II or III
	Code number				Code number			Code number		Code number
Surface and dimensions[a]	1	2	3	4	1,2	3	4	1,2	3,4	3,4
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
CONICAL										
Slope	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Height	35 m	55 m	75 m	100 m	60 m	75 m	100 m	60 m	100 m	100 m
INNER HORIZONTAL										
Height	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m	45 m
Radius	2 000 m	2 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m	3 500 m	4 000 m	4 000 m
INNER APPROACH										
Width	—	—	—	—	—	—	—	90 m	120 m[e]	120 m[e]
Distance from threshold	—	—	—	—	—	—	—	60 m	60 m	60 m
Length	—	—	—	—	—	—	—	900 m	900 m	900 m
Slope								2.5%	2%	2%
APPROACH										
Length of inner edge	60 m	80 m	150 m	150 m	140 m	280 m	280 m	140 m	280 m	280 m
Distance from threshold	30 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m	60 m
Divergence (each side)	10%	10%	10%	10%	15%	15%	15%	15%	15%	15%
First section										
Length	1 600 m	2 500 m	3 000 m	3 000 m	2 500 m	3 000 m	3 000 m	3 000 m	3 000 m	3 000 m
Slope	5%	4%	3.33%	2.5%	3.33%	2%	2%	2.5%	2%	2%
Second section										
Length	—	—	—	—	—	3 600 m[b]	3 600 m[b]	12 000 m	3 600 m[b]	3 600 m[b]
Slope	—	—	—	—	—	2.5%	2.5%	3%	2.5%	2.5%
Horizontal section										
Length	—	—	—	—	—	8 400 m[b]	8 400 m[b]	—	8 400 m[b]	8 400 m[b]
Total length	—	—	—	—	—	15 000 m	15 000 m	15 000 m	15 000 m	15 000 m
TRANSITIONAL										
Slope	20%	20%	14.3%	14.3%	20%	14.3%	14.3%	14.3%	14.3%	14.3%
INNER TRANSITIONAL										
Slope	—	—	—	—	—	—	—	40%	33.3%	33.3%
BALKED LANDING SURFACE										
Length of inner edge	—	—	—	—	—	—	—	90 m	120 m[e]	120 m[e]
Distance from threshold	—	—	—	—	—	—	—	c	1 800 m[d]	1 800 m[d]
Divergence (each side)	—	—	—	—	—	—	—	10%	10%	10%
Slope	—	—	—	—	—	—	—	4%	3.33%	3.33%

a. All dimensions are measured horizontally unless specified otherwise.
b. Variable length (see 4.2.9 or 4.2.17).
c. Distance to the end of strip.
d. Or end of runway whichever is less.

e. ~~Where the code letter is F (Table 1-1), t~~The width ~~is~~ may be increased taking into account the actual wingspan of the aeroplanes intending to use the runway, if they are ~~to 140 m except for those aerodromes that accommodate a code letter F aeroplane~~ equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre or other considerations specific to the aerodrome.

Note.— See Circulars 301, 345 and Chapter 4 of the PANS-Aerodromes, Part I (Doc 9981) for further information.

….

Origin:	**Rationale:**
ADOP/3	Following the conclusions reached at OCP/3 and OCP/4 in 1976, the obstacle free zone was introduced to protect balked landing occurring when performing a category II precision instrument approach. For this purpose, it was assumed that the precision approach instrument guidance system and the operational procedures employed would position the aircraft at the 30 m (100 ft) DH and displace it from the runway centre line by a distance not exceeding 15 m (50 ft). This could be interpreted as meaning that the cockpit would be within the red barrettes of the precision approach category II lighting system at a distance of approximately 300 m (1000 ft) from the runway threshold, if the pilot can be certain, by means of the visual cues available, that the approach could be continued. To this was added an allowance for the largest aircraft likely to carry out the operation having a wingspan of 60 m (200 ft) and a buffer area for wingtip and obstacle clearance of 15 m (50 ft) either side, making a total width of 120 m (400 ft) at origin, e.g. 60 m (200 ft) either side of the centre line. From this window it was further assumed that the aircraft will continue the approach down to and along the runway such that its outer wheels would be flying over the runway edge. The OFZ width was governed by the initial formula: (1) OFZ width = 30 m (allowed deviation for a category II approach after decision height) + 60 m wingspan + 30 m buffer. The OFZ dimension was not changed with the introduction of the Boeing 747-400 (wingspan 64.9 m), Lockheed Galaxy C5A (67.9 m) and Antonov 124 (73.3 m) because the assumed deviations and buffer values were considered sufficient to accommodate the increased wingspan due to the improved flying performances of these larger aeroplanes. At OCP/11 in 1997, though no safety event had suggested the 120 m width was not appropriate, it was considered suitable to determine the OFZ width for runways intended for code F aeroplanes with the following formula : (2) OFZ Width = Runway width – OMGWS + Wingspan + 30m (buffer). which led to a 155m wide OFZ for code F aeroplanes on a 60m wide runway. Formula (2) was never applied to other cases. The present wording of Note e. in Table 4-1, as per amendment 14 of Annex 14, Volume I, reflects that the standard value of 120 m is increased to 140 m for code F 45 m wide runways, based on formula (2) with an 80 m wingspan. It states clearly that according to Circular 301 and 345, an OFZ width of 120 m is adopted for code letter F aeroplanes, equipped with digital avionics that provide

	steering commands, to maintain an established track during the go-around manoeuvre when operating on a 45 m wide runway. Presently this covers all code F aeroplanes except the Galaxy C5A and the Antonov 124. However the present Note e. is unclear when code letter F aeroplanes, equipped with digital avionics that provide steering commands, are operated with those aeroplanes on the same runway. Both the C5A and the Antonov 124 are operated on 45 m wide runways with a 120m wide OFZ without any related safety event since 1982. New code F aeroplanes will very likely be able to meet the 120m wide OFZ requirement. Hence specifying globally a wider OFZ for code F aeroplanes seems excessive as records in operations since 1982, Circ 301 and Circ 345, US, Canadian and Australian regulations, and accidents analysis demonstrate that 120m is enough. The proposed wording removes a design constraint which proved not to be necessary and indicates where to find guidance on how to determine the appropriate OFZ width for a given runway. *(See background information in Attachment A.)*

INITIAL PROPOSAL 7

CHAPTER 5. VISUAL AIDS FOR NAVIGATION

….

5.3 Lights

….

5.3.20 Stop bars

Application

Note 1.— A stop bar is intended to be controlled either manually or automatically by air traffic services.

Note 2.— Runway incursions may take place in all visibility or weather conditions. The provision of stop bars at runway-holding positions and their use at night and in visibility conditions greater than 550 m runway visual range can form part of effective runway incursion prevention measures.

5.3.20.1 A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions less than a value of ~~3~~550 m, except where:

a) appropriate aids and procedures are available to assist in preventing inadvertent incursions of traffic onto the runway; or

b) operational procedures exist to limit, in runway visual range conditions less than a value of 550 m, the number of:

1) aircraft on the manoeuvring area to one at a time; and

2) vehicles on the manoeuvring area to the essential minimum.

~~5.3.20.2 A stop bar shall be provided at every runway-holding position serving a runway when it is intended that the runway will be used in runway visual range conditions of values between 350 m and 550 m, except where:~~

~~a) appropriate aids and procedures are available to assist in preventing inadvertent incursions of traffic onto the runway; or~~

~~b) operational procedures exist to limit, in runway visual range conditions less than a value of 550 m, the number of:~~

~~1) aircraft on the manoeuvring area to one at a time; and~~

~~2) vehicles on the manoeuvring area to the essential minimum.~~

….

(*Editorial note: Renumber subsequent paragraphs accordingly*)

Origin:	**Rationale:**
ADOP/3	Provisions on stop bars were first introduced in Annex 14, vide Amendment 24 stemming from the fifth meeting of the Visual Aids Panel (VAP/5). A recommendation was adopted via Amendment 38 for a stop bar to be provided at a taxi-holding position used in conjunction with a PA runway category II. This recommendation was in addition to a (then) existing Standard for PA runway category III. Vide Amendment 39, the term "PA runway category III" in the Standard was replaced with "a runway intended for use in RVR conditions less than a value of the order of 400 m". In similar fashion, the recommendation for "PA runway category II" was replaced with "a runway intended for use in RVR conditions of values between the order of 400 m and 800 m". Amendment 1 to Annex 14, Volume I, through the works of VAP/12, subsequently modified both the Standard and recommendation to their current form in paragraphs 5.3.20.1 and 5.3.20.2, respectively. VAP/12 agreed to a further suggestion that as a great majority of runway incursions took place in RVRs between 400 and 800 m, consideration should be given to upgrading the related recommendation to a Standard. VAP/12 agreed with the view, however, bearing in mind the high cost of installing and operating stop bars, it was agreed that the recommendation be made applicable as a Standard as of 1 January 1999 (eventually adopted as 1 January 2001 by the Council vide Amendment 1) and until such time, it remained as a Recommended Practice. (*Note that the RVR values of 400 m and 800 m had been changed to 350 m and 550 m, respectively, arising from Recommendation 2/4 of OP SP/5 in 1989.)* With the upgrading of the Recommendation to a Standard, as of 1 January 2001 (editorially reflected in Amendment 4 to Annex 14, Volume I), the text currently in 5.3.20.1 and 5.3.20.2 are exactly the same save for the RVR values. This created confusion. The proposed modification, which can be considered to be editorial, is intended to clarify the application of stop bars by using one standard instead of two to achieve the same result. The national regulations of several States (e.g Japan, France, Australia Canada) are already in line with the proposal and use one single provision for stop bars as proposed here.

….

5.3.23 Runway guard lights

Note.— Runway incursions may take place in all visibility or weather conditions. The use of runway guard lights at runway holding positions can form part of effective runway incursion prevention measures. ~~The purpose of r~~Runway guard lights ~~is to~~ warn pilots~~,~~ and drivers of vehicles~~,~~ when ~~they are~~ operating on taxiways~~,~~ that they are about to enter a runway. There are two standard configurations of runway guard lights as illustrated in Figure 5-29.

Origin:	**Rationale:**
ADOP/3	For consistency the proposed changes to the Note above puts it in line with the text used for stop bars. It also brings attention to the importance of the use of RGL as an effective runway incursion prevention program.

Application

5.3.23.1 Runway guard lights, Configuration A shall be provided at each taxiway/runway intersection, except at exit only taxiways, associated with a runway intended for use in:

a) runway visual range conditions less than a value of 550 m where a stop bar is not installed; and

b) runway visual range conditions of values between 550 m and 1 200 m where the traffic density is heavy.

Note 1. — Runway guard lights, Configuration B may supplement Configuration A when deemed necessary.

Note 2. — Guidance on the design, operation and the location of runway guard lights Configuration B is given in the Aerodrome Design Manual *(Doc 9157), Part 4.*

Origin:	**Rationale:**
ADOP/3	The existing text in para 5.3.23.1 is deemed to also include runway intersection with exit only taxiways, the latter which is prohibited by ATC to enter into the runway (similar intent to 5.3.29.1), hence the proposal to insert the term "except at exit only taxiways". Currently, paragraph 5.3.23.1 describes the application for Configuration A but not for Configuration B. Where taxiways were substantially wider than those specified in Annex 14, Volume I, viz wide-throat taxiways, the lights located on the sides in Configuration A were likely to be missed by pilots, unless supplemented by a row of lights (inset) located across the taxiway (Configuration B). The proposed Note stays in line with the VAP/12 decision to keep Configuration A as the minimum mandatory provision.

5.3.23.2 **Recommendation.—** *As part of runway incursion prevention measures, runway guard lights, Configuration A or B, should be provided at each taxiway/runway intersection where runway incursion hot spots have been identified, and used under all weather conditions during day and night.*

5.3.23.3 **Recommendation.—** *Configuration B runway guard lights should not be collocated with a stop bar.*

5.3.23.4 Where more than one runway holding positions exist at a runway/taxiway intersection, only the set of runway guard lights associated with the operational runway-holding position shall be illuminated.

Origin:	**Rationale:**
ADOP/3	The above proposal addresses the ongoing issue of runway incursions caused by having runway guard lights illuminated beyond the operational holding position and maintains consistency with similar provision for stop bars.

Location

5.3.23.4~~5~~ Runway guard lights, Configuration A, shall be located at each side of the taxiway on the holding side of the runway-holding position marking ~~at a distance from the runway centre line not less than that specified for a take-off runway in Table 3-2~~.

5.3.23.5~~6~~ Runway guard lights, Configuration B, shall be located across the taxiway on the holding side of the runway-holding position marking ~~at a distance from the runway centre line not less than that specified for a take-off runway in Table 3-2~~.

Origin:	**Rationale:**
ADOP/3	The above two proposals standardize the location of runway guard lights by associating them with the operational runway-holding positions.

…

(*Editorial note: renumber subsequent paragraphs accordingly*)

5.3.23.~~9~~10 The light beam shall be unidirectional and shall show yellow in the direction of approach to ~~aligned so as to be visible to the pilot of an aeroplane taxiing to~~ the runway-holding position.

Note.— For guidance on orientation and aiming of runway guard lights, see the Aerodrome Design Manual (Doc 9157) Part 4.

Origin:	**Rationale:**
ADOP/3	For consistency, the Standard is modified to align with the provisions for stop bar.

…

(*Editorial note: renumber subsequent paragraphs accordingly*)

….

5.3.29 No-entry bar

~~*Note 1.— A no-entry bar is intended to be controlled manually by air traffic services.*~~

Note ~~2~~.— Runway incursions may take place in all visibility or weather conditions. The use ~~provision~~ of no-entry bars ~~at taxiway/runway intersections and their use at night and in all visibility conditions~~ can form part of effective runway incursion prevention measures.

Origin:	**Rationale:**
ADOP/3	During discussions at VAWG/16, Note 1 was seen to be confusing since from the VAWG's perspective a no-entry bar should not be controlled by ATC under normal operations, as their aim is to forbid the entry on an exit-only taxiway. It was agreed that no-entry bars should not be switchable in operational situations. The only situation where switching might be useful was for maintenance purposes. Concerning Note *2*, the first and second sentence are seen to be contradictory. Although the first sentence specifies that runway incursions can occur in all weather or visibility conditions, the second sentence is about the use of no entry bars at night. This is quite confusing as it is commonly understood that the use of no-entry bar is only by night operations, although it could be used also by day in LVP.

….

Location

5.3.29.2 **Recommendation.**— *A no-entry bar should be located across the taxiway at the end of an exit only taxiway, where it is desired to prevent traffic from entering the taxiway in the wrong direction.*

5.3.29.3 **Recommendation.**— *A no-entry bar should be co-located with a no-entry sign and/or a no-entry marking.*

Origin:	**Rationale:**
ADOP/3	A no-entry bar should be used, if deemed necessary, to enhance no-entry marking or signs conspicuity.

(*Editorial note: renumber subsequent paragraphs accordingly*)

….

Characteristics

…

~~5.3.29.8 The lighting circuit shall be designed so that:~~

~~a) no-entry bars are switchable selectively or in groups.;~~

~~b) when a no-entry bar is illuminated, any taxiway centre line lights installed beyond the no-entry bar, when viewed towards the runway, shall be extinguished for a distance of at least 90 m; and~~

~~c) when a no-entry bar is illuminated, any stop bar installed between the no-entry bar and the runway shall be extinguished.~~

5.3.29.8 Taxiway centre line lights installed beyond the no-entry bar, looking in the direction of the runway, shall not be visible.

Origin:	**Rationale:**
ADOP/3	No-entry bars are used on exit only taxiways, as a consequence there is no reason to have centre line lights nor stop-bars beyond the no-entry bar, hence looking in the direction of the runway, the taxiway centre line should be invisible. It is also agreed that no-entry bars should not be switchable in operational situations. The only situation where switching might be useful is for maintenance purposes.

INITIAL PROPOSAL 8

5.4 Signs

5.4.1 General

….

Table 5-5. Location distances for taxiing guidance signs including runway exit signs

Sign height (mm)				Perpendicular distance from defined taxiway pavement edge to near side of sign	Perpendicular distance from defined runway pavement edge to near side of sign
Code number	Legend	Face (min.)	Installed (max.)		
1 or 2	200	~~400~~ 300	700	5-11 m	3-10 m
1 or 2	300	~~600~~ 450	900	5-11 m	3-10 m
3 or 4	300	~~600~~ 450	900	11-21 m	8-15 m
3 or 4	400	~~800~~ 600	1100	11-21 m	8-15 m

Origin:	**Rationale**
ADOP/3	Current provisions in Annex 14, Volume I stipulate a minimum face height of twice the legend height (H). The proposed changes to Table 5-5 reduce the minimum face height to 1.5 times the legend height (H). All other characteristics, e.g. legend height, color, sign width, spacing between characters, maximum installation height etc. remain untouched by this proposal. Signs with smaller face height are common in ICAO Member States, which consequently had to file a difference according to Article 38 of the Chicago Convention. The proposed amendment, if accepted, allows the affected States to delete the difference, leading to a higher degree of compliance. Signs with a reduced face height serve the same purpose of informing and instructing pilots while maneuvering on the aerodrome. A safety study indicates that the smaller signs provide for an equivalent level of safety compared to current requirements. There are two kinds of information provided to the pilot by the means of signs. First, the inscription provides information concerning, among others, the location and direction of aircraft. As the inscription is unchanged, the proposed changes have no effect on this. Second, the colour coding informs the pilot about the meaning of the sign (information only or mandatory instruction). Even though the surface of the colour is decreased, the colour coding information itself is still clearly visible, and therefore not negatively affected.

	Furthermore, it is to be emphasized that the proposed changes constitute a new **minimum** size only, meaning that all existing signs are still complying with ICAO provisions, therefore no airport or State has to physically change any of its signs or national regulations.

….

5.4.3 Information Signs

….

Characteristics

….

5.4.3.35 A taxiway shall be identified by a designator that is used only once on an aerodrome comprising a single letter, two duplicate letters or a combination of a letter or letters followed by a number.

Origin:	**Rationale**
ADOP/3	Providing the same taxiway designator for more than one taxiway on an aerodrome may lead to less clarity in taxi clearances given by ATC and a loss of situational awareness for pilots and vehicle operators, resulting in radiotelephony confusion and additional workload. Hence a provision that each taxiway designator shall be used only once on an aerodrome is introduced into the existing Standard.

5.4.3.36 ~~**Recommendation.**~~ When designating taxiways, the use of the letters I, O or X and the use of words such as inner and outer ~~should~~ shall be avoided ~~wherever possible~~ to avoid confusion with the numerals 1, 0 and closed marking.

Origin:	**Rationale**
ADOP/3	Reports from the pilot community indicate that there continues to be confusion concerning a taxiway designated X with a closed marking. It is proposed to raise the current Recommendation to a Standard.

5.4.3.37 The use of numbers alone on the manoeuvring area shall be reserved for the designation of runways.

5.4.3.38 **Recommendation.—** *Apron stand designators should not conflict with taxiway designators.*

Origin:	**Rationale**
ADOP/3	In order to avoid confusion with other designators, it is proposed that apron stands should have a designator that is different from taxiway designators at the aerodrome. This is of particular importance when stands are assigned a letter and number combination. Terminals may be named by a number or a letter (e.g. Terminal 5, Terminal B), with the attached stands usually numbered based on the terminal in which they are located. This creates the possibility of having, for example, both a stand B2 and a taxiway B2 at the same aerodrome, creating the potential for confusion. When there is more than one terminal, it is recommended that the designators for the stands consist of three numbers, the first number corresponding to the terminal and the following numbers to the stand. Where a letter is used to designate the terminal, the letter can be transformed into a number – e.g. A to 1, B to 2. Thus the principle that stand designators should not conflict with taxiway designators is recommended to be added. Guidance on apron stand designator numbering will be added to the appropriate manuals.

INITIAL PROPOSAL 9

CHAPTER 6. VISUAL AIDS FOR DENOTING OBSTACLES

6.1 Objects to be marked and/or lighted

Note 1.— The marking and/or lighting of obstacles is intended to reduce hazards to aircraft by indicating the presence of the obstacles. It does not necessarily reduce operating limitations which may be imposed by an obstacle.

Note 2.— An autonomous aircraft detection system may be installed on or near an obstacle (or group of obstacles such as wind farms), designed to operate the lighting only when the system detects an aircraft approaching the obstacle, in order to reduce light exposure to local residents. Guidance on the design and installation of an autonomous aircraft detection system is available in the Aerodrome Design Manual (Doc 9157), Part 4. The availability of such guidance is not intended to imply that such a system has to be provided.

…

Origin:	**Rationale**
ADOP/3	States and aerodrome operators are increasingly faced with concerns relating to the adverse impact of light pollution on health, environment as well as ambience and quality of life. An aircraft detection system is a means to reduce residential complaints regarding pollution emanating from obstacle lightings. It is used by a number of States (e.g. Canada, U.S., Norway, and Germany) and inclusion of a Note in Annex 14 Vol I, Chapter 6 would recognize the use of the system as a means to reduce potential light pollution and provide an option for States to operate the obstacle lighting only when required. The new Note 2 points to Doc 9157, Part 4 for guidance on design, evaluation and acceptance.

INITIAL PROPOSAL 10

CHAPTER 9. AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS

….

9.9 Siting of equipment and installations on operational areas

….

9.9.5 Any equipment or installation required for air navigation or for aircraft safety purposes which must be located on or near a strip of a precision approach runway category I, II or III and which:

a) ~~is situated on that portion of the strip within 77.5 m of the runway centre line where the code number is 4 and the code letter is F; or~~

~~b)~~ is situated within 240 m from the end of the strip and ~~within:~~

~~1) 60 m of the extended runway centre line where the code number is 3 or 4; or~~

~~2) 45 m of the extended runway centre line where the code number is 1 or 2; or~~

~~c~~b) penetrates the inner approach surface, the inner transitional surface or the balked landing surface~~;~~

shall be frangible and mounted as low as possible.

Origin:	**Rationale:**
ADOP/3	The proposed amendment to Standard 3.4.7, Standard 3.12.6, Recommendation 3.12.8, Footnote c) of Table 3-2 and Standard 9.9.5 have the objectives of removing the inconsistency by removing the figures which created confusion and replacing them with a clear reference to the OFZ dimensions. These specifications are directly related to the OFZ and corresponds to three different purposes: a) Standard 3.4.7: to prevent any obstacle to be on the strip within the OFZ; b) Footnote c) of Table 3-2 and Recommendation 3.12.8 : to set the limits for the location of runway and road holding positions; and c) Standard 9.9.5 : places a restriction to the installation of equipment in the OFZ to avoid obstacles within the OFZ and objects hiding the approach light system line of sight 300m upstream of the threshold. They are directly linked through geometric arguments to the OFZ width. They were modified with Amendment 3 to Annex 14, Volume I applicable in November 1999 to accommodate the code F OFZ width of 155 m on 60 m wide runways but should have been changed with Amendment 8 applicable in November 2006 which allowed the application of a 120m wide OFZ on a 45m wide runway for code letter F aeroplanes equipped with digital avionics that provide steering commands to

	maintain an established track during the go-around manoeuvre according to the publication of ICAO Circular 301. The present wording has not been modified following the adoption of the reduction of the code F OFZ width from 155m to 140m. In addition the present wording does not take into account the fact that for code letter F aeroplanes equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre, an OFZ width of 120 m, as per Table 4-1, is sufficient when operating on a 45 m wide runway. The proposed wording clarifies the safety objective of the Standard and ensures its application is consistent with the various OFZ widths. *(See background information in Attachment A.)*

INITIAL PROPOSAL 11

APPENDIX 4. REQUIREMENTS CONCERNING DESIGN OF TAXIING GUIDANCE SIGNS

….

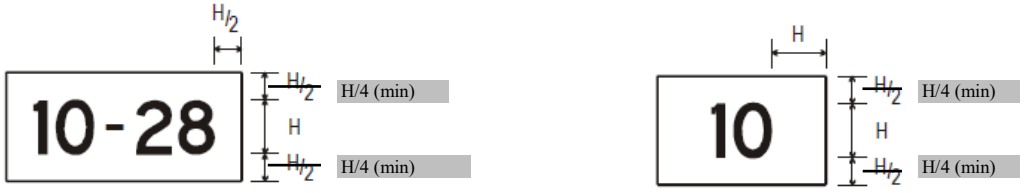
9. The forms of characters, i.e. letters, numbers, arrows and symbols, shall conform to those shown in Figure A4-2. The width of characters and the space between individual characters shall be determined as indicated in Table A4-1.

10. The face height of signs shall be as follows:

Legend height	*Face height (min)*
200 mm	~~400~~ 300 mm
300 mm	~~600~~ 450 mm
400 mm	~~800~~ 600 mm

11. The face width of signs shall be determined using Figure A4-4 except that, where a mandatory instruction sign is provided on one side of a taxiway only, the face width shall not be less than:

. . .



A. Sign with two runway designators B. Sign with one runway designator

Figure A4-4. Sign dimensions

Explanatory Note to Figure A4-4: "H" stands for the inscription height

Origin:	**Rationale**:
ADOP/3	The changes in Appendix 4 stem from proposed changes to Chapter 5, Table 5-5. The explanatory Note is deemed necessary in order to define "H" as the inscription height for clarification reasons as it has not been stated before in ICAO documents.

INITIAL PROPOSAL 12

ATTACHMENT A. GUIDANCE MATERIAL SUPPLEMENTARY TO ANNEX 14, VOLUME I

20. The ~~ACN-PCN~~ ACR-PCR method of reporting pavement strength

20.1 Overload operations

20.1.1 Overloading of pavements can result either from loads too large, or from a substantially increased application rate, or both. Loads larger than the defined (design or evaluation) load shorten the design life, whilst smaller loads extend it. With the exception of massive overloading, pavements in their structural behaviour are not subject to a particular limiting load above which they suddenly or catastrophically fail. Behaviour is such that a pavement can sustain a definable load for an expected number of repetitions during its design life. As a result, occasional minor overloading is acceptable, when expedient, with only limited loss of pavement life expectancy and relatively small acceleration of pavement deterioration. For those operations in which magnitude of overload and/or the frequency of use do not justify a detailed analysis, the following criteria are suggested:

a) for flexible and rigid pavements, occasional movements by aircraft with ~~ACN~~ ACR not exceeding 10 per cent above the reported ~~PCN~~ PCR ~~should~~ may not adversely affect the pavement;

~~b) for rigid or composite pavement, in which pavement layer provides a primary element of the structure, occasional movements by aircraft with ACN not exceeding 5 per cent above the reported PCN should not adversely affect the pavement;~~

~~c) if the pavement structure is unknown, the 5 per cent limitation should apply; and~~

~~d~~b) the annual number of overload movements ~~should~~may not exceed approximately 5 per cent of the total annual ~~aircraft~~ movements, excluding light aircraft.

Origin:	**Rationale**
ADOP/3	Since the new proposed system is based on the layered elastic analysis (LEA) for both rigid and flexible pavement, it is reasonable to adopt the same overload allowance for these two pavement types. However, overload operation conditions are not changed, and the number of overload operation will still be subject to the amount of overload operation with regard to the total annual departures that the pavement experiences. The different allowance of the current ACN-PCN system (5% allowance for rigid pavement, 10% for flexible pavement) was justified by the use of two different methods (CBR design procedure for flexible pavement and PCA method for rigid pavement), and the uncertainties of both systems to evaluate the amount of additional damage that an overload operation produced. The LEA is able to precisely analyse the contribution of each aircraft

	composing a mix to the maximum damage produced by the total traffic, through the "cumulative damage factor (CDF)" concept. This obviously eases the pavement overload criteria taking full advantage of how the overload aircraft behaves when it is mixed in an existing traffic mix.

20.1.2 Such overload movements should not normally be permitted on pavement exhibiting signs of distress or failure. Furthermore, overloading should be avoided during any periods of thaw following frost penetration, or when the strength of the pavement or its subgrade could be weakened by water. Where overload operations are conducted, the appropriate authority should review the relevant pavement condition regularly, and should also review the criteria for overload operations periodically since excessive repetition of overloads can cause severe shortening of pavement life or require major rehabilitation of pavement

20.2 ~~ACNs~~ACRs for several aircraft types

For convenience ~~several aircraft types currently in use have been evaluated on rigid and flexible pavements founded on the four subgrade categories in Chapter 2, 2.6.6 b), and the results tabulated in the *Aerodrome Design Manual* (Doc 9157), Part 3~~ a dedicated software is available on the ICAO website, for computing any aircraft ACRs at any mass on rigid and flexible pavements for the four standard subgrade strength categories detailed in Chapter 2, 2.6.6 b).

LIMITED INDEX OF SIGNIFICANT SUBJECTS INCLUDED IN ANNEX 14, VOLUME I

….

PAVEMENT STRENGTH

….

— — — — — — — —

ATTACHMENT C TO State letter AN 4/1.1.59-18/103

PROPOSED AMENDMENT TO ANNEX 4

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:

~~Text to be deleted is shown with a line through it.~~	text to be deleted
New text to be inserted is highlighted with grey shading.	new text to be inserted
~~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

PROPOSED AMENDMENT TO

INTERNATIONAL STANDARDS AND RECOMMENDED PRACTICES

AERONAUTICAL CHARTS

ANNEX 4

TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

. . .

INITIAL PROPOSAL 1

CHAPTER 14.

AERODROME GROUND MOVEMENT CHART - ICAO

….

14.6 Aerodrome data

14.6.1 This chart shall show in a similar manner all the information on the Aerodrome/Heliport Chart — ICAO relevant to the area depicted, including:

….

a) apron elevation to the nearest metre or foot;

….

m) any part of the depicted movement area permanently unsuitable for aircraft, clearly identified as such.

14.6.2 **Recommendation.—***For aerodromes accommodating aeroplanes with folding wing tips, the location to extend the wing tips should be shown on the chart.*

….

Origin:	**Rationale:**
ADOP/3	A commercial aeroplane entering into service in early 2020 will be equipped with a folding wing tip (FWT) system in order to secure the aerodynamic performance benefit of the larger span in flight, yet have the benefit of aerodrome compatibility of the lower ARC on the taxiway and apron systems. Current ICAO documents, such as Annex 4 and related guidance material do not address an aeroplane that changes ARC as its configuration changes, as is the case for FWTs.

	It is important to provide a harmonized system, by including in the AIP the location to extent the folding wing tips (FWT), thus providing guidance to aerodromes operators, airlines and flight crews.

ATTACHMENT D TO State letter AN 4/1.1.59-18/103

PROPOSED AMENDMENT TO THE PANS-AERODROMES (DOC 9981)

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:

~~Text to be deleted is shown with a line through it.~~	text to be deleted
New text to be inserted is highlighted with grey shading.	new text to be inserted
~~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

PROPOSED AMENDMENT TO

PROCEDURES FOR AIR NAVIGATION SERVICES

AERODROMES
(PANS-AERODROMES, DOC 9981)

INITIAL PROPOSAL 1

PART I — AERODROME CERTIFICATION, SAFETY ASSESSMENTS AND AERODROME COMPATIBILITY

….

CHAPTER 4

AERODROME COMPATIBILITY

….

Appendix to Chapter 4

PHYSICAL CHARACTERISTICS OF AERODROMES

….

2.5 RUNWAY STRIPS

2.5.1 Runway strip dimensions

….

2.5.1.5 Lateral deviation from the runway centre line during a balked landing with the use of the digital autopilot as well as manual flight with a flight director for guidance have shown that the risk associated with the deviation of specific aeroplanes is contained within the OFZ.

Note.— Provisions on OFZ are given in Annex 14, Volume I, and in Circ 301, New Larger Aeroplanes — Infringement of the Obstacle Free Zone: Operational Measures and Aeronautical Study *and* Circ 345, New Larger Aeroplanes — Infringement of the Obstacle Free Zone: Collision Risk Model and Aeronautical Study.

2.5.2 Obstacles on runway strips

Introduction

2.5.2.1 An object located on a runway strip which may endanger aeroplanes is regarded as an obstacle, according to the definition of "obstacle" and should be removed, as far as practicable. Obstacles may be either naturally occurring or deliberately provided for the purpose of air navigation.

Challenges

2.5.2.2 An obstacle on the runway strip may represent either:

a) a collision risk for an aeroplane in flight or for an aeroplane on the ground that has veered off the runway; and

b) a source of interference to navigation aids.

Note 1.— Mobile objects that are beyond the OFZ (inner transitional surface) but still within the runway strip, such as vehicles and holding aeroplanes at runway-holding positions, or wing tips of aeroplanes taxiing on a parallel taxiway to the runway, should be considered.

Note 2.— Provisions on OFZ are given in Annex 14, Volume I, and in Circ 301, New Larger Aeroplanes — Infringement of the Obstacle Free Zone: Operational Measures and Aeronautical Study *and Circ 345* — New Larger Aeroplanes — Infringement of the Obstacle Free Zone: Collision Risk Model and Aeronautical Study.

….

INITIAL PROPOSAL 2

Attachment A to Chapter 4

AEROPLANE PHYSICAL CHARACTERISTICS

….

6. WINGSPAN

The wingspan may have an impact on:

….

h) equipment for disabled aeroplane removal; and

i) de-icing.

In the case of an aeroplane equipped with folding wing tips, its reference code letter may change as a result of the folding/extending of the wing tips. Consideration should be given to the wingspan configuration and resultant operations of the aeroplane at an aerodrome.

Note .— Further information concerning aeroplanes with folding wing tips, physical characteristics and the concept of normal and non-normal operations can be found in the manufacturer's aircraft characteristics for airport planning manual.

Origin:	**Rationale:**
ADOP/3	A commercial airplane entering into service in early 2020 will be equipped with a folding wing tip (FWT) system in order to secure the aerodynamic performance benefit of the larger span in flight, yet have the benefit of aerodrome compatibility of the lower ARC on the taxiway and apron systems. Current ICAO documents, such as PANS-Aerodrome and related guidance material do not address an aeroplane that changes ARC as its configuration changes, as is the case for FWTs.

….

INITIAL PROPOSAL 3

Attachment D to Chapter 4

SELECTED AEROPLANE CHARACTERISTICS

Data are provided for convenience, are subject to change and should be used only as a guide. Accurate data should be obtained from the aircraft manufacturer's documentation. Many aeroplane types have optional weights and different engine models and engine thrusts; therefore pavement aspects and reference field lengths will vary, in some cases enough to change the aeroplane category. Reference field length should not be used for the design of aerodrome runway length, as the required length will vary depending on various factors such as aerodrome elevation, reference temperature and runway slope.

Aircraft model	*Take-off weight (kg)*	*Code*	*Reference field length (m)**	*Wingspan (m)*	*Outer main gear wheel span (m)*	*Nose gear to main gear distance (wheel base) (m)*	*Cockpit to main gear distance (m)*	*Fuselage length (m)*	*Overall (maximum) length (m)*	*Maximum tail height (m)*	*Approach speed (1.3×Vs) (kt)*	*Maximum evacuation slide length (m)*****
777-300ER	351 534	4E	3 060	64.8	12.9	31.2	32.3	73.1	73.9	18.8	149	12.6
777-9#	351 534	4E/ 4F	****	64.8/ 71.8	12.8	32.3	36.0	75.2	76.7	19.7	****	12.6
B787-8	219 539	4E	2 660	60.1	11.6	22.8	25.5	55.9	56.7	16.9	140***	11.1
MD-81	64 410	4C	2 290	32.9	6.2	22.1	21.5	41.6	45.0	9.2	134	5.3
MD-82	67 812	4C	2 280	32.9	6.2	22.1	21.5	41.6	45.0	9.2	134	5.3
MD-83	72 575	4C	2 470	32.9	6.2	22.1	21.5	41.6	45.0	9.2	144	5.3
MD-87	67 812	4C	2 260	32.9	6.2	19.2	21.5	36.3	39.8	9.5	134	5.3
MD-88	72 575	4C	2 470	32.9	6.2	22.1	21.5	41.6	45.0	9.2	144	5.3
MD-90	70 760	3C	1 800	32.9	6.2	23.5	22.9	43.0	46.5	9.5	138	5.3
MD-11	285 990	4D	3 130	51.97	12.6	24.6	31.0	58.6	61.6	17.9	153	9.8
DC8-62	158 757	4D	3 100	45.2	7.6	18.5	20.5	46.6	48.0	13.2	138	6.7
DC9-15	41 504	4C	1 990	27.3	6.0	13.3	12.7	28.1	31.8	8.4	132	5.3
DC9-20	45 813	3C	1 560	28.4	6.0	13.3	12.7	28.1	31.8	8.4	126	5.3
DC9-50	55 338	4C	2 451	28.5	5.9	18.6	18.0	37.0	40.7	8.8	135	5.3
BOMBARDIER CS100****	54 930	3C	1 509	35.1	8.0	12.9	13.7	34.9	34.9	11.5	127	
CS100 ER****	58 151	3C	1 509	35.1	8.0	12.9	13.7	34.9	34.9	11.5	127	
CS300****	59 783	4C	1 902	35.1	8.0	14.5	15.3	38.1	38.1	11.5	133	
CS300 XT****	59 783	3C	1 661	35.1	8.0	14.5	15.3	38.1	38.1	11.5	133	
CS300 ER****	63 321	4C	1 890	35.1	8.0	14.5	15.3	38.1	38.1	11.5	133	

CRJ200ER	23 133	3B	1 680	21.2	4.0	11.4	10.8	24.4	26.8	6.3	140	
CRJ200R	24 040	4B	1 835	21.2	4.0	11.4	10.8	24.4	26.8	6.3	140	
CRJ700	32 999	3B	1 606	23.3	5.0	15.0	14.4	29.7	32.3	7.6	135	
CRJ700ER	34 019	3B	1 724	23.3	5.0	15.0	14.4	29.7	32.3	7.6	135	
CRJ700R****	34 927	4B	1 851	23.3	5.0	15.0	14.4	29.7	32.3	7.6	136	
CRJ900	36 514	3B	1 778	23.3	5.0	17.3	16.8	33.5	36.2	7.4	136	
CRJ900ER	37 421	4C	1 862	24.9	5.0	17.3	16.8	33.5	36.2	7.4	136	
CRJ900R	38 329	4C	1 954	24.9	5.0	17.3	16.8	33.5	36.2	7.4	137	
CRJ1000****	40 823	4C	1 996	26.2	5.1	18.8	18.3	36.2	39.1	7.5	138	
CRJ1000ER****	41 640	4C	2 079	26.2	5.1	18.8	18.3	36.2	39.1	7.5	138	
DHC-8-100	15 650	2C	890	25.9	7.9	8.0	6.1	20.8	22.3	7.5	101	
DHC-8-200	16 465	2C	1 020	25.9	8.5	8.0	6.1	20.8	22.3	7.5	102	
DHC-8-300	18 643	2C	1 063	27.4	8.5	10.0	8.2	24.2	25.7	7.5	107	
DHC-8-400	27 987	3C	1 288	28.4	8.8	14.0	12.2	31.0	32.8	8.3	125	
EMBRAER ERJ 170-100 STD	35 990	3C	1 439	26.0	6.2	10.6	11.5	29.9	29.9	9.7	124	
ERJ 170-100 LR, SU and SE	37 200	3C	1 532	26.0	6.2	10.6	11.5	29.9	29.9	9.7	124	
ERJ 170-100 + SB 170-00-0016	38 600	3C	1 644	26.0	6.2	10.6	11.5	29.9	29.9	9.7	125	
ERJ 170-200 STD	37 500	3C	1 562	26.0	6.2	11.4	12.3	31.7	31.7	9.7	126	
ER 170-200 LR and SU	38 790	3C	1 667	26.0	6.2	11.4	12.3	31.7	31.7	9.7	126	
ERJ 170-200 + SB 170-00-0016	40 370	4C	2 244	26.0	6.2	11.4	12.3	31.7	31.7	9.7	126	
ERJ 190-100 STD	47 790	3C	1 476	28.7	7.1	13.8	14.8	36.3	36.3	10.6	124	
ERJ 190-100 LR	50 300	3C	1 616	28.7	7.1	13.8	14.8	36.3	36.3	10.6	124	
ERJ 190-100 IGW	51 800	3C	1 704	28.7	7.1	13.8	14.8	36.3	36.3	10.6	125	
ERJ 190-200 STD	48 790	3C	1 597	28.7	7.1	14.6	15.6	38.7	38.7	10.5	126	
ERJ 190-200 LR	50 790	3C	1 721	28.7	7.1	14.6	15.6	38.7	38.7	10.5	126	
ERJ 190-200 IGW	52 290	4C	1 818	28.7	7.1	14.6	15.6	38.7	38.7	10.5	128	

* Reference field length reflects the model/engine combination that provides the shortest field length and the standard conditions (maximum weight, sea level, std day, A/C off, runway dry with no slope).

** Span includes optional wiinglets.

*** Preliminary data.

**** Preliminary data — aircraft not yet certified.

***** Longest deployed slide lengths, including upper deck slides, referenced from aircraft centre line as measured horizontally. Data are based primarily on aircraft rescue fire-fighting charts.

Aircraft with folding wing tips (FWT)

ATTACHMENT E TO State letter AN 4/1.1.59-18/103

PROPOSED AMENDMENT TO THE PANS-AIM (DOC 10066)

NOTES ON THE PRESENTATION OF THE PROPOSED AMENDMENT

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

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

PROPOSED AMENDMENT TO

PROCEDURES FOR AIR NAVIGATION SERVICES

AERONAUTICAL INFORMATION MANAGEMENT
(PANS-AIM, DOC 10066)

INITIAL PROPOSAL 1

CHAPTER 1. DEFINITIONS

….

Orthometric height. Height of a point related to the geoid, generally presented as an MSL elevation.

Pavement classification rating (PCR). A number expressing the bearing strength of a pavement.

Performance-based communication (PBC). Communication based on performance specifications applied to the provision of air traffic services.

. . .

APPENDIX 1. AERONAUTICAL DATA CATALOGUE

. . .

Table A 1-1 Aerodrome/Heliport data – Apron-Taxiway

Subject	Property	Sub-Property	Type	Description	Note	Accuracy	Integrity	Orig Type	Pub. Res.	Chart Res.
. . .										
Taxiway	Location for wing tips extension	Position	Point	For aerodromes accommodating aeroplanes with folding wing tips, the location where to extend the wing tips						
. . .										

Origin:	**Rationale:**
ADOP/3	Consequential amendment arising from Initial Proposal 3 in Attachment B.

APPENDIX 2. CONTENTS OF THE AERONAUTICAL INFORMATION PUBLICATION (AIP)

. . .

**** AD 2.12 Runway physical characteristics

Detailed description of runway physical characteristics, for each runway, including:

. . .

3) dimensions of runways to the nearest metre or foot;

4) strength of pavement (~~PCN~~PCR and associated data) and surface of each runway and associated stopways;

5) geographical coordinates in degrees, minutes, seconds and hundredths of seconds for each threshold and runway end and, where appropriate, geoid undulation of:

. . .

Origin:	**Rationale:**
ADOP/3	Consequential amendment, arising from the proposal to replace PCN with PCR, as detailed in Initial proposal 4.

— — — — — — — —

ATTACHMENT F to State letter AN 4/1.1.59-18/103

RESPONSE FORM TO BE COMPLETED AND RETURNED TO ICAO TOGETHER WITH ANY COMMENTS YOU MAY HAVE ON THE PROPOSED AMENDMENTS

To: The Secretary General
International Civil Aviation Organization
999 Robert-Bourassa Boulevard
Montréal, Quebec
Canada, H3C 5H7

(State) _____

Please make a checkmark (✓) against one option for each amendment. If you choose options "agreement with comments" or "disagreement with comments", **please provide your comments on separate sheets**.

	Agreement without comments	*Agreement with comments**	*Disagreement without comments*	*Disagreement with comments*	*No position*
Amendment to Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations* (Attachment B refers)					
Amendment to Annex 4 — *Aeronautical Charts* (Attachment C refers)					
Amendment to Doc 9981, *Procedures for Air Navigation Services (PANS) - Aerodromes* (Attachment D refers)					
Amendment to Doc 10066, *Procedures for Air Navigation Services (PANS) – Aeronautical Information Management* (Attachment E refers)					

*"Agreement with comments" indicates that your State or organization agrees with the intent and overall thrust of the amendment proposal; the comments themselves may include, as necessary, your reservations concerning certain parts of the proposal and/or offer an alternative proposal in this regard.

Signature: _____ Date: _____

— END —

AN-WP/9323
22/5/19

International Civil Aviation Organization

WORKING PAPER

AIR NAVIGATION COMMISSION

FINAL REVIEW OF PROPOSED AMENDMENTS TO ANNEX 14, VOLUME I AND CONSEQUENTIAL AMENDMENTS TO ANNEX 4, PANS-AERODROMES (DOC 9981) AND PANS-AIM (DOC 10066) RELATING TO AERODROME DESIGN AND OPERATIONS ARISING FROM THE THIRD MEETING OF THE AERODROMES DESIGN AND OPERATIONS PANEL (ADOP/3)

(Item No. 21105)

(Presented by the Director of the Air Navigation Bureau)

SUMMARY

This paper presents the results of a consultation with States and international organizations on a proposal to amend Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations*, Annex 4 — *Aeronautical Charts*, *Procedures for Air Navigation Services (PANS) — Aerodromes* (Doc 9981) and *Procedures for Air Navigation Services (PANS) — Aeronautical Information Management* (PANS-AIM, Doc 10066).

Action by the Air Navigation Commission is in paragraph 6.

WORK PROGRAMME ITEMS

69, 130, 140, 144, 147, 697, 1638

COORDINATION

AMO, GIS, OAS, OPS, PCI

REFERENCES

*AN-WP/9267, DP No. 1
*AN-WP/9267.PDP
*AN Min. 209-3
*Annex 4
Annex 6
*Annex 14, Volume I
Doc 9157, ADM, Parts 1, 2, 4, 5 & 6
Doc 9184, APM Part 1
Doc 9365
*PANS-Aerodromes (Doc 9981)
*PANS-AIM (Doc 10066)
Circ 301
Circ 345
*ADOP/3 Report
*State letter AN 4/1.1.59-18/103

This working paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objectives.

* Principal references

1. INTRODUCTION

1.1 On 4 October 2018, the Air Navigation Commission (209-3) considered a preliminary review (AN-WP/9267 and DP No. 1) of proposals developed by the third meeting of the Aerodrome Design and Operations Panel (ADOP/3) to amend Annex 14 — *Aerodromes*, Volume I — *Aerodrome Design and Operations*, Annex 4 — *Aeronautical Charts*, *Procedures for Air Navigation Services (PANS) — Aerodromes* (Doc 9981) and the *Procedures for Air Navigation Services (PANS) — Aeronautical Information Management* (PANS-AIM, Doc 10066).

1.2 The Commission agreed that the proposal be transmitted to States and appropriate international organizations for comment. Accordingly, State letter AN 4/1.1.59-18/103, dated 18 December 2018, was sent with a due date for replies on 18 March 2019.

2. SUMMARY OF REPLIES

2.1 By 18 March 2019, 62 replies had been received from 56 States, including 15 Council Member States, and six international organizations. By 14 May 2019, 69 replies had been received from 63 States, including 18 Council Member States, and six international organizations. A summary of replies is in Appendix A.

3. NATURE AND SCOPE OF REPLIES

3.1 The majority of replies indicated broad support for the proposed amendments to Annex 14, Volume I, Annex 4, PANS-Aerodromes and PANS-AIM.

4. SECRETARIAT REVIEW

4.1 Comments received from States and international organizations on the amendment proposals, the Secretariat’s review of these comments, and the associated action proposed are in Appendix B.

5. APPLICABILITY

5.1 The applicability dates for the proposed amendments to Annex 14, Volume I, Annex 4 and PANS-Aerodromes are envisaged to be 5 November 2020, except for proposed amendments to Annex 14, Volume I related to airport master plan which should be indicated as 3 November 2022 and amendments to Annex 14, Volume I and PANS-AIM related to pavement rating which should be indicated as 28 November 2024.

6. ACTION BY THE AIR NAVIGATION COMMISSION

6.1 The Air Navigation Commission is invited to:

a) note the summary of replies in Appendix A;

b) consider the material in Appendix B and decide on the action to be taken on all matters raised therein;

c) agree that the proposed amendments to Annex 14, Volume I, Annex 4, PANS-Aerodromes and PANS-AIM as contained in Attachments B to E, respectively, to State letter AN 4/1.1.59-18/103, and as modified by action taken under b) above, be consolidated with other amendment proposals for inclusion in Amendment 15 to Annex 14, Amendment 61 to Annex 4, Amendment 3 to the PANS-Aerodromes and Amendment 1 to the PANS-AIM;

d) agree that the applicability dates for the proposed amendments to Annex 14, Volume I, Annex 4 and PANS-Aerodromes be indicated as 5 November 2020, except for proposed amendments to Annex 14, Volume I related to airport master plan which should be indicated as 3 November 2022 and amendments to Annex 14, Volume I and PANS-AIM related to pavement rating which should be indicated as 28 November 2024;

e) instruct the Secretary regarding the preparation of the draft report to Council for Amendment 15 to Annex 14 and Amendment 61 to Annex 4; and

f) instruct the Secretary regarding the preparation of the approval of Amendment 3 to the PANS-Aerodromes and Amendment 1 to the PANS-AIM.

— — — — — — — —

APPENDIX A

SUMMARY OF REPLIES TO STATE LETTER

A — Agreement without comments (includes "no objections")
AC — Agreement with comments and/or reservations
DC — Disagreement with comments
NP — No indication of position (includes "no comments" and acknowledgements)

Note.— X in the "AC" and "DC" columns indicates that the State concerned agrees with comments on certain parts of the amendment whilst disagreeing with others.

	Annex 14				Annex 4				Doc 9981 PANS-AERO				Doc 10066 PANS-AIM			
State /Intl. Orgs.	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**
Afghanistan																
Albania																
Algeria																
Andorra																
Angola																
Antigua and Barbuda																
Argentina																
Armenia	X				X				X				X			
Australia		X				X			X				X			
Austria		X				X				X				X		
Azerbaijan																
Bahamas																
Bahrain	X				X				X				X			
Bangladesh																
Barbados																
Belarus																
Belgium																
Belize																
Benin	X				X				X				X			
Bhutan	X				X				X				X			
Bolivia (Plurinational State of)		X			X				X				X			
Bosnia and Herzegovina	X				X				X				X			
Botswana																
Brazil	X				X				X				X			
Brunei Darussalam																
Bulgaria																
Burkina Faso																
Burundi																
Cabo Verde																
Cambodia		X			X				X				X			
Cameroon	X					X			X					X		
Canada		X			X				X				X			
Central African Republic																
Chad																
Chile	X				X				X				X			
China Hong Kong, SAR Macao, SAR	 X X	X			X X X				X X X				X X X			

	Annex 14				Annex 4				Doc 9981 PANS-AERO				Doc 10066 PANS-AIM			
State /Intl. Orgs.	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**
Colombia																
Comoros																
Congo																
Cook Islands																
Costa Rica	X				X				X				X			
Côte d'Ivoire																
Croatia																
Cuba	X				X				X				X			
Cyprus																
Czechia	X				X				X				X			
Dem. People's Rep. of Korea																
Dem. Rep. of the Congo																
Denmark																
Djibouti																
Dominica																
Dominican Republic	X				X				X				X			
Ecuador																
Egypt	X				X				X				X			
El Salvador	X				X				X				X			
Equatorial Guinea																
Eritrea																
Estonia	X				X				X				X			
Eswatini																
Ethiopia	X				X				X				X			
Fiji																
Finland		X				X				X				X		
France		X				X				X				X		
Gabon																
Gambia																
Georgia	X				X				X				X			
Germany		X			X				X				X			
Ghana																
Greece																
Grenada																
Guatemala																
Guinea																
Guinea-Bissau																
Guyana																
Haiti																

	Annex 14				Annex 4				Doc 9981 PANS-AERO				Doc 10066 PANS-AIM			
State /Intl. Orgs.	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**
Honduras																
Hungary																
Iceland																
India		X			X				X				X			
Indonesia	X				X				X				X			
Iran (Islamic Republic of)	X				X				X				X			
Iraq																
Ireland																
Israel																
Italy		X				X				X				X		
Jamaica																
Japan		X			X				X					X		
Jordan																
Kazakhstan																
Kenya																
Kiribati																
Kuwait																
Kyrgyzstan		X			X				X				X			
Lao People's Dem. Rep.																
Latvia		X				X				X				X		
Lebanon																
Lesotho																
Liberia																
Libya																
Lithuania																
Luxembourg																
Madagascar																
Malawi																
Malaysia	X				X				X				X			
Maldives																
Mali																
Malta		X				X				X				X		
Marshall Islands																
Mauritania																
Mauritius	X				X				X				X			
Mexico																
Micronesia (Federated States of)																
Monaco																
Mongolia																
Montenegro		X				X				X				X		
Morocco																
Mozambique																
Myanmar	X				X				X				X			
Namibia																
Nauru																

	Annex 14				Annex 4				Doc 9981 PANS-AERO				Doc 10066 PANS-AIM			
State /Intl. Orgs.	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**
Nepal	X				X				X				X			
Netherlands																
New Zealand	X				X				X				X			
Nicaragua																
Niger																
Nigeria																
North Macedonia	X				X				X				X			
Norway																
Oman	X				X				X				X			
Pakistan	X				X				X				X			
Palau																
Panama	X				X				X				X			
Papua New Guinea																
Paraguay	X				X				X				X			
Peru																
Philippines	X				X				X				X			
Poland			X			X			X					X		
Portugal																
Qatar	X				X				X				X			
Republic of Korea																
Republic of Moldova	X				X				X				X			
Romania		X				X				X				X		
Russian Federation																
Rwanda																
Saint Kitts and Nevis																
Saint Lucia																
Saint Vincent and the Grenadines																
Samoa																
San Marino	X				X				X				X			
Sao Tome and Principe																
Saudi Arabia																
Senegal																
Serbia	X				X				X				X			
Seychelles																
Sierra Leone																
Singapore		X			X				X				X			
Slovakia																
Slovenia		X				X				X				X		
Solomon Islands																
Somalia																
South Africa																
South Sudan																
Spain		X				X				X				X		
Sri Lanka																

	Annex 14				Annex 4				Doc 9981 PANS-AERO				Doc 10066 PANS-AIM			
State /Intl. Orgs.	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**
Sudan																
Suriname																
Sweden		X				X				X				X		
Switzerland			X		X				X				X			
Syrian Arab Republic																
Tajikistan																
Thailand	X				X				X				X			
Timor-Leste																
Togo																
Tonga																
Trinidad and Tobago																
Tunisia																
Turkey	X				X				X				X			
Turkmenistan																
Tuvalu																
Uganda																
Ukraine																
United Arab Emirates																
United Kingdom	X				X				X				X			
United Rep. of Tanzania																

	Annex 14				Annex 4				Doc 9981 PANS-AERO				Doc 10066 PANS-AIM			
State /Intl. Orgs.	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**	**A**	**AC**	**DC**	**NP**
United States		X			X				X				X			
Uruguay																
Uzbekistan	X				X				X				X			
Vanuatu																
Venezuela (Bolivarian Republic of)	X				X				X				X			
Viet Nam																
Yemen																
Zambia																
Zimbabwe																
ACI		X			X					X			X			
CANSO																
EUROCONTROL		X				X			X					X		
Regional Office																
IATA	X				X				X				X			
IBAC																
ICCAIA		X			X				X				X			
IAOPA																
IFALPA		X				X			X				X			
IFATCA	X				X				X				X			
IAC																
TOTALS	41	26	2	0	53	16	0	0	57	12	0	0	54	15	0	0

— — — — — — — —

APPENDIX B

COMMENTS OF STATES AND INTERNATIONAL ORGANIZATIONS IN RESPONSE TO STATE LETTER AN 4/1.1.59-18/103

Note 1.— All references are to Attachments B to E to State letter AN 4/1.1.59-18/103 unless indicated otherwise.

Note 2.— Changes as a result of comments received are shown with new text in grey shading and underline and deleted text in ~~strikethrough and underline~~.

REFERENCE: Annex 14, Initial Proposal 1, Page B-2 and B-3

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Bolivia
(Note.— See appropriate partial language version of this AN-WP for original text.)

Because the amendment creates a requirement for a document setting out the framework for the development and growth of an airport, called *Plan general* in Spanish, we recommend including a definition of this document. For added clarity and usability in the Latin American region, the Spanish version should use the standard term *Plan Maestro Aeroportuario* [*Airport Master Plan*] instead of *Plan general*. The former is widely used in the region. Although in Spain, the term *Plan Director* is often used, *Plan Maestro* [*master plan*] is commonly understood to mean the same thing. In any case, *plan general* is not specific enough. Moreover, in other sectors and activities where long-term planning is done, the term *Plan maestro* is normally used, for example in transport, urban planning, water and sanitation, etc. Standardising the term will allow for better integration of airport planning with government planning systems in other sectors, boosting State efficiency.

So, due to the frequent reference to this document in daily activities, we suggest creating a specific acronym, *AMP* (for the English term *Airport Master Plan*).

Suggested improvements:

ABBREVIATIONS AND SYMBOLS
(used in Annex 14, Volume I)

…
AMP Airport Master Plan
…

CHAPTER 1. GENERAL

1.1 Definitions

….
Airport Master Plan (AMP). Document that reflects the planning concept of an airport in terms of its growth, development and progress in a given time frame.

SECRETARIAT'S COMMENTS

The Secretariat agrees with **Bolivia**'s suggestion that "Plan Maestro Aeroportuario" is a more precise rendition of "Airport Master Plan" than "Plan General", and further agrees that the term "maestro" is widely used in Latin America and will be easily understood in Spain as well, even if the preferred expression in that country is indeed "Plan Director".

The proposal from **Bolivia** to create the acronym "AMP" is not supported for two reasons: a) the proposed acronym is not a commonly-used nor commonly-understood acronym; and b) the term "airport master plan" for which the acronym is proposed, is not, until now, used anywhere in the Annex other than in Chapter 1, section 1.5, where it is now proposed. As regards developing a formal definition for airport master plan, the ANC's *Guide to the Drafting of SARPS and PANS (Standards for Standards (SFS))* stipulates that the number of definitions introduced in an Annex shall be kept to a minimum. Furthermore, terms which are being used in their normal dictionary meaning or whose meanings are generally known shall not be defined. The *Airport Planning Manual* (Doc 9184), Part 1 — *Master Planning* explains, in detail, the purpose and objectives of a master plan which is considered adequate, hence **Bolivia's** proposal to create a formal definition for an airport master plan is not supported.

ACTION PROPOSED

Following consultation with the language section regarding the proposal to use the words "Plan Maestro Aeroportuario" instead of "Plan general", the Spanish wording proposed by **Bolivia** will be incorporated and presented in the draft report to Council.

REFERENCE: Annex 14, Initial Proposal 1, Page B-3 and B-4, Chapter 1

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Austria, Eurocontrol, Finland, Italy, Latvia, Malta, Montenegro, Romania, Slovenia and Sweden

In Chapter 1, with regard to the deletion of the visibility/RVR references from the definition of Precision approach runway category I, II and III, it is not understood why the visibility/RVR values contained in the current definitions of precision approach CAT I, II and III runways are considered necessary to be removed, as this would create an inconsistency with the relevant content of Annex 6 (Standard 4.2.8.3), while retaining the said values does not seem to contradict the PBAOM concept. Moreover, it should be ensured that any changes made to the definitions consistent with the relevant ones contained in Annex 6, and do not affect the integrity of the content of Annex 14, especially with regard to the provision of standardized visual aids, as this is currently linked to the visibility/RVR values contained in the definitions. With regard to the proposed definition of the non-instrument runway, further assessment is required for the proposed minima of 150 m (500ft), because the adoption of the definition may lead to aircraft operations with reduced aerodrome infrastructure.

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

Instrument runway definition

The removal of the RVR/visibility references from the definitions for CAT I, II and III precision approach runway is not consistent with para. 4.2.8.3 of Annex 6. SL 80 proposes to delete sub-categories A, B, C of CAT III, but not the visual references. Moreover, care should be taken to ensure that any change to the definitions does not affect the integrity of the content of Annex 14. The changes have an impact on the requirements for visual aids in particular as they relate to the RVR/visibility values contained in these definitions.

Further, the changes introduced bring the current runway definitions back to a categorisation based on approach type rather than on the type of operation, while retaining the MDH and/or DH as a discerning criterion. For example, the definition of non-precision runways no longer refers to type A operations, or to approaches with a DH. As a result, the categorisation of runways serving ILS approaches with a DH higher than 250ft is not as clear as it was. The current definition of non-precision approach runway allows for such ILS approaches to be supported on non-precision approach runways, whereas the amended definition seems to require that they once again be supported on precision approach runways. Was that the original intention? If not, it would be helpful to modify the definition as follows:

a) *Non-precision approach runway.* A runway served by visual aids and non-visual aid(s) ~~intended for landing operations following~~ supporting an instrument approach ~~operation type A and a visibility not less than 1 000 m~~ procedure with minima not lower than 75 m (250 ft) minimum descent height (MDH) or decision height (DH).

Definition of non-instrument runways

We understand the aim of improving accessibility and safety for general aviation by establishing instrument approach procedures at aerodromes that only have non-instrument runways, and we do not disagree in principle. However, this definition covers all non-instrument runways regardless of the traffic they serve. With no other conditions in place, 500 ft seems too low to adequately ensure the safety of commercial transport operations (especially wide-body aircraft).

The adoption of the new *non-instrument runway* definition will lead to less stringent infrastructure and operational requirements for non-instrument runways than for runways currently categorised as instrument runways. This is especially the case for marking (approach lighting system, emergency power supply), obstacle limitation surfaces (sizing of slopes, support perimeter width…), and for the dimensions of the runway strip (which could be reduced in width from 280 m to 150 m in the case of a code 3 or 4 runway).

By way of comparison, the minima associated with the approach procedures known as visual manoeuvring (circling) are 400, 500, 600 and 700 ft respectively for category A, B, C and D aircraft. Nowadays, these approaches must be done on non-precision instrument runways. Thus, the new definition proposed for non-instrument runways would, paradoxically, allow the fastest aircraft to do visual manoeuvring on runways that are less equipped and less protected than is presently the case.

Moreover, given a decision point at that altitude, an approach slope of 5% and a speed of 130 kt (the approach speed of an A320), the aircraft will only be about 45 seconds away from touchdown of its landing gear, leaving little time or room for manoeuvre for the pilot to react.

Therefore, although the rationale in the State letter is based on a value already in use in certain States, that value is being used here without any clarification as to the relevant regulatory framework prevailing in those States. Without the regulatory lock-in, the lesser requirements will apply de facto to commercial traffic facilities which currently have instrument runways with minima close to or higher than 500 ft. This is the case at Chambéry Airport in France, which has an instrument runway (ILS) with operational minima for category C aeroplanes higher than 500 ft due to nearby obstacles. In this instance, the new runway definition would allow for the characteristics and equipment of the runway to be downgraded, significantly reducing the level of safety.

To sum up, because there is no safety case assessing the impact of introducing such procedures for non-instrument runways for all possible types of operation, we believe it is premature to adopt this definition. We think it would be appropriate to wait for the development of guidance material on how to implement this definition, and for the provisions on the design and operation of these runways to be amended accordingly.

Germany

We highly appreciate the suggested changes of the Definitions (Instr. and Non-lnstr. Rwy). Please provide further information under which Job Card and leadership the mentioned joined task force will be implemented.

India

Clarity may be provided on non-precision runway with minima restricted at 500 ft. Can be defined as non-instrument runway.

Finland, Malta, Montenegro, Romania and Slovenia

With regard to the definition of non-precision approach runway, considering the fact that there may be such runways served by ILS approaches with Decision Height (DH) more than 250ft., it is considered appropriate to also include DH in the said definition.

Poland

1.1 Definitions. Changes to the definition of the instrument runway.

With regard to the deletion of the visibility/RVR references from the definitions of Precision approach runway category I, II and III, it is not clear why the visibility/RVR values contained in the current definitions of precision approach CAT I, II and III runways are considered necessary to be removed, as no inconsistency with the relevant content of Annex 6 (standard 4.2.8.3) is noticed, while retaining the said values does not seem to contradict the instrument approach operations classification. The above amendments to the definitions of Precision approach runway category I, II and III will have an adverse effect on the integrity of the content of Annex 14, especially with regard to the provision of standardised visual aids, as this is currently linked to the visibility/RVR values contained in these definitions.

For this reason, Poland does not agree to the proposed changes of the Precision approach runway category I, II and III definitions and to remove the RVR values, without any further changes of the visual aids requirements.

Rationale:

Regarding the current regulations it is clear, that for the runway operating at least in CAT II (RVR 300 m), there must be a runway guard light (runway intended for use in runway visual range conditions less than a value of 550 m), runway turn-pad light (used in runway visual range conditions less than a value of 350m), stop bar (serving a runway when it is intended that the runway will be used in runway visual range conditions less than a value of 350 m), etc.

Poland would like to propose to:

1. add a new regulation clearly binding operations in CAT II, III with infrastructure demands; or
2. redefine current regulations for visual aids.

Ad. 1) New regulation: Regarding the detailed requirements provided in chapter 5, Precision approach runway category II or III should be protected by stop-bars, no-entry bars, runway guard lights and road-holding position lights. Such runway should be equipped with runway turn-pad lights and rapid exit taxi way lights. Taxiways serving such runway should be equipped with taxiway center line light.

Ad.2) Amendment of the existing regulation could be done like for runway centre line lights that "shall be provided on a precision approach runway category II or III", so for example:

Runway turn-pad lights shall be provided for continuous guidance on a runway turn-pad installed on precision approach runway category II or III or in take-off operations under RVR 350m, to enable an aeroplane to complete a 180-degree turn and align with the runway center line.

Spain
(Note.— See appropriate partial language version of this AN-WP for original text.)

With respect to the deletion of the references to RVR/visibility from the definition of CAT I, II and III precision approach runway, we seek clarification concerning the need to eliminate the RVR/visibility values contained in the current definitions of CAT I, II and III precision approach runways. We must ensure that any changes made to the definitions do not affect any of the content of Annex 14, especially as regards the provision of standardized visual aids, since this is currently linked to the RVR/visibility values contained in the definitions.

In this regard, we must take into consideration the fact that the provisions referring to visual aids are often linked to the RVR values. If the RVR values are removed from the definition, these standards will be based *de facto* on the Annex 6 provisions. Despite the greater flexibility offered by this change, it would result in a lack of guidelines for establishing the required visual aids.

On the other hand, with respect to the proposed definition of a non-instrument runway, a better assessment of the proposed minima of 150 m (500 feet) is required, since the adoption of the definition could result in aircraft operating with limited aerodrome infrastructure.

Switzerland

Definitions

The new definitions for Instrument runways (Non-precision approach runway and Precision approach runway categories I, II and Ill) are highly appreciated, as it simplifies the application of those definitions and reveals inconsistencies with the current provisions of ICAO Annex 6.

The new definition for Non-instrument runways by allowing instrument approach procedures with minimas not lower than 500 ft is highly appreciated, as it reflects the current framework applied in Switzerland by national regulations and noticed as an ICAO deviation (which by an application of the new definition could be removed).

We would recommend adding as a Guidance the following Figure to explain the relations between Annex 6, Annex 14 and Annex 10 in an adequate Manual (e.g. *Manual of All-Weather Operations*, Doc 9365):

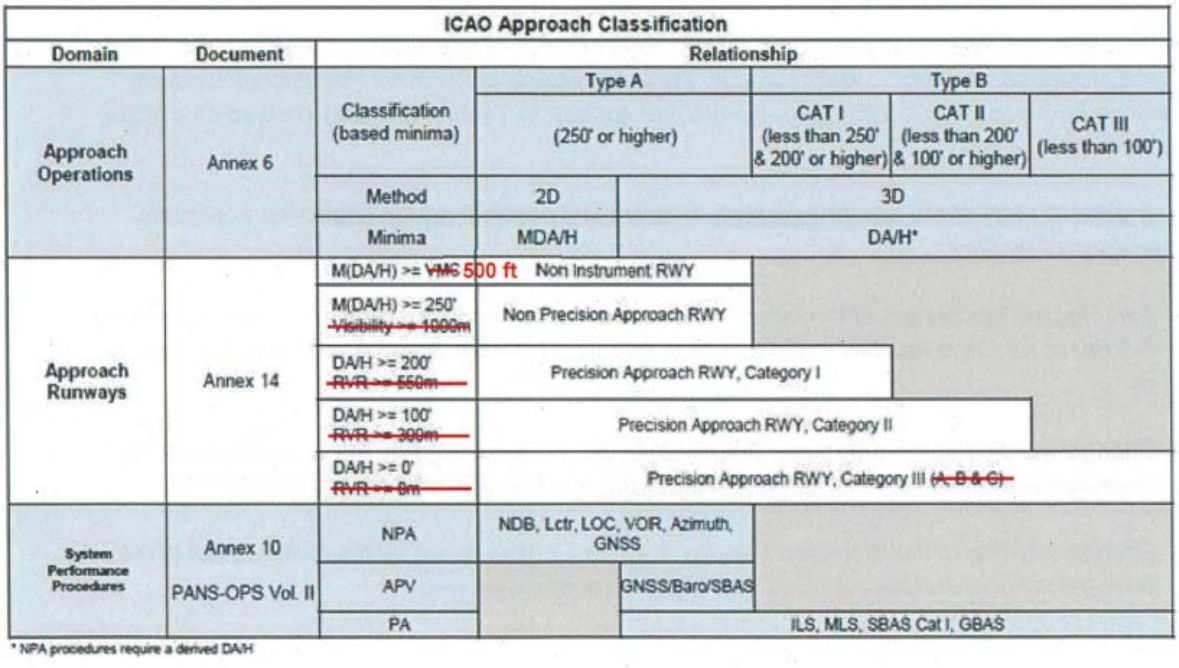


Figure 1: *Proposed Guidance Material to explain relations between Annex 6, Annex 14 and Annex 10*

United States

Standards, such as the separation of a runway-holding position to the runway centerline, is dependent on the type of runway (e.g. non-instrument, non-precision, precision, etc.). The removal of the visibility component of the definition can result in low visibility air operations to occur with less stringent separation standards. No objection provided assurance that there is no compromise to safety.

ACI

Under Initial Proposal 1, the State Letter proposes to remove runway visual range (RVR) criteria from the definition of an instrument runway, to be consistent with Annex 6. With this removal, it is not clear how and when pattern B runway holding positions (RHPs), provided as described in Annex 14 Volume 1, sections 5.2.10.2 & 5.2.10.3, should be used.

The airport operator and/or ANSP decide when to invoke the aerodrome's low visibility procedure (LVP), normally based on RVR and surface visibility in other parts of the movement area, as stated in PANS-Aerodromes, Attachment C to Chapter 2, 5.16 titled Low Visibility Operations.

ACI suggests to add a new Note (see below) in Annex 14, immediately following the sub-heading 5.2.10 Runway Holding Position Marking:

Note .— Where more than one runway holding position is provided on a taxiway, the one in use will depend on established Low Visibility Procedures. Further guidance on operations in low visibility conditions is available in Doc 9981–PANS-Aerodromes, Doc 9365 – Manual of All-Weather Operations, Doc 9137 — Airport Services Manual, Part 8 — Airport Operational Services, Doc 9476 — Manual of Surface Movement Guidance and Control Systems (SMGCS); and Doc 9830 — Advanced Surface Movement Guidance and Control Systems (A-SMGCS) Manual.

ACI therefore suggests adding more detailed provisions to PANS-Aerodromes and to the appropriate Doc(s). Going further, ACI suggests including a new chapter in PANS-Aerodromes on the use and applicability of visual aids.

SECRETARIAT'S COMMENTS

Comments from **Austria, Eurocontrol, Finland, France, Italy, Latvia, Malta, Montenegro, Poland, Romania, Slovenia**, **Spain**, **Sweden, United States** and **ACI** expressing reservations with the proposed amendments are noted. Also noted are comments from **Finland, Malta, Montenegro, Romania** and **Slovenia** related to the inclusion of decision height (DH) and the comment from **India** concerning minima values, in the proposed definitions of NPA runways.

In relation to the proposed revision to the various definitions to support the PBAOM concept, the Secretariat wishes to draw attention to a PBAOM-related job card developed by the recent FLTOPSP/5 in AN-WP/9301 which will be taken up by the Commission in the same session. The proposed job card contains details of a complete package of amendment proposals involving six Annexes (including Annex 14 Vol I), four PANS and Doc 9365 in order to support the PBAOM concept. The package will include modifications to current flight operations, flight procedures as well as definitions of the various categories of runways, with the latter proposed for a delivery date of 4Q/2022. In light of the extensive comments

and confusion expressed by States and **ACI** germane to the proposed revision to definitions of runway categories stemming from ADOP/3, the Secretariat is of the view that it might be appropriate to defer the proposals in Initial Proposal 1 of State letter 18/103 (related to definitions supporting PBAOM) and to include them as part of a comprehensive package of deliverables arising from the FLTOPSP/5 job card since changes to the runway definitions should not be done in isolation.

Concerning the proposed amendment to the definition of PA runways category III, it will be recalled that FLTOPSP/4, in accordance with job card FLTOPSP.027.02 and with a view to simplify the various classification of instrument approach operations according to intended operations, developed a proposed amendment to paragraph 4.2.8.3 of Annex 6, Part I (see AN-WP/9291). The amendment proposal had undergone the due process and, if adopted by the Council, will be included in Amendment 44 to Annex 6, Part I. In order to avoid inconsistency between Annex 6, Part I and Annex 14, Volume I, as commented by several States, the Secretariat proposes a consequential amendment to the definition of PA runways category III in the action proposed.

The comment from **Germany** is noted. The removal of CAT IIIA, IIIB and IIIC definitions can be found in Job Card FLTOPSP.027.02, while the job card related to PBAOM (as yet unnumbered) developed by FLTOPSP/5, containing revised definitions of runways, can be found in AN-WP/9301.

The comment from **Switzerland** is noted. The recommendation to include the diagram proposed by **Switzerland,** explaining the relationship between Annexes 6, 10 — *Aeronautical Telecommunications* and 14, will be coordinated with the relevant Secretariat during the update to, among others, Doc 9365, *Manual of All-Weather Operations.*

ACTION PROPOSED

a) *Defer* proposed amendments to definitions of NINST and INST runways in Annex 14, Volume I supporting PBAOM concept (Initial Proposal 1) to the timeline indicated in the new FLTOPSP/5 job card (concerning PBAOM) and resubmit as a total package stemming from the job card.

b) *Amend* the current definition of PA approach runway Cat III as follows:

….

c) *Precision approach runway, category II*. A runway served by visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type B with a decision height (DH) lower than 60 m (200 ft) but not lower than 30 m (100 ft) and a runway visual range not less than 300 m.

d) *Precision approach runway, category III*. A runway served by visual aids and non-visual aid(s) intended for landing operations following an instrument approach operation type B ~~to and along the surface of the runway and:~~

~~A intended for operations~~ with a decision height (DH) lower than 30 m (100 ft), or no decision height and a runway visual range ~~not~~ less than 300 ~~175~~ m or ~~no runway visual range limitations.~~

~~B intended for operations with a decision height (DH) lower than 15 m (50 ft), or no decision height and a runway visual range less than 175 m but not less than 50 m.~~

~~C intended for operations with no decision height (DH) and~~ no runway visual range limitations.

REFERENCE: Annex 14, Initial Proposal 2, Page B-6, Section 1.5.1

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Bolivia

We suggest including a paragraph that provides a recommendation for States to implement the necessary restrictions where there is an increase in the number of runways or the existing runways are enlarged.

We also suggest that the Spanish version use the standard term *Plan Maestro Aeroportuario* [*Airport Master Plan*], which is widely used in the Latin American region. Although in Spain, the term *Plan Director* is often used, the term *Plan Maestro* [*master plan*] may be used in other Spanish speaking countries. The proposed text indicates that the development of equipment should be included in the Master Plan.

Suggested improvements:
…

1.5.1 **Recommendation.—** *A master plan containing detailed plans for the development of aerodrome infrastructure and equipment should be established for aerodromes deemed relevant by States.*

1.5.2 **Recommendation.—** *The master plan should:*

a) contain a schedule of priorities including a phased implementation plan; and

b) give a graphic representation of the development of an airport and prior land use allocations of premises adjacent to the airport, including future restrictions in respect of obstacle limitation surfaces and features that might attract birds and other animals, and;

c) ~~b)~~ be reviewed periodically to take into account current and future aerodrome traffic.

Germany

We highly appreciate the content of the proposed amendment. However we do not support the intention to raise the recommendation up to a standard.

Rationale: With the potential introduction of a standard, states may be urged to introduce political discussions whether or not an airport master planning is reasonably required. The decision whether to carry out a Master Planning or not should be based on case by case decision and not regulative obliged.

Japan

Japan agrees with Recommendation 1.5.1 of Initial Proposal 2. However, a master plan containing detailed plans for the development of aerodrome infrastructures can be affected by various unmanageable factors, such as environmental consideration on noise issue, consensus building with local residents and financial constraints of airport operators. In fact, it is not always possible to prepare such long-term plans without any ad-hoc restrictions. Therefore, developing a master plan in terms of its scope, content, timeline and formulation process should be left to each State. Japan considers that the upgrade of the Recommendation 1.5.1 to a Standard in the future will be inappropriate.

Kyrgyzstan
(Note.— See appropriate partial language version of this AN-WP for original text.)

We propose to delete the changes and amendments in paragraph 1.5 on the introduction of provisions on master planning for long-term aerodrome development. The entry of such amendments into force will require additional financial resources for research, consultation and the development of such master plans. Meanwhile, aerodrome operators are implementing a strategy and aerodrome development programme. We believe it would be useful to define the method and main approach to the way in which the State determines which aerodromes in the State are important, and to define the main sections and structure of the master plan for long-term development. More mature, detailed information concerning master planning is required in order for these amendments to be reviewed and adopted.

ACI

Under Initial Proposal 2, ACI supports the proposed SARPS on Airport Master planning but notes that the new guidance material on Airport Master Planning (Doc 9184, Part 1) is being extensively amended to support these new SARPS, hence adequate time is required for States and airports to implement the new guidance material once it is released.

ACI therefore suggests revising the applicability date of the new SARPS on Master planning to the next cycle (i.e. November 2022), so that the provisions of the new SARPS may be effectively implemented.

SECRETARIAT'S COMMENTS

The first comment from **Bolivia** concerning "…to implement the necessary restrictions where there is an increase in the number of runways or the existing runways are enlarged" is not properly understood. The Secretariat believes that this comment is related to **Bolivia**'s subsequent comment to paragraph 1.5.2 (b) where the term "future restriction in respect of …" is used. If this is a correct interpretation, the Secretariat is of the view that a separate paragraph containing such recommendations is not necessary in a performance-based SARP since issues such as obstacles and other hazards, including potential for wildlife/bird strikes, are among the factors to be considered in an airport master plan (see guidance in Doc 9184, *Airport Planning Manual*, Part 1 — *Master Planning*, Chapter 5, section 5.5). Furthermore, provisions related to, inter alia, land use are already covered in the recommendation in existing paragraph 1.5.2, Annex 14, Volume I. As regards the use of the Spanish term, refer to the action proposed on page B-2. The proposal to include the term "equipment" is noted but not supported since airport master plans describe expansion and development in macro terms, involving such diverse disciplines as, but not limited to, traffic forecasting, economic feasibility, finance/funding, environment et al. On that score,

when planning for airport development, it is a given that equipment forms an integral part of all landside, airside and support elements.

The Secretariat noted the agreement of **Japan** and **Germany** with the proposed recommendation in the new paragraph 1.5.1 and also noted their position that they do not support upgrading the recommendation to a Standard due to reasons stated.

Kyrgyzstan does not support the proposals in Annex 14, Volume I, Chapter 1, section 1.5, asserting that additional financial resources are required. The financial cost involved in preparing a master plan constitutes a very small portion of the capital expenditure incurred in an airport development project. While the cost for developing a master plan is minimal, the benefits are enormous since a master plan is a long-term guide to development that supports, inter alia, an airport's business development strategy. Without a master plan, there is a real and significant risk that short-term decision-making will result in capital-intensive capacity enhancement projects that are poorly located and inappropriately sized. The end result is that scarce capital is wasted on projects that potentially restrict the airport's overall capacity and performance, thereby impeding the airport's ability to fully utilize its infrastructure's ultimate capacity. Concerning the request for more guidance, it is envisaged that the complete update to Doc 9184, *Airport Planning Manual*, Part 1 - *Master Planning* will provide the comprehensive guidance needed by **Kyrgyzstan**.

ACI supports the proposed amendments but suggests revising the applicability date of the SARPS to the next cycle i.e. November 2022 instead of November 2020. This is to provide adequate time for States and airports to implement the new guidance material once it is released. The Secretariat considers that the request from **ACI** has strong merit on account of two justifications: a) in November 2020, there will be a slew of SARPs that will become applicable, in particular the requirements for the global reporting format for runway surface conditions assessments and reporting in a multitude of documents, viz, Annex 14, Volume I, Annex 3, Annex 6 Parts I and II, Annex 8 — *Airworthiness of Aircraft*, Annex 15 — *Aeronautical Information Services*, Doc 9981 - PANS-Aerodromes, Doc 4444 - PANS-ATM and Doc 10066 - PANS-AIM, not excluding other SARPs in this working paper stemming from ADOP/3, all of which are also expected to be applicable in November 2020. It is therefore prudent to consider if States are able to keep up with the pace of SARPs amendment; and b) the comprehensive guidance in Doc 9184, Part 1 is multidisciplinary involving at least two Bureaux, viz. Air Navigation and Air Transport. The guidance touches on such diverse aspects as traffic forecasting, financing, charges, airfield and terminals including facilitation and security, cargo and dangerous goods, air traffic services, search and rescue, radio navigation aids, meteorology et al. It is envisaged that coordination with the various sections in the two Bureaux will require an inordinate amount of time to bring the thirty-two year old guidance in the manual, which is being developed by an International Air Transport Association (IATA)-led task force, to be current with several Annexes, Technical Instructions et al, including the time needed for simultaneous publication in all ICAO official languages. This proposal from **ACI** also addresses the comment from **Kyrgyzstan** requesting for more detailed information concerning master plan.

ACTION PROPOSED

Agree to defer proposed amendments concerning airport master plan in Annex 14, Volume I, Chapter 1, section 1.5 to an applicability date of 3 November 2022.

REFERENCE: Annex 14, Initial Proposal 3, Page B-9, Table 1-1

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

The French term used to translate *wing tip* is *extrémité d'aile*. We propose to modify *Note 2* to Table 1-1 (B-9).

[Translator's note: The proposed modification concerns the French version only.]

India

Regarding Note 2, no such guidelines are available in the *Procedures for Air Navigation Services Aerodromes (PANS-Aerodromes, Doc 9981,* Second edition 2016).

SECRETARIAT'S COMMENTS

The comment from **France** is noted and will be referred to the language section for further action.

The comment from **India** is noted. Due to the voluminous amount of materials related to the operation of the first commercial aeroplane equipped with folding wing tip technology, and with such materials being proprietary, it is considered appropriate to include only a note in Annex 14, Volume I, referring to provisions in Doc 9981. The latter document further points to information being available in the aircraft manufacturer's documentations such as:

http://www.boeing.com/resources/boeingdotcom/commercial/airports/acaps/777-9_RevA.pdf

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 4, Page B-10 to B-13, Section 2.6

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Bolivia

The amendment should also specify whether (or not) adoption of the layered elastic analysis (LEA) would entail a re-assessment of the subgrade for pavements currently reporting PCN based on CBR (for flexible pavements) or the modulus of subgrade reaction (for rigid pavements).

SECRETARIAT'S COMMENTS

The comment from **Bolivia** is noted but not supported, as the requirements in the Annex should remain high level in essence, while detailed technical clarifications should be given in the supporting guidance materials. It should be noted that neither the LEA nor the CBR are mentioned in the amendment itself. The adoption of the LEA would not require reassessment of pavements, and the clarification regarding this relevant question is given in the guidance material supporting the ACR-PCR (Doc 9157, Part 3 — *Pavements*), to which the amendment refers.

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 4, Page B-10 to B-13, Section 2.6

Cambodia

State Secretariat of Civil Aviation has comments that should keep Example 4, para 2.6.6 in this Annex.

SECRETARIAT'S COMMENTS

The comment from **Cambodia** is noted but not supported. Example 4 is proposed for removal as it was based on the all up weight (AUW) method for reporting pavement strength, and is not relevant to either PCN or PCR.

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 4, Page B-10 to B-13, Section 2.6

Canada

Actual changes to ACR/PCR in the Canadian standards will occur at a future date in consideration of the final text published in the Annex.

SECRETARIAT'S COMMENTS

The comment from **Canada** is noted and supported. The applicability date of the amendment is planned for November 2024 in order to allow States adequate time to prepare for the implementation of the final amendment.

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 4, Page B-10 to B-13, Section 2.6

Finland, Malta, Montenegro, Romania and Slovenia

In Chapter 2, consider whether the example provided in Standard 2.6.8, where the aircraft mass is 6500 kg, is in line with the content of the Standard itself, as the latter concerns the reporting of the bearing strength of pavements intended for aircraft with mass equal to or less than 5700 kg.

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

We do not understand the proposed amendment to the example in 2.6.8 because it seems to no longer address the case of aircraft of an allowable maximum mass less than or equal to 5700 kg (6500 kg > 5700 kg).

SECRETARIAT'S COMMENTS

The comment from **Finland, Malta, Montenegro, Romania, Slovenia and France** concerning the example supporting 2.6.8 are noted and supported. The Secretariat proposes to amend the example, using a numerical value which corresponds with the provision itself.

ACTION PROPOSED

Amend paragraph the example supporting 2.6.8 as follows*:*

Example: ~~6500~~ 4800 Kg/0.60 MPa

REFERENCE: Annex 14, Initial Proposal 4, Page B-10 to B-13, Section 2.6

Kyrgyzstan
(Note.— See appropriate partial language version of this AN-WP for original text.)

We propose to delete the amendment concerning the assessment of the bearing strength of aerodrome pavements using the ACR-PCR method. Existing aerodromes use the ACN-PCN method for assessing the bearing strength of aerodrome pavements. Aerodrome data on pavement bearing strengths is published in aeronautical manuals and aerodrome operations documents, and they are published in accordance with existing Standards and Recommended Practices using the terms "ACN, PCN", and the ACN-PCN method. Currently, no detailed information is available about how such changes will be reflected in the research method, in calculations, and in the use of the conclusions concerning the bearing strength of

aerodrome pavements. Additional time is required for the ACR-PCR method to be studied by technical institutes conducting aeronautical research on the assessment of the aerodrome pavement bearing strength. Changes in the methodology are required, and specialists must be trained on the use and application of the elasticity modulus in the calculations of pavement bearing strength. The adoption of the amendments with respect to ACR-PCR could cause regional research institutes to be ill-prepared for such amendments and aerodromes in the region to be unable to implement the adopted amendments. The transition to the ACR-PCR method may require training of personnel, changes in calculation methods, and the acquisition of additional equipment and computer programs. Furthermore, the transition from the ACN-PCN method to the ACR-PCR method will result in additional costs for the conduct of research, publication in aeronautical manuals, and the introduction of amendments to operational documents. It may also cause confusion among aerodrome users. Thus more mature, detailed information is required for the review and adoption of these amendments.

We propose to delete the amendment concerning the adoption of requirements, as a Standard, for the use of stop bars in runway visual range conditions less than 550m.

SECRETARIAT'S COMMENTS

The Secretariat takes note of **Kyrgyzstan's** concerns with regard to the proposed amendment on the ACR-PCR method. The proposed deletion of this amendment, however, is not felt to be justified and therefore not supported. The Secretariat wishes to remind that all the points raised by **Kyrgyzstan** have been already dealt with and addressed by the ADOP Aerodrome Pavement Expert Group (APEG), the ADOP itself and the ANC. Among others:

a) the new ACR-PCR method is built upon the existing 38 year old ACN-PCN method; however, it provides necessary modernization and updating, taking into account the developments in this area and proposes a new reporting methodology, aimed at optimized utilization of pavements, considering all aircraft which are intended to serve on a given pavement, in a very accurate manner;

b) the current pavement classification number reporting format is, however, maintained in the new reporting system as each aircraft will still be assigned a number that will express the structural loading effect of the aircraft on a pavement;

c) the amendment is supported by updated guidance material detailed in the *Aerodrome Design Manual*, Part 3 — *Pavements* (Doc 9157), and by a dedicated software (free of charge, available on the ICAO website);

d) the applicability date of the amendment is planned for November 2024 in order to allow States adequate time to prepare for the implementation of the amendment;

e) following discussions within the ADOP and with ACI regarding the training issue, it has been agreed that the required training is relatively simple, as the ACR-PCR method is built upon the ACN-PCN method and on the same philosophy; and

f) according to the impact assessment, the cost associated with the new amendment is deemed minor.

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 4, Page B-10 to B-13, Section 2.6

Switzerland

The proposed change from the current known classification numbers (ACN and PCN) to classification ratings (ACR and PCR) is a new approach, which requires a deep technical knowledge. Therefore it is very important, to have solid Guidance Material available (e.g. an updated *Aerodrome Design Manual, Part 3 — Pavements*, Doc 9157).

Providing a dedicated software for determining the ACR values is highly appreciated, nevertheless the use of this software and their limitations should be described precisely.

Section 2.6.6

The Standard reads that information on pavement type [...]shall be reported using the following codes: (pavement type, subgrade strength category, max allowable tire pressure category, evaluation method). In example 3, maximum allowable tire pressure is reported without using the category (0.80 MPa). There is therefore an inconsistency between the Standard and the example which should be revised.

Section 2.6.8

The requirement is for aircraft mass equal to or less than 5700 Kg but the example is for a greater aircraft mass (6500 Kg). Therefore, the example is not useful for the requirement 2.6.8 and is in contradiction with Standard 2.6.2 ([...]greater than 5700 kg shall be made available using ACR-PCR.) We therefore suggest to amend the example (according to AMDT 14):

Example: ~~6 500~~ 4 000 Kg/0.60 MPa.

SECRETARIAT'S COMMENTS

Switzerland's general comments are noted and supported. The amendment concerning the new ACR-PCR method is indeed supported by a dedicated guidance material in the *Aerodrome Design Manual*, Part 3 — *Pavements* (Doc 9157), and by a dedicated software that will be available on the ICAO website along with explanatory notes.

The Secretariat agrees with **Switzerland's** comment concerning example 3 supporting 2.6.6 and proposes to remove it.

The comment on 2.6.8 has been already addressed on page B-14.

ACTION PROPOSED

Amend 2.6.8 as follows:

~~Example 3. *If the bearing strength of a flexible pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be PCN PCR 40 and the maximum allowable tire pressure is 0.80 MPa, then the reported information would be PCN PCR 40 / F / B / 0.80 MPa / T*~~

REFERENCE: Annex 14, Initial Proposal 4, Page B-10 to B-13, Section 2.6

United States

Reference Chapter 2 ADM paragraph 2.6.6 (b) examples 1, 2 and 3

Numerical numbers in examples 1, 2 and 3 should be adjusted to match procedure, numerical numbers need to be increased by a factor of 10.

ICCAIA

It is understood and agreed by the Airfield Pavement Expert Group that in the new system, both the Aircraft Classification Rating (ACR) and Pavement Classification Rating (PCR) will be expressed in hundreds of kilograms (instead of thousands of kilograms in the current ACN/PCN system). This non-fundamental difference is intended to avoid any confusion between ACN (resp. PCN) and ACR (resp. PCR) during the transition period and beyond.

Consequently the examples 1, 2 and 3 should be numerically modified for complying with the proposed change.

Note: Guidance Manual (ADM Part.3 Pavement) will also reflect this change.

Change proposal:

Example 1. – if the bearing strength of a rigid pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be ~~PCN~~ PCR ~~80~~ 760 and there is no tire pressure limitation, then the reported information would be:

~~PCN~~ PCR ~~80~~ 760/ R / B / W / T

Example 2. – if the bearing strength of a composite pavement, behaving like a flexible pavement and resting on a high strength subgrade, has been assessed by using aircraft experience to be PCR 550 and the maximum tire pressure allowable is 1.25 MPa, then the reported information would be:

~~PCN~~ PCR ~~50~~ 550/ F / A / Y / U

Note. – Composite construction.

Example 3. – If the bearing strength of a flexible pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be ~~PCN~~ PCR ~~40~~ and the maximum allowable tire pressure is 0.80 MPa, then the reported information would be

~~PCN~~ PCR ~~40~~ 400/ F / B / 0.80 MPa / T

Similarly to the current system, The ACR/PCR system is intended for aircraft of ramp mass greater than 5 700Kg (see 2.6.2).

Consequently, example in 2.6.8 should be numerically modified for complying with the lower limit of the ACR/PCR applicability.

Change proposal:

2.6.8 The bearing strength of a pavement intended for aircraft of apron (ramp) mass equal to or less than 5 700 Kg shall be made available by reporting the following information:

a) maximum allowable aircraft mass; and
b) maximum allowable tire pressure.

Example: ~~6 500~~ 4 800 Kg/0.60 MPa

SECRETARIAT'S COMMENTS

The comment from the **United States** and **ICCAIA** regarding a reference from 2.6.6 to the *Aerodrome Design Manual*, Part 3 — *Pavements* (Doc 9157) is noted and supported.

The comment from the **United States** and **ICCAIA** regarding the need to modify the numbers in the examples supporting 2.6.6 in order to align the examples with the proposed provisions on ACR-PCR, is noted and supported as well.

Accordingly, the Secretariat accepts the modified examples proposed by **ICCAIA**.

The comment from **ICCAIA** concerning 2.6.8 has been addressed on page B-14.

ACTION PROPOSED

a) *Amend* the note supporting 2.6.6 as follows:

2.6.6 Information on pavement type for ~~ACN-PCN~~ ACR-PCR determination, subgrade strength category, maximum, allowable tire pressure category and evaluation method shall be reported using the following codes:
….

Note. – The following examples illustrate how pavement strength data are reported under ~~ACN-PCN~~ ACR-PCR method. Further guidance on this topic is contained in the *Aerodrome Design Manual* (Doc 9157), *Part 3 - Pavements*.

b) *Amend the examples supporting 2.6.6 as follows:*

Example 1. – if the bearing strength of a rigid pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be ~~PCN~~ PCR ~~80~~ 760 and there is no tire pressure limitation, then the reported information would be:

~~PCN~~ PCR ~~80~~ 760 / R / B / W / T

Example 2. – if the bearing strength of a composite pavement, behaving like a flexible pavement and resting on a high strength subgrade, has been assessed by using aircraft experience to be PCR 550 and the maximum tire pressure allowable is 1.25 MPa, then the reported information would be:

~~PCN~~ PCR ~~50~~ 550 / F / A / Y / U
…..

Example 3 – If the bearing strength of a flexible pavement, resting on a medium strength subgrade, has been assessed by technical evaluation to be ~~PCN~~ PCR ~~40~~ and the maximum allowable tire pressure is 0.80 MPa, then the reported information would be:

~~PCN~~ PCR ~~40~~ 400 / F / B/ 0.80 MPa / T

REFERENCE: Annex 14, Initial Proposal 5, Page B-13, paragraph 3.4.7

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

India

Agreement. However adequate timeline to be decided for compliance.

Switzerland

The aim to avoid repetitions of Figures (dimensions of OFZ) is appreciated. Nevertheless, the current proposed wording "... delineated by the lower edges of the inner transitional surfaces." seems to be incomplete, as the inner transitional surface in Table 4-1 is only defined by a slope requirement.

In our point of view, there are three options to solve this problem and to clarify the applicable dimensions of an OFZ:

a) add Figures for "Length of the inner edge" to the requirements for Inner Transitional in Table 4-1 (90 m for Code number 1 and 2, 120m for Code Number 3 and 4, including Footnote e);or

b) change wording of the proposed Chapter 3.4.7 to "... delineated by the ~~lower edges of the inner transitional surfaces~~ length of the inner edge of the balked landing surfaces."; or

c) change wording of the proposed Chapter 3.4. 7 to "... delineated by the ~~lower edges of the inner transitional surfaces~~ width[1] of the inner approach surfaces."

SECRETARIAT'S COMMENTS

The comment from **India** is noted. The proposed amendment under consideration is not a new requirement but rather a more performance-based enhancement of an existing requirement and an applicability date of 5 November 2020 should be adequate in this regard.

The comment from **Switzerland** is noted and partly supported only in respect of the addition of figures to better explain the characteristics of certain obstacle surfaces. Specifications concerning inner transitional surface are adequately described in Annex 14, Volume I, Chapter 4, paragraphs 4.1.17 to 4.1.20. These had been developed as part of Amendment 30 to Annex 14 in 1976 arising from the Eighth Air Navigation Conference in 1974 and had withstood the test of time. Any changes to the description of the obstacle limitation surfaces should not be done in isolation since the Obstacle Limitation Task Force (OLSTF) is in the process of developing a comprehensive package of amendment to the provisions in Annex 14, Vol I, Chapter 4 and it is therefore most appropriate to await the results of the OLSTF.

ACTION PROPOSED

Task the OLSTF to consider developing diagrams to better illustrate/describe the characteristics of the various obstacle limitation surfaces, including the inner transitional surfaces.

REFERENCE: Annex 14, Initial Proposal 5, Page B-14, paragraph 3.6.3

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Austria, Finland, Italy, Latvia, Malta, Montenegro, Romania, Slovenia and Sweden

In Chapter 3, with regard to the amendment of paragraph 3.6.3, it is understood that the rationale of the proposed change is *"to avoid disparity between the runway strip width, the width of the inner edge of the corresponding OLS and the width of the potential clearway"*. However, the proposed text for non-instrument runways foresees that the distance to which a clearway should extent laterally is to be "at least" half of the width of the runway strip prescribed for such runways. Therefore, if the intent of this wording is to allow the possibility to have a clearway which is wider than the associated strip width for such runways, then this should be clarified in the form of a relevant Note to the proposed provision.

[1] In Table 4-1, only in case of the Inner Approach surface the expression "Width" is used. In all other examples (also in case of Balked landing surface, where the same figures appear) the expression "Length of the inner edge" is used. We recommend harmonizing the use of this expression.

India

For instrument runway proposal for total width of clearway may be considered equal to the total width of the runway strip.

Switzerland

The new figures for the width of a clearway are highly appreciated, as they reflect the current framework applied in Switzerland by national regulations.

SECRETARIAT'S COMMENTS

The comments from **Austria, Finland, Italy, Latvia, Malta, Montenegro, Romania, Slovenia and Sweden** are noted but not supported. Concerning "the possibility to have a clearway which is wider than the associated strip for such runways, then this should be clarified in the form of a relevant Note…", the intent is adequately reflected in the existing provision – "..to a distance of at least …", the text of which has not been proposed to be changed.

The comment from **India** is noted but not supported. The current provision concerning width of clearway was derived as part of Amendment 19 to Annex 14 in 1964 "in order to align them with the (then) latest operational concepts developed by the Airworthiness Committee". The proposed amendment under consideration distinguishes between provisions for instrument and non-instrument runways; however, as clarified in Note 3.6 Clearways, the inclusion of detailed specifications for clearways is not intended to imply that a clearway has to be provided.

The comment and support from **Switzerland** for the proposed amendment is noted.

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 5, Page B-16, Section 3.12.6

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Finland, Malta, Montenegro, Romania and Slovenia

(However,) given that the inner transitional surface is bounded by the balked landing surface, and they are both part of the obstacle free zone, it is considered appropriate to replace the term "inner transitional surface" with the term "obstacle free zone" in the relevant text of 3.12.6, as follows:

3.12.6 The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the centre line of a runway shall be in accordance with Table 3-2 and, in the case of a precision approach runway, such that a holding aircraft or

vehicle will not interfere with the operation of radio navigation aids or penetrate the ~~inner transitional surface~~ obstacle free zone.

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

Although the most common infrastructure configurations require protection against penetration of the inner transitional surfaces as a priority, we see the need to extend the requirements for the location of stopping positions to all surfaces comprising an OFZ, which are all covered by the same safety objective. We propose an alternative wording for para. 3.12.6 so as to offer the same protections for all surfaces that constitute an OFZ:

3.12.6 The distance between a holding bay, runway-holding position established at a taxiway/runway intersection or road-holding position and the centre line of a runway shall be in accordance with Table 3-2 and, in the case of a precision approach runway, such that a holding aircraft or vehicle will not interfere with the operation of radio navigation aids or penetrate ~~the inner transitional surface~~ the obstacle free zone (OFZ).

SECRETARIAT'S COMMENTS

The comments from **Finland, France, Malta, Montenegro, Romania and Slovenia** are noted but not supported. "Obstacle free zone", as currently defined in Annex 14, Volume I, Chapter 1, is "the airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces …" and is therefore not the appropriate surface insofar as the control of aircraft or vehicle on the manoeuvring area is concerned. The most appropriate surface is the inner transitional surface which is described in the Note to *Inner transitional surface* in Annex 14, Volume I, Chapter 4, section 4.1, Obstacle Limitation Surfaces which stipulates "It is intended that the inner transitional surface be the controlling obstacle limitation surface for navigation aids, aircraft and other vehicles that must be near the runway and which is not to be penetrated ….".

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 5, Page B-17, Section 3.12, Table 3-2

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

China

1) Footnote C in the Chinese version of Table 3-2 has not been deleted (it has been deleted in the English version).

2) Note 3 was originally an explanation to footnote C; as footnote C is now deleted in this amendment, the 100m set forth in Note 3 has no connection in Table 3-2.

3) According to Attachment A – *Background Information Concerning Obstacle Free Zone (OFZ) Dimensions and the Saint-Petersburg Formulae*, a 120m OFZ width for code letter F area can satisfy the usage requirements. It is difficult to understand why the new Note 3 still keeps the 140m OFZ width used in the 14th amendment.

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

Furthermore, the wording of *Note 3* to Table 3-2 is not consistent with the substance of Proposal 6 which seeks to lessen the generic width requirements at the origin of an OFZ to 120 m for all code 3 and 4 precision approach runways. In the current version of Table 3-2, *Note 3* addresses the case of code F aircraft at a code 4 runway-holding position. The amendment proposal, on the other hand, only addresses the special case in which the width at the origin of the OFZ would have been increased to 140 m (in keeping with the option provided in *Note (e)* to Table 4-1). *Note 3* should, on the contrary, provide more generic coverage for instances where location at 90 m would not be sufficient and the aircraft would have more restrictions than in Note 1. We propose the following alternative wording:

Note 3 – For code 4 runways, where the inner length of the inner approach surface is higher than 120 m, a distance higher than 90 m may be necessary to ensure that a holding aircraft is clear of the obstacle free zone. For example, ~~The~~ A distance of ~~107.5~~ 100 m ~~for code number 4 where the code letter is F~~ is based on an aircraft with a tail height of 24 m, a distance from the nose to the highest part of the tail of 62.2 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centre line, being clear of ~~the~~ a 140 m wide obstacle free zone.

India

Calculation for establishing holding point for code F aircraft may be taken into the consideration for 90m {60 m (half of the OFZ width) + 30m (buffer) = 90m}.

SECRETARIAT'S COMMENTS

The comments from **China** are noted. With regard to the first comment, upon further review, it is confirmed that Footnote C in the Chinese version of Table 3-2 had indeed been deleted in the State letter. With regard to the new Note 3, the revised 100 m value is given as an example of runway holding position calculated when the inner width of the OFZ is larger than 120 m. The Secretariat agrees that the 140 m value in the new Note 3 creates confusion and should be removed.

The Secretariat agrees with the comments from **France.** See the action proposed below, which is slightly modified to be in line with the format in preceding Notes 1 and 2.

The comment from **India** is noted and is, in fact, reflected in the current Note 1 to Table 3-2.

ACTION PROPOSED

Amend proposed Note 3 in Table 3-2 as follows:

Note 3 – For code number 4 where the width of the inner edge of the inner approach surface is more than 120 m, a distance higher than 90 m may be necessary to ensure that a holding aircraft is clear of the obstacle free zone. For example, ~~The~~ a distance of ~~107.5~~ 100 m ~~for code number 4 where the code letter is F~~ is based on an aircraft with a tail height of 24 m, a distance from the nose to the highest part of the tail of 62.2 m and a nose height of 10 m holding at an angle of 45° or more with respect to the runway centre line, being clear of the obstacle free zone.

REFERENCE: Annex 14, Initial Proposal 5, Page B-18, Section 3.12.8

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

India

It implies that the ratio between increases in distance to difference in elevation from threshold to holding bay is 1:5.

Whereas, the slope ratio in Inner Transitional Surface is 1: 3. Similar ambiguity is existing in footnote b) of table 3-2.

SECRETARIAT'S COMMENTS

The comments from **India** are noted but not supported because paragraph 3.12.8 pertains to the distance of holding bay and holding positions with respect to the threshold and the increment to be made when the former is at an elevation higher than the latter, while **India's** comment pertains to characteristics of inner transitional surface.

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 6, Page B-19, Chapter 4, Table 4-1

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

China

According to the analysis and elaboration of the Rationale, it is safe for code letter F aeroplanes equipped with digital avionics to operate on a runway with an OFZ width of 120m, and the original footnote e) had the same meaning. The new footnote e), however, implies that it is not completely safe for such aeroplanes to operate on runways with a 120m width OFZ, and it may be necessary to increase the OFZ width under certain considerations. There seems to be a contradiction between what is stated in the Rationale and in footnote e).

It would make more sense to delete the restrictive conditions of aeroplanes equipped with digital avionics, and change to "The width may be increased taking into account the actual wingspan of the aeroplanes or other considerations specific to the aerodrome."

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

The new wording of the note seems to go against the desired outcome. It allows for an increase in the width of the OLS BALKED LANDING SURFACE when aircraft using the runway are equipped with digital avionics that provide steering commands to maintain an established track, whereas the original intent was to only allow for an increase in width at the origin of an OFZ for code F runways used by unequipped aircraft.

We propose the following wording:

e) The width may be increased taking into account the actual wingspan of the aeroplanes intending to use the runway, if they are not equipped with digital avionics that provide steering commands to maintain an established track during the go-around manoeuvre or other considerations specific to the aerodrome.

India

The statement in footnote e) needs rewording for aircraft not equipped with digital avionics.

Finland, Malta, Montenegro, Romania and Slovenia

In Chapter 4, the proposed wording of Note (e) of Table 4-1, where it is stated " ...if they are...", needs to be reconsidered, as the Note may be interpreted as having the meaning that the width of the related surfaces needs to be increased, as a result of the aircraft being equipped with digital avionics.

Spain
(Note.— See appropriate partial language version of this AN-WP for original text.)

In Chapter 4, the text proposed in footnote e. of Table 4-1 appears to indicate that the (code letter F) aircraft equipped with digital avionics that provide steering commands to maintain an established track during a go-around manoeuvre require a greater OFZ width than those without such avionics, which is precisely opposite what is stated in the "rationale".

Spain believes that the proposed text for the footnote should be redrafted to establish clearly that code letter F aircraft equipped with such avionics (such as the Airbus 380 or the Boeing 747-800) may use, in the context of precision approaches, runways having OFZ widths of 120 m in accordance with the conclusions of Circular 301 (and of the future Circular 345), whereas code letter F aircraft not having such equipment (An 124, C-5 Galaxy) require runways with OFZ widths of 140 m.

SECRETARIAT'S COMMENTS

The Secretariat agrees with the comments from **China, France, India, Finland, Malta, Montenegro, Romania, Slovenia and Spain** expressing that the proposed amendment seems to be in contradiction with the intent of the existing Note e). At the outset, the existing texts ".. aeroplanes equipped with digital avionics.." in Note e) were first introduced via Amendment 8 to Annex 14, Volume I stemming from the fourteenth meeting of the Obstacle Clearance Panel (OCP/14, 2005). The footnote had been recently amended via Amendment 14 to Annex 14, Volume I by the thirteenth meeting of the Instrument Flight Procedure Panel (IFPP/13, 2015) to ensure that the footnote is compliant with Circs 301 and 345 and Doc 9981.

The alternative texts proposed by **China** attempt to make the note more flexible but have the unintended consequence of being too generic compared to the current Note e). The alternative proposal from **France**, although logical, would seem to be inconsistent with the older generation aircraft quoted in the penultimate paragraph in the rational box i.e. the C5A and Antonov 124 that are operating safely on 45 m wide runways with a 120 m OFZ.

In light of the comments above, the Secretariat is of the view that the amendment proposed in Initial Proposal 6 should be deferred for three reasons: a) further coordination with other expert groups (IFPP, FLTOPSP et al) is needed to investigate instances of aircraft not equipped with digital avionics having conducted safe operations without the need for wider balked landing surface; b) work being progressed by the Obstacle Limitation Surface Task Force (OLSTF) regarding a new methodology for the various obstacle limitation surfaces may have an impact on the same; and c) the said Note had only been recently amended as part of Amendment 14 to Annex 14, Vol I which became applicable not too long ago on 8 November 2018, frequent changes to the same may not be seen to be desirable.

ACTION PROPOSED

Defer proposed amendment to Note e) of Table 4-1 in Initial Proposal 6 and to refer to other expert groups such as the IFPP, FLTOPSP, and OSLTF for further action.

REFERENCE: Annex 14, Initial Proposal 7, Page B-22, Section 5.3.20

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Canada

The justification provides a factual timeline of why this section has been living with a dual application level for a number of years. However, it does not provide a safety and scientific analysis to support having stop bars for operations in visibility greater than 350m. Also, the justification includes reference to a number of States, including Canada, as having a single level application. However, this is misleading to the reader as Canada has an application level of 1200RVR (350m) for Stop Bar, not the 550m presented in this State Letter. Canada does not support this change and plans to maintain its current application of 1200RVR (350m) which is complemented with Runway Guard Lights for operations between 800m and 350m.

Germany

Formal Note:
Within the amendment proposal different spellings for runway holding positions are being used: 'runway *-* holding position' vs. 'runway holding position'. Please correct.

SECRETARIAT'S COMMENTS

The comments from **Canada** regarding the need for a safety and scientific analysis to support having stop bars for operations in visibility greater than 350 m is noted and agreed. The current Standard in paragraph 5.3.20.2 first existed as a Recommended Practice as chronicled in the rationale box in State letter AN 4/1.1.59-18/103. VAP/11 (1987) agreed that the provision of stop bars at runway entrances should not be related to the landing category of the runway but should be referenced to the lowest RVR in which it was intended operations should take place. Consequently, the (then) Standard requiring a stop bar to be provided at a (then) taxi-holding position used in conjunction with a PA runway Cat III was amended to the current Standard in 5.3.20.1, while a similar recommendation requiring a stop bar used in conjunction with a PA runway Cat II was amended to a Recommended Practice (see further archival information in the rationale box upgrading this recommendation to a Standard). Subsequently, the latter Recommended Practice was proposed at VAP/12 (1991) to be upgraded to a Standard on the basis that a great majority of runway incursions took place in RVRs between 400 m and 800 m. The comment from **Canada** deserves careful research and will be referred to the appropriate expert groups such as FLTOPSP and ADOP (including the Visual Aids Working Group) for further action.

The comment from **Germany** concerning the spelling of "runway-holding" versus "runway holding" is noted and appreciated – see action proposed.

ACTION PROPOSED

a) *Task* the ADOP to consider the need to conduct a safety and scientific analysis to support having stop bars for operations in visibility greater than 350 m.

b) *Amend* the spelling below:

5.3.23 Runway guard lights

Note.— Runway incursions may take place in all visibility or weather conditions. The use of runway guard lights at ~~runway-holding~~ runway-holding positions can form part of effective runway incursion prevention measures…

…

5.3.23.4 Where more than one ~~runway-holding~~ runway-holding positions exist at a runway/taxiway intersection, only the set of runway guard lights associated with the operational runway-holding position shall be illuminated.

REFERENCE: Annex 14, Initial Proposal 7, Page B-24, Section 5.3.23

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Australia

5.3.23.1 Australia recommends that configuration B runway guard lights are still mandated where vehicles are permitted to use an 'exit only taxiway' for the purposes of entering a runway for inspection and maintenance purposes. The absence of the runway hard light may exacerbate the runway incursion risk by vehicles, even if designated as an exit only taxiway for aircraft.

Canada

The rationale for adding "except for exit only taxiways" is not clear. The same rationale is not being applied to runway holding position (SARP 3.2.12) or to runway holding position marking (SARP 5.2.10.1). The management of air traffic on movement areas (including "Exit only taxiways") is an operational decision by the aerodrome operator. The inclusion of this text in the standard will remove any flexibility for the aerodrome operator to use that type of movement area in any direction required for operational reasons. Furthermore, the application of RGL ought to be linked to the provision of runway holding positions in SARP 3.12.2. If a runway holding position has been established, then the application of RGL kicks in. Canada does not support this change and will continue with the application of RGL to be provided at each runway holding position associated with a runway operating in visibility conditions below RVR2600' (800m) where a stop bar is not installed and operated or where operational procedures are in place to limit the movement of aircraft.

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

5.3.23.5 and 5.3.23.6 Location of the runway guard lights

The proposed wording appears to impose a location upwind, and not abeam the holding position. We propose the following alternative wording (taken from our national regulations CHEA 1.5.3.4.8.5.2):

Location

5.3.23.~~4~~5 Runway guard lights, Configuration A, shall be located at each side of the taxiway ~~on the holding side of~~ abeam the runway-holding position marking ~~at a distance from the runway centre line not less than that specified for a take-off runway in Table 3-2~~.

5.3.23.~~5~~6 Runway guard lights, Configuration B, shall be located across the taxiway ~~on the holding side of~~ abeam the runway-holding position marking ~~at a distance from the runway centre line not less than that specified for a take-off runway in Table 3-2~~.

Germany

5.3.23.1:
The formulation 'except at exit only taxiways' is not supported by Germany. It should be kept in mind that aerodrome operators retain the flexibility to use Exit Only Taxiways, e.g. to tow aircraft or for movement of vehicles. For this reason, Runway Guard Lights, including those ones installed at Exit Only Taxiways, remain an effective tool to minimize runway incursions.

5.3.23.4:
From our point of view the new proposed standard demands for a switchable configuration of RGLs only where more than one runway holding position exist (CAT I and CAT II/III) and when the CAT II/III holding position is additionally marked by a set of RGLs. The proposed standard does not justify the requirement to mark each CAT II/III holding position with a pair of RGLs mandatory. With this intention, the proposal is supported by Germany.

5.3.23.5 and 5.3.23.6 (Runway Guard Lights, Configuration A and B):
The amendment proposal is appreciated. However the formulation should be revised: instead of'[..] on the holding side of the runway-holding position marking.' it should read '[..].at the runway-holding position marking.'

Rationale:
Our amendment proposal should lead to more flexibility in the arrangement of the RGLs in relation to the associated runway-holding positions. This flexibility is required since today's designs of RGLs in relation with their associated runway-holding positions are being different from case to case. Due to the consideration of the line-of-sight, which depends of the pilots eye height over ground and therefore on the relevant Design ACFT more flexibility is needed.

India

Regarding 5.3.23.4. Clarity on "all holding positions will be provided with RGLs and only the one under operational use would be illuminated" may be provided.

Switzerland

It is proposed to exempt taxiways used for exiting runways only[2] from the requirement having runway guard lights installed. **Switzerland would like to clearly point out our disagreement with this proposal**, as runway guard lights are considered as an important part of the effective runway incursion prevention measures[3]. Respecting the well-known Swiss cheese model, there is no reason to abandon this important safety barrier, irrespective if a taxiway is used as taxiway for exiting runways only or not, especially in bad weather conditions.

On the other hand, the current definition of the location "taxiway/runway intersection" could be misleading, as this location could be misunderstood as the runway edge. In Chapters 5.3.23.5 and 5.3.23.6, the location of runway guard lights is prescribed correctly by the holding side of the runway-holding position marking. In line with the rational served by ADOP/3 to standardize the location of runway guard lights by associating them with the operational runway-holding positions, we therefore suggest the same definition of the location also in Chapter 5.3.23.1, 5.3.23.2 and 5.3.23.4:

5.3.23.1 Runway guard lights, Configuration A shall be provided at each runway-holding position ~~taxiway/runway intersection, except at exit only taxiways,~~ associated with a runway intended for use in:
. . .

5.3.23.2 **Recommendation.—** *As part of runway incursion prevention measures, runway guard lights, Configuration A or B, should be provided at each runway-holding position ~~taxiway/runway intersection~~ where runway incursion hot spots have been identified, and used under all weather conditions during day and night.*

5.3.23.4 Where more than one runway holding positions exist ~~at a runway/taxiway intersection~~, only the set of runway guard lights associated with the operational runway-holding position shall be illuminated.

ACI

Under Initial Proposal 7, concerning Runway Guard Lights (RGL), an amendment is proposed in section 5.3.23.1, Annex 14, Vol I, to add: except at exit only taxiways. ACI would only agree with this if an additional note were added, as follows:

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[2] The current expression «Exit only taxiways» is misleading, as there exists no definition for such taxiways. Therefore, the expression "taxiways used for exiting runways only" should be used instead.

[3] See Note of Chapter 5.3.23 «Note.-Runway incursions may take place in all visibility or weather conditions. The use of runway guard lights at runway holding positions can form part of effective runway incursion prevention measures. Runway guard lights warn pilots and drivers of vehicles when operating on taxiways that they are about to enter a runway.

Note x.— Runway guard lights may be installed on exit only taxiways when deemed necessary to prevent runway incursions by vehicular traffic.

In explanation, ACI notes that Annex 14 currently requires an RGL at each taxiway/runway intersection. Although aircraft are prohibited from using an exit only taxiway in the opposite direction, vehicles used for runway maintenance, inspection, grass mowing, winter service/cleaning are commonly authorised by ATC to enter a runway via 'exit only taxiways' for operational reasons. In these circumstances, ACI believes that provision of RGL remains an important safety net for vehicle operators.

IFLAPA

IFALPA recommends maintaining the requirement for runway guard lights at each taxiway/runway intersection associated with a runway intended for use in low visibility operations.

Runway guard lights (RGL) have proven to be an effective measure in preventing incursions and would likely help emphasize situational awareness to all on taxiway and runway intersections, including exit-only taxiways. As an example, in the United States there have been numerous runway Incursions involving exit-only taxiways. At Chicago O'Hare (KORD), there were at least two incursions before in-pavement and taxiway edge RGLs were installed at an exit-only taxiway.

Subsequent to those installations, we are not aware of any further incursions, and the corresponding "hot spot" was removed. There is a safety benefit in having RGL at all taxiways. Designating a taxiway as exit-only does not mean a pilot or especially a vehicle operator, will not make a mistake and enter the runway at that intersection.

As such, IFALPA recommends against the addition of the text: "except at exit only taxiways" proposed for provision 5.3.23.1.

SECRETARIAT'S COMMENTS

The comments from **Australia, Canada, Germany, Switzerland, ACI** and **IFALPA,** strongly disagreeing with the proposal in paragraph 5.3.23.1 to exempt runway guard lights (RGLs) at exit only taxiways, are noted and agreed. Specifications pertaining to RGL were first introduced in Annex 14, Volume I via Amendment 1 in 1995 arising from the twelfth meeting of the Visual Aids Panel (VAP/12, 1991). As specified in the current Note to section 5.3.23 in Annex 14, Volume I, Chapter 5, the purpose of RGLs is to warn pilots and drivers of vehicles when they are operating on taxiways that they are about to enter a runway. It is used as a runway incursion prevention tool to provide increased awareness and, as opposed to stop bars; the operation of the RGLs does not require intervention by ATC. In some countries such as the United Kingdom, RGLs are required at all runway-holding positions under certain conditions and it is common practice for the lights, where provided, to be lit permanently, thereby creating a "ring of yellow" around the runway. The Secretariat agrees with the views expressed by **Canada**, **Germany** and **ACI** that the management of traffic on movement areas, including at an exit only taxiway, is an operational decision by the aerodrome operator and that the absence of RGLs may exacerbate runway incursion risks by vehicles even if the taxiway had been designated as an exit only taxiway for aircraft.

The comment from **France** is noted but not supported. The term "abeam" is not considered to be more precise than the term proposed by ADOP and as contained in the State letter i.e. "on the holding side of the runway-holding position marking". The latter term is currently used in Annex 14, Volume I,

Chapter 5, paragraphs 5.2.16.3 and 5.2.16.4. This comment from the Secretariat also addresses the third comment from **Germany**.

The comment from **Switzerland** is noted but not supported due to the overall format of specifications in Chapter 5 of Annex 14, Volume I. The provisions are currently structured into three distinct categories, i.e. application, location and characteristics**.** The first category describes what are the requirements, the second where the visual aids are located, oftentimes in very precise terms, with the third category describing the characteristics, including technical specifications. The proposal from **Switzerland** essentially repeats some of the texts proposed in the location category in the application category. The term "runway/taxiway intersection" currently used in the application category is intended to be a generic description with further details available in the location category.

ACTION PROPOSED

Amend paragraph 5.3.23.1 to read:

5.3.23.1 Runway guard lights, Configuration A shall be provided at each taxiway/runway intersection~~,~~ ~~*except at exit only taxiways*~~, associated with a runway intended for use in:

a) runway visual range conditions less than a value of 550 m where a stop bar is not installed; and

b) runway visual range conditions of values between 550 m and 1 200 m where the traffic density is heavy.

Note 1. — Runway guard lights, Configuration B may supplement Configuration A when deemed necessary.

Note 2. — Guidance on the design, operation and the location of runway guard lights Configuration B is given in the Aerodrome Design Manual (Doc 9157), Part 4.

REFERENCE: Annex 14, Initial Proposal 7, Page B-26, Section 5.3.29.3

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

5.3.29 No-entry bar

In view of the shared safety objective of stop bars and no-entry bars, it would be consistent to also update Table 8-1 in order to specify, in the case of CAT II/III approach runways that can be used for take-off with an RVR of less than 800 m, that the switching time for stop bars also applies to no-entry bars.

Poland

Poland agrees with the following comments.

Poland would like to suggest a change to:

"A no-entry bar should be co-located with a no-entry marking"

And:

"A no-entry bar should be used:

- when runway intended for use in runway visual range conditions less than a value of 550 m", or

- when runway intended for use in runway visual range conditions up to 550 m, where no entry sign can be placed or additional enhancement is desired;"

Rationale:

Since stop-bars are important for prevention of RWY INC, so are no-entry bars. Thus the usage of no entry under 550 is the same as proposed for stop-bars. Additionally, if there is a no-entry bar there is no need of any entry sign. But if a sign is required, the no-entry bar should be considered as an equivalent.

SECRETARIAT'S COMMENTS

The comment from **France** is noted but not supported. While it is agreed that both stop bars and no-entry bars contain safety objectives, their functions are inherently different. A stop bar regulates aircraft and vehicular traffic at recognized holding points and indicates when it should stop and when it may proceed under authorization from ATC. A no-entry bar, on the other hand, is provided across and at the end of a taxiway which is intended to be used as an exit only taxiway to assist in preventing inadvertent access of traffic to that taxiway. While stop bars have an important contribution to flight safety, no-entry bars are essentially used to regulate ground safety; therefore, in the view of the Secretariat, connecting the latter to a secondary power source is considered not only unnecessary but in so doing would unduly overload the secondary power supply.

The comment from **Poland** introducing RVR values in the application of no-entry bars is noted and will be referred to the ADOP and other operational expert groups for further consideration.

ACTION PROPOSED

Refer **Poland**'s comment introducing RVR values in the application of no-entry bars to the ADOP and other expert groups for further consideration.

REFERENCE: Annex 14, Initial Proposal 7, Page B-27, Section 5.3.29.8

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

ACI

Also in Initial Proposal 7, the following addition is proposed:

5.3.29.8 Taxiway centre line lights installed beyond the no-entry bar, looking in the direction of the runway, shall not be visible.

ACI believes that the expression "looking in the direction of the runway" is not clear, and suggests to amend it as follows:

5.3.29.8 Taxiway centre line lights installed beyond the no-entry bar, looking in the direction of the runway, shall not be visible when viewed from the taxiway.

SECRETARIAT'S COMMENTS

The comment from **ACI** is noted and agreed as it provides better clarification of the intent.

ACTION PROPOSED

Amend paragraph 5.3.29.8 with the underscored texts as follows:

5.3.29.8 Taxiway centre line lights installed beyond the no-entry bar, looking in the direction of the runway, shall not be visible when viewed from the taxiway.

REFERENCE: Initial Proposal 8, Page B-28, Section 5.4.1, Table 5-5

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Austria, Finland, Italy, Latvia, Malta, Montenegro, Romania, Slovenia and Sweden

In Chapter 5, with regard to the proposed changes to Table 5-5 and Appendix 4, it is found that the proposed change necessitates an amendment of the existing regulatory framework of the States that have adjusted their regulatory framework to this provision, without any associated safety benefit.

SECRETARIAT'S COMMENTS

The comments from **Austria, Finland, Italy, Latvia, Malta, Montenegro, Romania, Slovenia** and **Sweden** are noted but not agreed. The impact assessment of the proposals had been carefully analysed and presented during the preliminary review (AN-WP/9267 refers). Concerning adjustment of existing

States' regulatory frameworks to cater for such an amendment, the proposed changes constitute a new minimum size, meaning that all existing regulations and physical signs are still complying with the provisions, therefore no State or airport has to amend its national regulations or physically change any of its current signs.

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 8, Page B-29, Section 5.4.3.35

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Canada

The additional text "two duplicate" being proposed would effectively prohibit the use of two different letters, such as "AC" as a taxiway designator. For example, only "AA" would be acceptable. This is not realistic and extremely prohibitive. Canada does not support this change and plans to continue its current application of using a unique designator comprising one or more alpha or alphanumeric characters.

The table in PANS-Aerodromes, Attachment D to Chapter 4 - Selected Aeroplane Characteristics includes operational details and dimensional characteristics of various aeroplanes. Of particular attention is the "Outer Main Gear Wheel Span" column. It has been noted that the information provided is not consistent with the "Outer to Outer Main Gear Wheel Span" defined in Annex 14, Vol I. This difference could easily result in misinterpretation by an airport operator as being the same dimension and result in an aeroplane being under protected for a given requirement, e.g. DHC-8-400 actual outer to outer is in excess of 9m putting it into a higher category.

India

Two duplicate letters may be clarified.

Singapore

Singapore agrees with the rationale provided in the State Letter and agrees that taxiway designations can only be used once in an aerodrome. However, the rationale to have duplicate letters in a taxiway designator with more than one letter is not provided. Singapore is of the view that the new requirement on the use of designator comprising of two duplicate letters may:

a) result in many airports to become non-compliant. In order to be back in compliance, these affected airports may start to rename the affected taxiways. This could be a large and complicated exercise especially for major airports and may create confusion to pilots and vehicle operators if implemented inappropriately; and

b) increase confusion or misunderstanding between pilots, drivers, and ATC, especially in situations where there are cross radio transmissions or the transmissions are garbled. For example, an

aerodrome could have Taxiway A and Taxiway AA next to each other. If the radio transmission quality is not clear, a pilot might hear "taxiway alpha" instead of "taxiway alpha alpha", and proceed onto the wrong taxiway.

As such, Singapore proposes for paragraph 5.4.3.35 be amended to:

5.4.3.35 A taxiway shall be identified by a designator that is used only once on an aerodrome comprising a ~~single~~ letter, ~~two duplicate~~ letters or a combination of a letter or letters followed by a number.

Spain
(Note.— See appropriate partial language version of this AN-WP for original text.)

With respect to the amendment of paragraph 5.4.3.35 in Chapter 5, it is concluded that the change enables taxiways with type AA and AB1 designations to be identified, but it would eliminate the possibility of having taxiways designated as AB (through the addition of “duplicates” to the text of Standard 5.4.3.35), which the Standard currently allows, and which is used in some airports. Although it is understood that this change could help to avoid confusion and thus have a positive impact on safety, the change would require that aerodromes currently using this type of designation (two different letters, such as AB) would have to adapt these designations to the new Standard. The impact of such changes should be assessed.

Switzerland

It is proposed by the State Letter to identify taxiways in terms of using a single letter, two duplicate letters or a combination of letters followed by a number. In our point of view, the use of two letters (followed by a number or not) is problematic in respect of the phraseology. We therefore would prefer, if only one letter followed by a number (or numbers) could be used instead, as spelling of two numbers in a row leads to less confusion than spelling of two letters in a row. We therefore suggest the following changes to Chapter 5.4.3.35, in line with the rationale served by ADOP/3; that each taxiway designator shall be used only once on an aerodrome:

5.4.3.35 A taxiway shall be identified by a designator that is used only once on an aerodrome comprising a single letter, ~~two duplicate letters~~ or a combination of a letter ~~or letters~~ followed by a number or numbers.

SECRETARIAT’S COMMENTS

Comments from **Canada, India, Singapore, Spain** and **Switzerland** express objections to the use of the word “duplicate” in the proposal, on which the Secretariat agrees. It may be recalled that in the working paper provided at ADOP/3, the term “duplicate” was not used but had, instead, been provided in a flimsy when attempting to simplify the proposals as requested by ADOP/3. The basis in proposing the word “duplicate” was to make taxi instructions on radio communications clear and precise with two duplicate letter designators, i.e. AA, BB, CC, et cetera, as opposed to two-letter designators AB, AC and AD. It was reasoned that it could be difficult to distinguish on radio communications the difference between taxiway “AC” and taxiways “A” and “C” in a taxi instruction such as “taxi runway 09 via Alpha Charlie or “taxi runway 09 via Alpha, Charlie”.

While the use of duplicate letters may solve one possible problem, as commented in the responses received, they may cause others. It is widely acknowledged that phraseologies used in radio communications have a great impact on the naming of taxiways. Where there is a possibility for confusion, ATC are trained to ensure clarity. Doc 4444 - PANS-ATM, Doc 9432, *Manual of Radiotelephony* and Doc 9870, Manual *on the Prevention of Runway Incursions* contain procedures and guidance concerning taxiing and runway incursions. In addition, Doc 4444 requires, inter alia, that a) the standard taxi routes to be used at an aerodrome should, whenever practicable, be published in the national AIP and b) aerodrome controllers maintain a continuous watch on all flight operations on and in the vicinity of an aerodrome as well as vehicles and personnel on the manoeuvring area. In sum, it is the view of the Secretariat that there is insufficient reason to change substantially from current provisions that permit either duplicate letters or differing letters.

The Secretariat agrees with the proposal from **Singapore** but suggests retaining the word "two" since use of two-letter taxiway designators is commonly used. This, however, does not limit the use of more than two-character names since the provision permits the use of "a combination of a letter or letters followed by a number".

The Secretariat wishes to call to attention that ADOP/3 endorsed the position that detailed guidance, rather than significant changes to the SARPs, be made available in Doc 9157, Part 2 to account for the multitude practices taxiways are currently named, taking into account the comments received from States.

The comment from **Canada** concerning discrepancy with respect to dimensions of outer main gear wheel span (OMGWS) is not related to the subject matter but will be referred to the aircraft manufacturer represented in the ADOP for further action.

ACTION PROPOSED

a) *Amend* 5.4.3.35 as follows:

5.4.3.35 A taxiway shall be identified by a designator that is used only once on an aerodrome comprising a single letter, two ~~duplicate~~ letters or a combination of a letter or letters followed by a number.

b) *Refer* **Canada's** comment concerning dimensions of OMGWS to ICCAIA for further action.

REFERENCE: Annex 14, Initial Proposal 8, Page B-29 and B-30, Section 5.4.3.36 and 5.4.3.38

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Bolivia

The use of the negative tense in the Spanish text is unwieldy. We propose that the wording be revised and simplified to say that apron stand designators should be compatible with taxiway designators. In addition, we suggest specifying that this is achieved when the designators are different.

We further observe that the rationale originating from ADOP/3 provides an important clarification, and could usefully be incorporated into Annex 14, Vol. I as a Note.

SUGGESTED IMPROVEMENTS:

5.4.3.38 **Recommendation.-** Apron stand designators should ~~not~~ be ~~in~~compatible with taxiway designators, and different designators should be used to this end.

[Translator's note: The sentence above reflects the structure and words of the Spanish version of the SL proposal, with the changes proposed by the State.]

India

Paragraph 5.4.3.36

The word "avoided" may be replaced with 'shall not be used" to make it precise.

Paragraph 5.4.3.38

Guidance on apron stand designator numbering is required.

SECRETARIAT'S COMMENTS

The first comment from **Bolivia** concerning the use of a double negative is noted. Concerning the second comment, the Secretariat does not agree with the suggested text proposed by **Bolivia** as it seems to run counter to the intended objective of the proposal which is to prevent conflict of apron stand designators with taxiway designators. Furthermore, **Bolivia's** underscored texts seem to be in conflict with the earlier part of its proposal which called for the apron stand designators to be "compatible with" taxiway designators. However, the Secretariat is aware of the intent of the changes proposed by **Bolivia** and consequently, proposes a change to the text to make the provision clearer and unambiguous. See action proposed.

The proposal from **India** is noted and supported. Paragraph 5.4.3.36, in its current form, is a Recommended Practice, hence the use of such passive words as "should", "be avoided" and "wherever possible". As stated in the rationale box, reports from the pilot community indicate that there continues to be confusion concerning a taxiway designated as "X" with a closed marking, with ADOP endorsing the proposal to upgrade the provision to a mandatory Standard. In doing so, the proposal from **India** correctly reflects the intent. The subsequent comment regarding the need for guidance on an apron stand designator is noted and will be included in the updated guidance currently under preparation.

ACTION PROPOSED

a) *Amend* paragraph 5.4.3.36 as follows:

5.4.3.36 ~~**Recommendation.**~~ When designating taxiways, ~~the use of~~ the letters I, O or X and the ~~use of~~ words such as inner and outer ~~should be avoided wherever possible~~ shall not be used to avoid confusion with the numerals 1, 0 and closed marking.

b) *Amend* paragraph 5.4.3.38 as follows*:*

5.4.3.38 **Recommendation.—** *Apron stand designators should not ~~conflict with~~ be the same as taxiway designators.*

REFERENCE: Annex 14, Initial Proposal 9, Page B-31, Section 6.1

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

IFALPA

IFALPA recommends against the use of autonomous aircraft detection systems. An autonomous aircraft detection system which operates the lighting for denoting obstacles is unacceptable. Such systems introduce additional risk for aircraft operating in areas with obstacles, particularly for helicopters and smaller aircraft.

Presently, there is no fault-free system that can detect all aircraft operating in an area. Additionally, there is a case that ADS-B, which is not presently required, could become inoperative or inaccurate which would lead to the aircraft not being tracked by the detection system. Radar works best with aircraft that have transponders but is still not required in all areas and needs to be within line of sight of a radar antenna. This may not be possible or available to implement in most areas. Terrain and weather may also influence the availability and area that can be monitored by autonomous aircraft detection systems.

If the tracking input fails or is compromised, there must be a default way to activate the obstacle lights. In such cases as this, the lights may be activated and extinguished frequently, reducing the energy and light pollution benefits of the autonomous aircraft detection system installation.

As such, IFALPA recommends against the inclusion of Note 2 to section 6.1.

SECRETARIAT'S COMMENTS

The comments from **IFALPA** are noted but not supported. The proposal is intended to be only for guidance as reflected in the proposed Note 2 to Chapter 6, section 6.1. It is also clearly stated in the Note that the availability of such guidance is not intended to imply that such a system has to be provided. If a State decides that the system would not work, then it is entirely up to the State not to permit such installation. At an operational level, the system is intended to be independent of aircraft systems such as a transponder since not all aircraft are equipped with such systems. The autonomous aircraft detection system uses active detection (i.e. radar) and is capable of turning the lights on in the event of a failure of the detection system.

On balance, considering that such system had been installed in a number of countries such as Canada, Germany, Norway and the United States with its attendant benefits in terms of health, environment and quality of life, the Secretariat considers that it is appropriate to retain the Note, as proposed.

ACTION PROPOSED

No action.

REFERENCE: Annex 14, Initial Proposal 10, Page B-32, paragraph 9.9.5

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Austria, Finland, Italy, Latvia, Malta, Montenegro, Romania, Slovenia and Sweden

In Chapter 9, as a result of the proposed amendment of Standard 9.9.5, the equipment and installation in question now need to meet two conditions in order to be frangible and mounted as low as possible. That is to be situated within 240m from the end of the strip and to penetrate the surfaces which are mentioned in the new paragraph (b). This in practice means that such equipment or installation may still be situated in the area in question, but if there is no penetration of the surfaces mentioned in paragraph (b), there is no need for them to be frangible and mounted as low as possible, which is not possible as this area overlaps with the RESA. Therefore, the word "and" at the end of the new paragraph (a) needs to be replaced with "or", in order to avoid this inconsistency.

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

The intent of Proposal 10 is to align provision 9.9.5 with the amendments to the OFZ dimensions for runways serving code F aircraft. In fact, only sub-paragraph (a) of 9.9.5 addresses this, and (b) should have remained unchanged. Moreover, the rationale for the proposed amendments to the current version of 9.9.5 (b) is not well founded, and bears no relation to the sizing of the OFZs. Also, the amendment proposal for 9.9.5 (b) clashes with the requirements for navigation aids on precision approach runways, in particular provision 9.9.4 which this provision completes.

We propose to simplify the wording of sub-paragraph (c) by generalising the surfaces covered by the term OFZ, as follows:

9.9.5 Any equipment or installation required for air navigation or for aircraft safety purposes which must be located on or near a strip of a precision approach runway category I, II or III and which:

a) is situated within 240 m from the end of the strip and within:

   1) 60 m of the extended runway centre line where the code number is 3 or 4; or
   2) 45 m of the extended runway centre line where the code number is 1 or 2; or

b) penetrates ~~the inner approach surface, the inner transitional surface or the balked landing surface~~ the obstacle surface zone (OFZ);

Spain
(Note.— See appropriate partial language version of this AN-WP for original text.)

The ADOP/3 adopted a text that differs from that proposed in the State letter. In State letter 2018/103, a "**Y**" was omitted from subpara. a), namely: "a) is situated within 240 m from the end of the strip **Y**". This way, in the version developed by the ADOP/3, the requirement of frangibility applied to any objects that were situated at that distance AND infringed on the OFZ, whereas the State letter text tacitly imposes that it is good for those situated at 240 m or for those that infringe on the OFZ.

Spain considers that this requirement should be linked to the requirements for the RESA and the radio altimeter operating area as indicated below:

> RESA:
> It is stated that a RESA must extend "from the end of one runway strip to at least 90 m and, to the extent possible, to a distance of: 240 m where the code number is 3 or 4" and "120 m where the code number is 1 or 2 and the runway is for instrument flight".
>
> Radio altimeter operating area:
> (a) a radio altimeter operating area should be established in the area behind the Category II and III precision approach runway threshold, and if possible, in the area behind the Category I precision approach runway threshold.
>
> (b) length of the area: a radio altimeter operating area should extend in front of the threshold along a distance of 300 m, at minimum.

By imposing a set distance of 240 m in Standard 9.9.5, frangibility requirements are being established for objects that, depending on the aerodrome, could be outside the RESA/radio altimeter operating area in the case of a CAT I runway or, to the contrary, that would meet the Standards in question, but that could not comply with the recommended distances. In these cases, it is possible that the requirement imposed by 9.9.5 might not be achievable. For all of these reasons, there appears to be an inconsistency in the latest proposed version of 9.9.5 which the text proposed by the ADOP/3 appears to have resolved, by additionally linking that requirement to the infringement of the OFZ. The version proposed by the State letter, however, appears to maintain the inconsistency among the three Standards (RESA, radio altimeter operating area, and 9.9.5).

SECRETARIAT'S COMMENTS

The comments from **Austria, Finland, Italy, Latvia, Malta, Montenegro, Romania, Slovenia** and **Sweden** are likewise expressed by **Spain** in respect of the inadvertent replacement of "or" with "and" stemming from the manner the amendments had been (re)structured in paragraph 9.9.5. The Secretariat agrees with the comments as it is not intended that the two original conditions in existing sub-paragraph b) and c) be made a requirement in order any equipment and installation to be made frangible and mounted as low as possible.

The comments from **France** are noted and agreed to in most part. However, with the objective of not detracting from the original intent of paragraph 9.9.5, the texts of which are a continuation of those in the

preceding paragraph 9.9.4, the Secretariat agrees with the proposal from **France** to retain most of the current text in paragraph 9.9.5, except the latter's proposal to generalize the surfaces with the term "obstacle surface zone (OFZ)" in the new sub-paragraph b). Maintaining the current enumeration of the surfaces, viz, inner approach surface, inner transitional surface or the balked landing surface is considered more precise than using the term OFZ which is currently defined in Annex 14, Volume I as "the airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces…". Note also **France's** proposal to use the term OFZ has the effect of replacing the current "or" in 9.9.5 c) with "and" as contained in the definition of OFZ.

ACTION PROPOSED

Amend paragraph 9.9.5 as follows:

9.9.5 Any equipment or installation required for air navigation or for aircraft safety purposes which must be located on or near a strip of a precision approach runway category I, II or III and which:

a) ~~is situated on that portion of the strip within 77.5 m of the runway centre line where the code number is 4 and the code letter is F; or~~

~~b)~~ is situated within 240 m from the end of the strip and within:

1) 60 m of the extended runway centre line where the code number is 3 or 4; or

2) 45 m of the extended runway centre line where the code number is 1 or 2; or

~~c~~b) penetrates the inner approach surface, the inner transitional surface or the balked landing surface;

shall be frangible and mounted as low as possible.

REFERENCE: Annex 14, Initial Proposal 12, Page B-35, paragraph 20.1.1

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

In 20.1.1 (b) of Attachment A, the wording proposed by the task force has been modified. The phrase *should not* has been replaced with *may not*, which makes the provision more stringent as concerns the management of overload movements. This restriction is not justified. We propose to revert to the previous wording of this sub-paragraph, as follows:

~~d~~b) the annual number of overload movements should~~may~~ not exceed approximately 5 per cent of the total annual ~~aircraft~~ movements, excluding light aircraft.

SECRETARIAT'S COMMENTS

The comment from France is noted and supported.

ACTION PROPOSED

Amend the proposed paragraph 20.1.1 (b) of Attachment A to Annex 14, Volume I as follows:

~~*d*~~*b) the annual number of overload movements should~~*may*~~ not exceed approximately 5 per cent of the total annual ~~*aircraft*~~ movements, excluding light aircraft.*

REFERENCE: Annex 4, Initial Proposal 1, Page C-2, paragraph 14.6

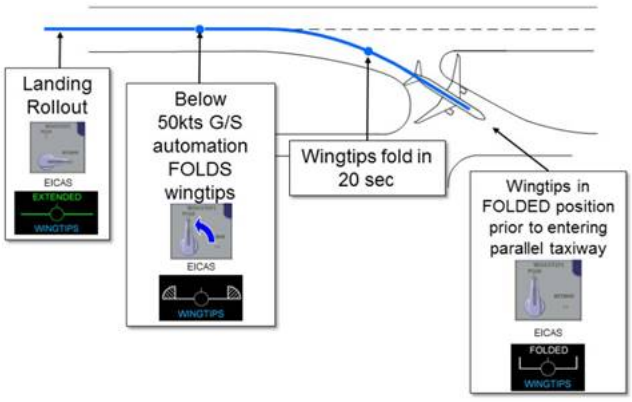
STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Cameroon
(Note.— See appropriate partial language version of this AN-WP for original text.)

It is recommended that, in the case of aerodromes accommodating aeroplanes with folding wing tips, the aerodrome ground movement chart should indicate the location for extending the wing tips. However, there is no indication as to the location where the wing tips should be folded, in this case after landing.

SECRETARIAT'S COMMENTS

With reference to the comment from **Cameroon**, the folding wing tip system will automatically fold the wing tips when the aeroplane has touched down and when the ground speed is below 50 knots. The automatic folding of the wing tips will ease the flight crew high workload during landing operations – see diagram below. There is no need to publish the location where the wing tip will fold as this automatic procedure will be the normal operation of the aeroplane.



Further information on the concept of operations is available in both the aircraft manufacturer and ACI portals:

http://www.boeing.com/resources/boeingdotcom/commercial/airports/acaps/777-9_RevA.pdf

https://aci.aero/about-aci/priorities/technical-issues/documentation/

ACTION PROPOSED

No action.

REFERENCE: Annex 4, Initial Proposal 1, Page C-2, paragraph 14.6.2

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Australia

Australia agrees with the proposal to include this Recommended Practice, but notes that a standardized symbology is required for marking on charts the location at which wing-tips should be extended.

Austria, Finland, Italy, Latvia, Malta, Montenegro, Poland, Romania, Slovenia, Spain and Sweden

Paragraph 14.6.2 of Annex 4 foresees that the aerodrome ground movement chart should be made available when, due to congestion of information, details necessary for the ground movement of aircraft cannot be shown with sufficient clarity on the aerodrome chart. Therefore, there may be cases where, according to Annex 4, there is no need to publish an aerodrome ground movement chart, but on the other hand, there are aircraft with folding wing tips operating at such aerodromes. In order to avoid this potential problem, it is suggested to duplicate the content of the proposed recommended practice (paragraph 14.6.2) in Chapter 13 (Aerodrome/Heliport Chart - ICAO) of Annex 4.

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

The French term used to translate *wing tip* is *extrémité d'aile*. We propose to modify the French version of provision 14.6.2.

[Translator's note: The proposed modification concerns the French version only.]

Additional proposal: Annex 4, para. 14.2 provides that aerodrome ground movement charts (GMC) should be made available when, because of information overload, the necessary details for the ground movements of aircraft cannot be shown on the aerodrome chart with sufficient clarity.

There may be instances where, consistent with Annex 4, an aerodrome does not have to publish a ground movement chart even though aircraft with folding wing tips are operating there. The suggestion, therefore, is to have the same modification as in Chapter 13, para. 14.6.2 (Airport/aerodrome charts – ICAO) of Annex 4 so as to cover that risk.

Spain
(Note.— See appropriate partial language version of this AN-WP for original text.)

Furthermore, we believe that the locations at an aerodrome where the wingtips can be extended are not only on the taxiway, but rather in those places included in the PANS-AIM Aeronautical Data Catalogue, according to the proposed amendment.

Eurocontrol

The Aerodrome Ground Movement Chart is a supplementary chart to Aerodrome/Heliport Chart and is provided only where, due to congestion of information, details necessary for the ground movement of aircraft along the taxiways to and from the aircraft stands cannot be shown with sufficient clarity on the Aerodrome/Heliport Chart. It is suggested that the proposed recommended practice (paragraph 14.6.2) should be also duplicated in Annex 4, Chapter 13 (Aerodrome/Heliport Chart) to ensure that the information about folding wing tips operations are published on Aerodrome/Heliport Chart when Aerodrome Ground Movement Chart is not provided.

IFALPA

Given the risk associated with the changing dimension of the wings for folding-wing aircraft. Provision of information on where wingtips may be safely extended will be essential to the safe and expeditious movement of aircraft on the surface of aerodromes. As such IFALPA recommends that the proposed provision 14.6.2 be made a Standard. Rather than using the verbiage “to extend the wing tips”, it would be improved to use the verbiage “where the wing tips may be safely extended” because the former may interfere with standard operating procedures whereas the latter defines the location on the aerodrome where there is adequate clearance to extend the wing tips. In addition it is recommended that suitable signage and markings be developed to easily identify these areas.

State Letter proposal:

14.6.2 **Recommendation.—***For aerodromes accommodating aeroplanes with folding wing tips, the location to extend the wing tips should be shown on the chart.*

IFALPA proposal:

14.6.2 ~~**Recommendation.** —~~For aerodromes accommodating aeroplanes with folding wing tips, the location where the wing tips may be safely extended ~~to extend the wing tips should~~ shall be shown on the chart.

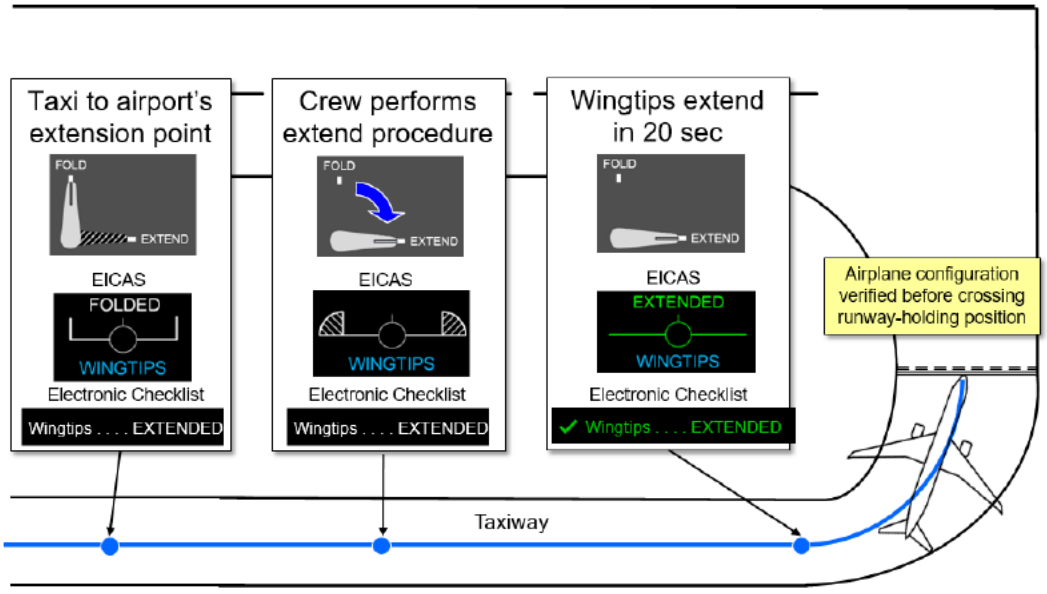
SECRETARIAT’S COMMENTS

The comment from **Australia** is noted and agreed. As part of the implementation process, guidance material for the charting manual will be developed as a matter of priority to provide States and aerodromes with examples and the associated symbology.

With reference to the comment from **France** concerning a proposed modification to the translation, the Secretariat agrees with the proposed change.

The comments from **Austria, Finland, Italy, Latvia, Malta, Montenegro, Poland, Romania, Slovenia, Sweden** and **Eurocontrol** proposing to duplicate the recommendation in the aerodrome chart are noted and agreed. In this way if States do not have a ground movement chart, but intending to accommodate aircraft with folding tips, they can promulgate the related information through the AD chart. When they have both chart types, based on paragraph 13.2.2, it is up to the States to make sure that the elements portrayed on the supplementary charts are not duplicated on the aerodrome chart.

With regards to the comment from **Spain**, in the normal procedure for departure, the exact location to extend the wing tips will be determined by the aerodrome based on its operational plans and physical layout. It has been suggested by the aircraft manufacturer that the folding wing tips are fully extended before crossing the runway-holding position, preferably at a distance of 300 m from the runway. This distance was suggested as a best practice from the 777X Boeing Airport Compatibility Group 2 (BACG2) based on the understanding that the airfield layout differs from aerodrome to aerodrome. The location to extend the wing tips will be part of the pre-flight briefing – see diagram below.



Further guidance on the concept of operations is available in both the aircraft manufacturer and ACI portals provided in the Secretariat's response to the comment from **Cameroon** above.

It may be recalled that a comprehensive concept of operations, including the processes involved for normal and non-normal operations, had been provided in an informal briefing to the Air Navigation Commission on 26 January 2018.

The proposal from **IFALPA** is considered to be too strong at this stage; the intention is to start with a smooth approach to see also how many of these situations will occur. Currently, there are only eight air

operators belonging to seven States that have made purchases for aeroplanes with FWT technology. Once more experience is obtained; the recommendation can be upgraded to a Standard.

ACTION PROPOSED

a) *Add* the following provision to Annex 4, Chapter 13, section 13.2:

13.2 Availability

13.2.1 …

13.2.2 …

13.3.3 ***Recommendation.—***For aerodromes accommodating aeroplanes with folding wing tips, the location to extend the wing tips should be shown on the chart.

b) Following consultation with the language section regarding paragraph 14.6.2, the French wording proposed by **France** will be incorporated and presented in the draft report to Council.

c) *Task* ADOP, together with the Annex 4 Secretariat, to develop the necessary guidance for States and aerodromes, intending to accommodate aeroplanes with folding wing-tips, with standardized symbology for marking on charts the location at which wing-tips should be extended.

REFERENCE: PANS-AERODROMES, General

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Austria, Finland, Italy, Latvia, Malta, Montenegro, Romania, Slovenia, Spain and Sweden
(Note.— See appropriate partial language version of this AN-WP for original text in Spanish.)

With regard to the proposed amendments to the Procedures for Air Navigation Services (PANS) - Aerodromes (Doc 9981), it is recommended to express agreement with the following comment:

"The abbreviations PCN and ACN and related terms are also contained in Section 11 of Appendix to Chapter 4 of PANS – Aerodromes, as well as in the list of acronyms. Therefore, relevant consequential changes should also be made to the content of PANS – Aerodromes."

REFERENCE: PANS-AERODROMES, Initial Proposal 3, Page D-5, Selected Aeroplane Characteristics

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

The French term used to translate *wing tip* is *extrémité d'aile*. We propose to modify the French version of para. 6 of Attachment A, Chapter 4 and the legend to the table in the attachment.

[Translator's note: The proposed modification concerns the French version only.]

Additional proposal: The acronyms PCN and ACN and the related terms are also in Section 11 of the Appendix to Chapter 4 of PANS-Aerodromes, and in the list of acronyms. Therefore, the necessary modifications should also be made to the PANS-Aerodromes text.

ACI

For clarity, the heading of the third column of the table should read "Aerodrome Reference Code" instead of "Code".

SECRETARIAT'S COMMENTS

The Secretariat agrees with the comments from **Austria, Finland, Italy, Latvia, Malta Montenegro, Romania, Slovenia, Spain, Sweden and France** regarding the consequential incorporation of the acronyms ACR and PCR in the Appendix to Chapter 4 of the PANS-Aerodromes (Part I).

Regarding the comment from **France**, the Secretariat agrees with the proposal to use the French term "extrémité d'aile" for wing tip in Attachment A to Chapter 4 (page D-4 of State letter) as well as in the footnote to the table in Attachment A, Chapter 4 of the PANS-Aerodromes (Doc 9981) (page D-6 of State letter 18/103).

ACTION PROPOSED

a) *Replace* ACN/PCN to ACR/PCR in the following places in the PANS-Aerodromes (Doc 9981, Part I) – Acronym list, Section 11 of the Appendix to Chapter 4, and section 15 of the Attachment to Chapter 4.

b) Following consultation with the language section regarding the French term "extrémité d'aile" for wing tip in Attachment A to Chapter 4 as well as in the footnote to the table in Attachment A, Chapter 4 of the PANS-Aerodromes (Doc 9981), the French wording proposed by **France** will be incorporated and presented in the draft report to Council.

REFERENCE: PANS-AIM, Initial Proposal 1, Page E-2, Table A 1-1 and paragraph AD 2.12

STATES' AND INTERNATIONAL ORGANIZATIONS' COMMENTS

Austria, Finland, Italy, Latvia, Malta, Montenegro, Poland, Romania, Slovenia, Spain and Sweden
(Note.— See appropriate partial language version of this AN-WP for original text in Spanish.)

With regard to the proposed amendments to the Procedures for Air Navigation Services - Aeronautical Information Management (PANS-AIM, Doc 10066)):

The abbreviations PCN and ACN are also contained in Table A 1-1 Aerodrome / Heliport data of the Aeronautical Data Catalogue (Appendix 1) of PANS-AIM. Therefore, consequential changes from PCN to PCR and ACN to ACR should also be made to the content of Appendix 1.

The change from PCN to PCR is proposed for AD 2.12 regarding the expression of runway strength. PANS-AIM AD 2.8, covers the strength of taxiways and aprons, without any reference to the methodology used (PCN) for reporting their strength, as opposed to the case of AD 2.12. Therefore, given that:

a) the abbreviation PCN is currently included in Table A 1-1 of the Aeronautical Data Catalogue for the areas of the aerodrome covered by AD 2.8; and

b) Annex 14 foresees the reporting for these areas of the aerodrome expressed in PCN (future PCR) for pavements intended for aircraft of apron (ramp) mass greater than 5 700 kg;

It is suggested, as part of the proposed consequential changes, to also include the said methodology (PCR) in AD 2.8 and provide guidance in PANS-AIM and/or the aeronautical data catalogue when there is a need to publish the PCN (PCR).

Cameroon
(Note.— See appropriate partial language version of this AN-WP for original text.)

Table A 1-1 Aerodrome/Heliport data – Apron-Taxiway gives a location for extending wing tips at aerodromes accommodating aeroplanes with folding wing tips. However, there is no indication as to the location where the wing tips should be folded, in this case after landing.

France
(Note.— See appropriate partial language version of this AN-WP for original text.)

The French term used to translate *wing tip* is *extrémité d'aile*. We propose to modify the French version of para. 6 of Attachment A, Chapter 4 and the legend to the table in the attachment.

[Translator's note: The proposed modification concerns the French version only.]

Additional proposal: The acronyms PCN and ACN are also in Table A 1-1 Aerodrome/Heliport Data of the Aeronautical Data Catalogue (Appendix 1) of PANS-AIM. Therefore, the consequential amendments changing PCN to PCR and ACN to ACR should also be made to the text of Appendix 1.

In Proposal 1 of the PANS-AIM amendment, PCN is to be replaced with PCR in AD 2.12 but not in AD 2.8 which addresses the strength of taxiways and aprons because the methodology to be used is not specified under this heading.

It is suggested, as part of the proposed consequential amendments, to also include said methodology (PCR) in AD 2.8 and to provide guidance in PANS-AIM and/or in the aeronautical data catalogue when it is necessary to publish the PCN or the PCR.

Japan

The initial proposal 1 of the amendment of PANS-AIM replaces the term "PCN" with "PCR" in Appendix 2. It is recommended that the term "PCN" described in PANS-AIM Appendix A – Aeronautical Data Catalogue (Table A 1-1 Aerodrome/Heliport data) also should be replaced by "PCR".

Eurocontrol

The change from PCN to PCR regarding the expression of runway strength is proposed for Appendix 2 Contents of the AIP, ****AD 2.12 Runway physical characteristics. However, the same Appendix 2, **** AD 2.8 Aprons, taxiways and check locations/positions data that covers the strength of taxiways and aprons, does not have any reference to the methodology used (PCN) for reporting their strength, as opposed to the case of AD 2.12. Considering that Annex 14 foresees the reporting for these areas of the aerodrome expressed in PCN (future PCR}, it is suggested to also include the PCR methodology in **relevant part of AD 2.8.**

It is suggested to modify accordingly the entries having PCN values in PANS-AIM, Appendix 1-Aeronautical Data Catalogue Table A 1-1 Aerodrome I Heliport data e.g. Runway strength, RWY displaced area strength, Apron strength, Taxiway strength, Aircraft stand strength.

SECRETARIAT'S COMMENTS

The Secretariat supports the comments from **Austria, Eurocontrol, Finland, France, Italy, Japan, Latvia, Montenegro, Poland, Romania, Slovenia, Spain and Sweden** regarding the replacement of the acronyms ACN/PCN in AD 2.12 (Runway physical characteristics) and Table A1-1 of the Aeronautical Data Catalogue (Appendix 1) of PANS-AIM with ACR/PCR, and the incorporation of ACR/PCR in AD 2.8 (Aprons, taxiways and check locations/positions data) in order to express pavement strength.

The comment from **Austria, Finland, France, Italy, Latvia, Montenegro, Poland, Romania, Slovenia, Spain and Sweden** to provide guidance in PANS-AIM and/or in the aeronautical data catalogue when it is necessary to publish the PCN or the PCR is noted and will be referred to the relevant expert group for further consideration.

With regards to the comment from **France**, it is noted that the comment which is related to PANS-AIM is repeated verbatim from the comment pertaining to PANS-Aerodromes, with the consequence that the placeholder is erroneously quoted. The correct reference in PANS-AIM, as specified in the State letter on page E-2, is Table A 1-1, Appendix 1, PANS-AIM, to which the Secretariat agrees with the proposal.

The comment from **Cameroon** refers to the subject of aeroplane with folding wing tip and has been addressed on page B-43.

ACTION PROPOSED

a) *Replace* ACN/PCN with ACR/PCR in AD 2.12 and Table A1-1 of the Aeronautical Data Catalogue of the PANS-AIM (Doc 10066).

b) *Amend* AD 2.8 in the PANS-AIM (Doc 10066) as follows:

Details related to the physical characteristics of aprons, taxiways and locations/positions of designated Checkpoints, including:

1) designation, surface and strength (PCR) of aprons; and
2) designation, width, surface and strength (PCR) of taxiways.

c) Following consultation with the language section regarding the French term “extrémité d’aile” for wing tip in Table A 1-1, Appendix 1, PANS-AIM, the French wording proposed by **France** will be incorporated and presented in the draft report to Council.

d) *Refer* the comment from **Austria, Finland, France, Italy, Latvia, Montenegro, Poland, Romania, Slovenia, Spain and Sweden** to provide guidance in PANS-AIM and/or in the aeronautical data catalogue when it is necessary to publish the PCN or the PCR, to the relevant expert group for further consideration.

— END —