

International Civil Aviation Organization



ICAO

**Twenty Sixth Meeting of the Communications/  
Navigation and Surveillance Sub-group (CNS SG/26) of  
APANPIRG**

Video Teleconference, 5 – 9 September 2022

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**Agenda Item 5:** Aeronautical Mobile Communications Service and Aeronautical electromagnetic spectrum utilization

5.3 Other issues related to aeronautical communications service and aeronautical radio spectrum management, especially on 5G implementation and potential impacts to aircraft radio altimeters

**AMENDMENT 91 TO ANNEX 10, VOLUME III ON SELECTIVE CALLING CODES**

(Presented by the Secretariat)

**SUMMARY**

This paper presents the main points of State Letter Ref.: AN 7/64.2.2-20/127 and the action required by the letter regarding the Adoption of Amendment 91 to Annex 10, Volume III, which concerns the expansion of the pool of selective calling (SELCAL) codes, for review and action by the meeting. It is reproduced from WP/15 of ACSICG/9.

**1. INTRODUCTION**

1.1 A State Letter with Ref.: AN 7/64.2.2-20/127 and **Subject:** *Adoption of Amendment 91 to Annex 10, Volume III* was circulated to States on 9 December 2020. Action required by the letter: a) Notify any disapproval before 22 March 2021; b) Notify any differences and compliance before 3 October 2022; c) Consider the use of the Electronic Filing of Differences (EFOD) System for notification of differences and compliance.

1.2 ICAO APAC Regional Office received a reminder email from Aviation Spectrum Resources, Inc. (ASRI) on 17 March 2022, and then forwarded the email with the State Letter to member States.

**2. DISCUSSION**

2.1 The current pool of SELCAL addresses is oversubscribed by approximately four to one, resulting in the risk that the same address could be allocated to four or more aircraft. Operationally, these aircraft may all receive the same SELCAL notification at times, thus increasing pilot workload and creating potential for operational errors.

2.2 Amendment 91 to Annex 10, Volume III is intended to address proposals developed by the second meeting of the Communications Panel Data Communication Infrastructure Working

**Agenda Item 5**

05 – 09/09/22

Group (CP-DCIWG/2) to amend Annex 10 — *Aeronautical Telecommunications*, Volume III — *Communication Systems*, Part II — *Voice Communication System*, related to the expansion of the pool of selective calling (SELCAL) codes.

2.3 The Amendment 91 to the International Standards and Recommended Practices, Annex 10 — Aeronautical Telecommunications, Volume III — Communication Systems was adopted by the Council at the sixth meeting of its 221st Session on 6 November 2020.

2.4 When adopting the amendment, the Council prescribed 22 March 2021 as the date on which it will become effective, except for any part concerning which a majority of Contracting States have registered their disapproval before that date. In addition, the Council resolved that Amendment 91, to the extent it becomes effective, will become applicable on 3 November 2022

2.5 The SELCAL amendment uses sixteen (16) new audio tones, in addition to the existing 16 audio tones, to create SELCAL codes from a total of 32 available audio frequencies (called SELCAL32). As of 3 November 2022, SELCAL codes using the tones Red T through Red 9 as given in Table 3-1 of the Amendment shall only be assigned to SELCAL-equipped aircraft with the capability of receiving these tones, and aeronautical stations which are required to communicate with SELCAL-equipped aircraft shall have SELCAL encoders that support all tones. The air navigation services providers (ANSPs) are requested to upgrade ground systems (flight planning and SELCAL encoder) to support global implementation of SELCAL32 by 3 November 2022 and should consider taking the necessary steps to be compliant with the Amendment.

2.6 The State Letter is provided in **Appendix A** to this paper, guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in its Attachment D, Information on implementation and available guidance material, as well as an impact assessment relevant to this adoption of an Annex amendment are presented in its Attachments E and F respectively, and the AMENDMENT 91 text is at the end of the State Letter package.

2.7 The Amendment has also been reviewed by the Ninth Meeting of the Aeronautical Communication Services Implementation Coordination Group (ACSICG/9) held from 19 to 21 April 2022 through WP/15. However, considering the ACSICG may not be the most appropriate platform to discuss this topic, ICAO Regional Office issued the State Letter Ref.: T 8/4.3: AP107/22 (CNS) dated 10 August 2022 with the Subject of *Selective Calling (SELCAL) Code Pool Expansion*, which is provided in **Appendix B**, to remind the State/Administration to notify ICAO Headquarters (HQ) on any differences and compliance regarding Amendment 91 to Annex 10, Volume III before 3 October 2022, copy notifications to ICAO APAC Regional Office by e-mail to [apac@icao.int](mailto:apac@icao.int) with copies to [ylo@icao.int](mailto:ylo@icao.int) and [wzhong@icao.int](mailto:wzhong@icao.int) to share readiness status for the applicability of SELCAL32, and take other actions as appropriate.

### 3. ACTION BY THE MEETING

3.1 The meeting is invited to:

- a) note the information contained in this paper;
- b) notify ICAO HQ on any differences and compliance before 3 October 2022, and copy your notifications to the ICAO Regional Office accredited to your Government; and
- c) discuss any relevant matter as appropriate.

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International  
Civil Aviation  
Organization

Organisation  
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Organización  
de Aviación Civil  
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Международная  
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منظمة الطيران  
المدني الدولي

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航空组织

Tel.: +1 514-954-8219 ext. 7130

Ref.: AN 7/64.2.2-20/127

9 December 2020

**Subject:** Adoption of Amendment 91 to Annex 10,  
Volume III

**Action required:** a) Notify any disapproval before  
22 March 2021; b) Notify any differences and  
compliance before 3 October 2022; c) Consider the use  
of the Electronic Filing of Differences (EFOD) System  
for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 91 to the *International Standards and Recommended Practices, Annex 10 — Aeronautical Telecommunications, Volume III — Communication Systems* was adopted by the Council at the sixth meeting of its 221st Session on 6 November 2020. Copies of the Amendment and the Resolution of Adoption are available as attachments to the electronic version of this State letter on the ICAO-NET (<http://portal.icao.int>) where you can access all other relevant documentation.

2. When adopting the amendment, the Council prescribed 22 March 2021 as the date on which it will become effective, except for any part concerning which a majority of Contracting States have registered their disapproval before that date. In addition, the Council resolved that Amendment 91, to the extent it becomes effective, will become applicable on 3 November 2022.

3. Amendment 91 arises from recommendations developed by the second meeting of the Communications Panel Data Communication Infrastructure Working Group (CP DCIWG/2). The proposal concerns the expansion of the pool of selective calling (SELCAL) codes.

4. The subject is given in the amendment to the Foreword of Annex 10, a copy of which is in Attachment A.

5. In conformity with the Resolution of Adoption, may I request:
- a) that before 22 March 2021 you inform me if there is any part of the adopted Standards and Recommended Practices (SARPs) amendments in Amendment 91 concerning which your Government wishes to register disapproval, using the form in Attachment B for this purpose. Please note that only statements of disapproval need be registered and if you do not reply it will be assumed that you do not disapprove of the amendment;
  - b) that before 3 October 2022 you inform me of the following, using the Electronic Filing of Differences (EFOD) System or the form in Attachment C for this purpose:
    - 1) any differences that will exist on 3 November 2022 between the national regulations or practices of your Government and the provisions of the whole of Annex 10, Volume III, as amended by all amendments up to and including Amendment 91, and thereafter of any further differences that may arise; and
    - 2) the date or dates by which your Government will have complied with the provisions of the whole of Annex 10, Volume III as amended by all amendments up to and including Amendment 91.

6. With reference to the request in paragraph 5 a) above, it should be noted that a registration of disapproval of Amendment 91 or any part of it in accordance with Article 90 of the Convention does not constitute a notification of differences under Article 38 of the Convention. To comply with the latter provision, a separate statement is necessary if any differences do exist, as requested in paragraph 5 b) 1). It is recalled in this respect that international Standards in Annexes have a conditional binding force, to the extent that the State or States concerned have not notified any difference thereto under Article 38 of the Convention.

7. With reference to the request in paragraph 5 b) above, it should be also noted that the ICAO Assembly, at its 39th Session (27 September to 6 October 2016), resolved that Member States should be encouraged to use the EFOD System when notifying differences (Resolution A39-22 refers). The EFOD System is currently available on the Universal Safety Oversight Audit Programme (USOAP) restricted website (<http://www.icao.int/usoap>) which is accessible by all Member States. You are invited to consider using this for notification of compliance and differences.

8. Guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in Attachment D. Please note that a detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

9. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 5 b) above, to the ICAO Regional Office accredited to your Government.

10. At the fifth meeting of its 204th Session, the Council requested that States, when being advised of the adoption of an Annex amendment, be provided with information on implementation and available guidance material, as well as an impact assessment. This is presented for your information in Attachments E and F, respectively.

11. As soon as practicable after the amendment becomes effective, on 22 March 2021, replacement pages incorporating Amendment 91 will be forwarded to you.

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



Fang Liu  
Secretary General

**Enclosures:**

- A — Amendment to the Foreword of Annex 10, Volume III
- B — Form on notification of disapproval of all or part of Amendment 91 to Annex 10, Volume III
- C — Form on notification of compliance with or differences from Annex 10, Volume III
- D — Note on the Notification of Differences
- E — Implementation task list and outline of guidance material in relation to Amendment 91 to Annex 10, Volume III
- F — Impact assessment in relation to Amendment 91 to Annex 10, Volume III

**ATTACHMENT A** to State letter AN 7/64.2.2-20/127

**AMENDMENT TO THE FOREWORD OF ANNEX 10, VOLUME III**

Add the following elements at the end of Table A:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Adopted/Approved Effective Applicable</i>
91	Second meeting of the Communications Panel Data Communications Infrastructure Working Group (CP-DCIWG/2).	Amendment concerning the selective calling system (SELCAL).	6 November 2020 22 March 2021 3 November 2022

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**NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF  
AMENDMENT 91 TO ANNEX 10, VOLUME III**

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

(State) \_\_\_\_\_ hereby wishes to disapprove the following parts of  
Amendment 91 to Annex 10, Volume III:

Signature \_\_\_\_\_

Date \_\_\_\_\_

*NOTES*

- 1) If you wish to disapprove all or part of Amendment 91 to Annex 10, Volume III please dispatch this notification of disapproval to reach ICAO Headquarters by 22 March 2021. If it has not been received by that date it will be assumed that you do not disapprove of the amendment. **If you approve of all parts of Amendment 91, it is not necessary to return this notification of disapproval.**
- 2) This notification should not be considered a notification of compliance with or differences from Annex 10, Volume III. Separate notifications on this are necessary. (See Attachment C.)
- 3) Please use extra sheets as required.

\_\_\_\_\_

**NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES  
FROM ANNEX 10, VOLUME III  
(Including all amendments up to and including Amendment 91)**

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

1. No differences will exist on \_\_\_\_\_ between the national regulations and/or practices of **(State)** \_\_\_\_\_ and the provisions of Annex 10, Volume III, including all amendments up to and including Amendment 91.

2. The following differences will exist on \_\_\_\_\_ between the regulations and/or practices of **(State)** \_\_\_\_\_ and the provisions of Annex 10, Volume III, including Amendment 91 (Please see Note 2) below.)

<b>a) Annex Provision</b> (Please give exact paragraph reference)	<b>b) Details of Difference</b> (Please describe the difference clearly and concisely)	<b>c) Remarks</b> (Please indicate reasons for the difference)
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(Please use extra sheets as required)

3. By the dates indicated below, **(State)** \_\_\_\_\_ will have complied with the provisions of Annex 10, Volume III, including all amendments up to and including Amendment 91 for which differences have been notified in 2 above.

<b>a) Annex Provision</b> (Please give exact paragraph reference)	<b>b) Date</b>	<b>c) Comments</b>
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(Please use extra sheets as required)

Signature \_\_\_\_\_ Date \_\_\_\_\_

*NOTES*

- 1) If paragraph 1 above is applicable to your State, please complete paragraph 1 and return this form to ICAO Headquarters. If paragraph 2 is applicable to you, please complete paragraphs 2 and 3 and return the form to ICAO Headquarters.
- 2) A detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.
- 3) Guidance on the notification of differences is provided in the Note on the Notification of Differences and in the *Manual on Notification and Publication of Differences* (Doc 10055).
- 4) Please send a copy of this notification to the ICAO Regional Office accredited to your Government.

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**NOTE ON THE NOTIFICATION OF DIFFERENCES**  
*(Prepared and issued in accordance with instructions of the Council)*

1. *Introduction*

1.1 Article 38 of the *Convention on International Civil Aviation* (“Convention”) requires that a Contracting State notify ICAO any time it does not comply with a Standard in all respects, it does not bring its regulations or practices into full accord with any Standard, or it adopts regulations or practices differing in any particular respect from the Standard.

1.2 The Assembly and the Council, when reviewing the notification of differences by Contracting States in compliance with Article 38 of the Convention, have repeatedly noted that the timeliness and currency of such notifications is not entirely satisfactory. Therefore, this note is issued to reiterate the primary purpose of Article 38 of the Convention and to facilitate the determination and notification of differences.

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

1.4 Contracting States are, therefore, requested to give particular attention to the notification of differences with respect to Standards in all Annexes, as described in paragraph 4 b) 1) of the Resolution of Adoption.

1.5 Although differences from Recommended Practices are not notifiable under Article 38 of the Convention, the Assembly has urged Contracting States to extend the above considerations to Recommended Practices contained in Annexes to the Convention, as well.

2. *Notification of differences from Standards and Recommended Practices (SARPs)*

2.1 Guidance to Contracting States in the notification of differences to Standards and Recommended Practices (SARPs) can only be given in very general terms. Contracting States are further reminded that compliance with SARPs generally extends beyond the issuance of national regulations and requires establishment of practical arrangements for implementation, such as the provision of facilities, personnel and equipment and effective enforcement mechanisms. Contracting States should take those elements into account when determining their compliance and differences. The following categories of differences are provided as a guide in determining whether a notifiable difference exists:

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

- b) *A Contracting State's requirement is different in character or the Contracting State has established other means of compliance (Category B)\**. This category applies, in particular, when the national regulation and practices are different in character from the corresponding SARP, or when the national regulation and practices differ in principle, type or system from the corresponding SARP, without necessarily imposing an additional obligation; and
- c) *A Contracting State's requirement is less protective, partially implemented or not implemented (Category C)*. This category applies when the national regulation and practices are less protective than the corresponding SARP; when no national regulation has been promulgated to address the corresponding SARP, in whole or in part; or when the Contracting State has not brought its practices into full accord with the corresponding SARP.

These categories do not apply to Not Applicable SARP. Please see the paragraph below.

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

2.3 **Differences from appendices, tables and figures.** The material comprising a SARP includes not only the SARP itself, but also the appendices, tables and figures associated with the SARP. Therefore, differences from appendices, tables and figures are notifiable under Article 38. In order to file a difference against an appendix, table or figure, States should file a difference against the SARP that makes reference to the appendix, table or figure.

2.4 **Differences from definitions.** Contracting States should notify differences from definitions. The definition of a term used in a SARP does not have independent status but is an essential part of each SARP in which the term is used. Therefore, a difference from the definition of the term may result in there being a difference from any SARP in which the term is used. To this end, Contracting States should take into consideration differences from definitions when determining compliance or differences to SARPs in which the terms are used.

2.5 The notification of differences should be not only to the latest amendment but to the whole Annex, including the amendment. In other words, Contracting States that have already notified differences are requested to provide regular updates of the differences previously notified until the difference no longer exists.

2.6 Further guidance on the identification and notification of differences, examples of well-defined differences and examples of model processes and procedures for management of the notification of differences can be found in the *Manual on Notification and Publication of Differences* (Doc 10055).

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\* The expression "different in character or other means of compliance" in b) would be applied to a national regulation and practice which achieve, by other means, the same objective as that of the corresponding SARPs or for other substantive reasons so cannot be classified under a) or c).

3. *Form of notification of differences*

3.1 Differences can be notified:

- a) by sending to ICAO Headquarters a form on notification of compliance or differences;  
or
- b) through the Electronic Filing of Differences (EFOD) System at [www.icao.int/usoap](http://www.icao.int/usoap).

3.2 When notifying differences, the following information should be provided:

- a) the number of the paragraph or subparagraph which contains the SARP to which the difference relates\*;
- b) the reasons why the State does not comply with the SARP, or considers it necessary to adopt different regulations or practices;
- c) a clear and concise description of the difference; and
- d) intentions for future compliance and any date by which your Government plans to confirm compliance with and remove its difference from the SARP for which the difference has been notified.

3.3 The differences notified will be made available to other Contracting States, normally in the terms used by the Contracting State when making the notification. In the interest of making the information as useful as possible, Contracting States are requested to ensure that:

- a) statements be as clear and concise as possible and be confined to essential points;
- b) the provision of extracts from national regulations not be considered as sufficient to satisfy the obligation to notify differences; and
- c) general comments, unclear acronyms and references be avoided.

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\* This applies only when the notification is made under 3.1 a).

**IMPLEMENTATION TASK LIST AND OUTLINE OF GUIDANCE MATERIAL  
IN RELATION TO AMENDMENT 91 TO ANNEX 10, VOLUME III**

**1. IMPLEMENTATION TASK LIST**

1.1 Essential steps to be followed by a State to implement the amendment to Annex 10, Volume III:

- a) implement the necessary software and/or hardware SELCAL ground system upgrades;
- b) provide training to the radio operators on the new SELCAL code availability and identification of operational aspects of the rule-making process necessary to transpose the new and modified ICAO provisions into the national regulations taking into consideration the applicability date;
- c) drafting of the modification(s) to the national regulations and means of compliance;
- d) official adoption of the national regulations and means of compliance;
- e) filing of State differences with ICAO, if necessary;
- f) publication of significant differences in AIP, if necessary; and
- g) training of operational staff in the use of new provisions.

**2. STANDARDIZATION PROCESS**

2.1 Effective date: 22 March 2021

2.2 Applicability date: 3 November 2022

2.3 Embedded date(s): None

**3. SUPPORTING DOCUMENTATION**

3.1 **ICAO documentation:**

<b>Title/Doc no.</b>	<b>Type (PANS/TI/Manual/Circ.)</b>	<b>Publication date</b>
None		

3.2 **External documentation:**

<b>Title</b>	<b>External Organization</b>	<b>Publication date</b>
ARINC Specification 714A – Mark 4 Airborne Selective Calling (SELCAL)	ARINC	Available
RTCA DO-93A Minimum Operational Performance Standards (MOPS) for Airborne Selective Calling Equipment	RTCA	Available

4. **IMPLEMENTATION ASSISTANCE TASKS**

<b>Type</b>	<b>Global</b>	<b>Regional</b>
Workshops		PIRGs, RASGs

5. **UNIVERSAL SAFETY OVERSIGHT AUDIT PROGRAMME (USOAP)**

5.1 No changes are envisaged in the Protocol Questions (PQs).

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**IMPACT ASSESSMENT IN RELATION TO  
AMENDMENT 91 TO ANNEX 10, VOLUME III**

**1. INTRODUCTION**

1.1 Amendment 91 to Annex 10, Volume III is intended to address proposals developed by the second meeting of the Communications Panel Data Communication Infrastructure Working Group (CP-DCIWG/2) to amend Annex 10 — *Aeronautical Telecommunications, Volume III — Communication Systems, Part II — Voice Communication System*, related to the expansion of the pool of selective calling (SELCAL) codes.

**2. IMPACT ASSESSMENT**

**2.1 Amendment related to selective calling system (SELCAL)**

2.1.1 *Safety impact:* Positive. The potential for miscommunication and confusion on the part of the pilot and radio operator will be reduced.

2.1.2 *Financial impact:* Increase in costs for the industry. For air navigation services providers (ANSPs) operating aeronautical HF radio stations, there will be a one-time cost to upgrade the ground systems (flight planning and SELCAL encoder) to support the proposed SELCAL upgrade solution. Ground infrastructure software and/or hardware solutions are currently available from multiple sources to support the proposed SELCAL upgrade solution.

2.1.3 The cost will vary for each aeronautical radio station based on whether a stand-alone solution or an integrated solution is needed. In the first case it will be in the range USD 5 000 to USD 10 000. For integrated systems requiring software updates, this could increase by a factor of 5 to 10.

2.1.4 For aircraft operators, the provision of the proposed SELCAL upgrade will be offered as an option for new aircraft only; hence, the impact will be small.

2.1.5 *Security impact:* Negligible. Although SELCAL has no explicit security measures, the possibility of contacting multiple aircraft with only one code had increased the potential for interference from “nuisance” sources. This will be greatly reduced.

2.1.6 *Environmental impact:* None.

2.1.7 *Efficiency impact:* Positive. It will reduce the amount of miscommunication on the part of pilots and radio operators.

2.1.8 *Expected implementation time:* One to two years. With regard to States, suppliers of the SELCAL ground system upgrades (software and/or hardware) are currently available and implementation schedules will take less than two years. A survey of the ANSPs was completed in 2017 and showed an overwhelming support of the proposed SELCAL upgrade. The results also indicated that ANSPs

implementations would be completed in 2022. With regard to industry, Airbus and Boeing supported the standards development of the proposed SELCAL upgrade solution. Airbus and Boeing are expected to begin offering the SELCAL upgrade functionality on new aircraft being delivered after the 2020 timeframe, with some existing aircraft being already compatible with suitable software upgrades. Certified SELCAL avionics (software upgrade) availability will take 18 to 24 months.

— END —

**AMENDMENT 91**  
**TO THE**  
**INTERNATIONAL STANDARDS**  
**AND RECOMMENDED PRACTICES**  
**AND PROCEDURES FOR AIR NAVIGATION SERVICES**

**AERONAUTICAL**  
**TELECOMMUNICATIONS**

**ANNEX 10**  
**TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

**VOLUME III**  
**(COMMUNICATION SYSTEMS)**

The amendment to Annex 10, Volume III, contained in this document was adopted by the Council of ICAO on **6 November 2020**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **22 March 2021** will become effective on that date and will become applicable on **3 November 2022** as specified in the Resolution of Adoption. (State letter AN 7/64.2.2-20/127 refers.)

**NOVEMBER 2020**

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

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

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

~~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

**TEXT OF AMENDMENT 91 TO  
INTERNATIONAL STANDARDS  
AND RECOMMENDED PRACTICES**

**AERONAUTICAL TELECOMMUNICATIONS  
ANNEX 10**

**VOLUME III  
COMMUNICATION SYSTEMS**

**TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

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**PART II – VOICE COMMUNICATION SYSTEMS**

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**CHAPTER 3. SELCAL SYSTEM**

**3.1 Recommendation.**— *Until 2 November 2022, where a SELCAL system is installed, the following system characteristics should be applied:*

- a) Transmitted code. Each transmitted code should be made up of two consecutive tone pulses, with each pulse containing two simultaneously transmitted tones. The pulses should be of 1.0 plus or minus 0.25 seconds duration, separated by an interval of 0.2 plus or minus 0.1 second.*
- b) Stability. The frequency of transmitted tones should be held to plus or minus 0.15 per cent tolerance to ensure proper operation of the airborne decoder.*
- c) Distortion. The overall audio distortion present on the transmitted RF signal should not exceed 15 per cent.*
- d) Per cent modulation. The RF signal transmitted by the ground radio station should contain, within 3 dB, equal amounts of the two modulating tones. The combination of tones should result in a modulation envelope having a nominal modulation percentage as high as possible and in no case less than 60 per cent.*
- e) Transmitted tones. Tone codes should be made up of various combinations of the tones listed in the following table and designated by colour and letter as indicated:*

<i>Designation</i>	<i>Frequency (Hz)</i>
<i>Red A</i>	<i>312.6</i>
<i>Red B</i>	<i>346.7</i>
<i>Red C</i>	<i>384.6</i>
<i>Red D</i>	<i>426.6</i>
<i>Red E</i>	<i>473.2</i>
<i>Red F</i>	<i>524.8</i>
<i>Red G</i>	<i>582.1</i>
<i>Red H</i>	<i>645.7</i>

<i>Red J</i>	716.1
<i>Red K</i>	794.3
<i>Red L</i>	881.0
<i>Red M</i>	977.2
<i>Red P</i>	1 083.9
<i>Red Q</i>	1 202.3
<i>Red R</i>	1 333.5
<i>Red S</i>	1 479.1

*Note 1.— It should be noted that the tones are spaced by Log-1 0.045 to avoid the possibility of harmonic combinations.*

*Note 2.— In accordance with the application principles developed by the Sixth Session of the Communications Division, the only codes at present used internationally are selected from the red group.*

*Note 3.— Guidance material on the use of SELCAL systems is contained in the Attachment to Part II.*

*Note 4.— The tones Red P, Red Q, Red R, and Red S are applicable after 1 September 1985, in accordance with 3.2.*

3.2 As from 1 September 1985 Until 2 November 2022, aeronautical stations which are required to communicate with SELCAL-equipped aircraft shall have SELCAL encoders in accordance with the red group in the table of tone frequencies of 3.1. After 1 September 1985, SELCAL codes using the tones Red P, Red Q, Red R, and Red S may be assigned.

3.1 As of 3 November 2022, **Recommendation.**— Where a SELCAL system is installed, the following system characteristics ~~should~~ shall be applied:

- a) Transmitted code. Each transmitted code ~~should~~ shall be made up of two consecutive tone pulses, with each pulse containing two simultaneously transmitted tones. The pulses ~~should~~ shall be of 1.0 plus or minus 0.25 seconds duration, separated by an interval of 0.2 plus or minus 0.1 second.
- b) Frequency stability. The frequency of transmitted tones ~~should~~ shall be held to plus or minus 0.15 per cent tolerance to ensure proper operation of the airborne decoder.
- c) Distortion. The overall audio distortion present on the transmitted RF signal ~~should~~ shall not exceed 15 per cent.
- d) Level stability. ~~Per cent modulation.~~—The RF signal transmitted by the ground radio station ~~should~~ shall contain, within 3 dB, equal amounts of the two modulating tones.

3.1.1 **Recommendation.**— As of 3 November 2022, modulation envelope. The combination of tones should result in a modulation envelope having a nominal modulation percentage as high as possible and ~~in no cases~~ not less than 60 per cent.

e) — 3.2 As of 3 November 2022, the Transmitted tones. ~~Tone codes~~ shall be made up of various combinations of the tones listed in the following ~~Tables~~ 3-1. They are ~~and~~ designated by colour and letter or number as indicated:

**Table 3-1. SELCAL tones designated by colour and letter or number  
(applicable as of 3 November 2022)**

<i>Designation</i>	<i>Frequency (Hz)</i>
<i>Red A</i>	312.6
<i>Red B</i>	346.7
<i>Red C</i>	384.6
<i>Red D</i>	426.6
<i>Red E</i>	473.2
<i>Red F</i>	524.8
<i>Red G</i>	582.1
<i>Red H</i>	645.7
<i>Red J</i>	716.1
<i>Red K</i>	794.3
<i>Red L</i>	881.0
<i>Red M</i>	977.2
<i>Red P</i>	1083.9
<i>Red Q</i>	1202.3
<i>Red R</i>	1333.5
<i>Red S</i>	1479.1
<i>Red T</i>	329.2
<i>Red U</i>	365.2
<i>Red V</i>	405.0
<i>Red W</i>	449.3
<i>Red X</i>	498.3
<i>Red Y</i>	552.7
<i>Red Z</i>	613.1
<i>Red 1</i>	680.0
<i>Red 2</i>	754.2
<i>Red 3</i>	836.6
<i>Red 4</i>	927.9
<i>Red 5</i>	1 029.2
<i>Red 6</i>	1 141.6
<i>Red 7</i>	1 266.2
<i>Red 8</i>	1 404.4
<i>Red 9</i>	1 557.8

*Note 1.— ~~It should be noted that~~ The frequencies of the tones are spaced by Log-1 0.0450.0225 to avoid the possibility of harmonic combinations.*

*Note 2.— In accordance with the application principles developed by the Sixth Session of the Communications Division, the only codes at present used internationally are selected from the red group.*

*Note 3.— Guidance material on the use of SELCAL systems is contained in the Attachment to Part II.*

*Note 4.— ~~The tones Red P, Red Q, Red R, and Red S are applicable after 1 September 1985, in accordance with 3.2.~~*

3.23 ~~As from 1 September 1985~~ As of 3 November 2022, aeronautical stations which are required to communicate with SELCAL-equipped aircraft shall have SELCAL encoders that support all tones in

accordance with ~~the red group in the table of tone frequencies of 3.1. After 1 September 1985, SELCAL codes using the tones Red P, Red Q, Red R, and Red S may be assigned.~~ Table 3-1.

3.4 As of 3 November 2022, SELCAL codes using the tones Red T through Red 9 as given in Table 3-1 shall only be assigned to SELCAL-equipped aircraft with the capability of receiving these tones.

...

— END —



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Международная  
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авиации

منظمة الطيران  
المدني الدولي

国际民用  
航空组织

**Ref.:** T 8/4.3: AP107/22 (CNS)

10 August 2022

**Subject:** Selective Calling (SELCAL) Code Pool  
Expansion

**Action Required:** a) Notify ICAO Headquarters of any differences and compliance before 3 October 2022; b) Copy your notifications to ICAO Asia and Pacific Regional Office; c) Take other actions as appropriate.

Dear Sir/Madam,

I wish to remind you about the Amendment 91 to the International Civil Aviation Organization (ICAO) Annex 10, Volume III, which concerns the expansion of the pool of the Selective Calling (SELCAL) codes.

The current pool of SELCAL addresses is oversubscribed by approximately four to one, resulting in the risk that the same address could be allocated to four or more aircraft. Operationally, the duplication of codes is creating potential human factors risk for aircrews and additional workload on service providers. To support the increasing demand for SELCAL aircraft code assignments and avoid affecting aviation safety, the ICAO Communications Panel (CP) identified the need to expand the number of Selective Calling (SELCAL) code assignments and raised the recommendations of Amendment 91 to the *International Standards and Recommended Practices, Annex 10 — Aeronautical Telecommunications, Volume III — Communication Systems* which was adopted by the Council at the sixth meeting of its 221st Session on 6 November 2020.

The SELCAL amendment uses sixteen (16) new audio tones, in addition to the existing 16 audio tones, to create SELCAL codes from a total of 32 available audio frequencies (called SELCAL32). As of 3 November 2022, SELCAL codes using the tones Red T through Red 9 as given in Table 3-1 of the Amendment shall only be assigned to SELCAL-equipped aircraft with the capability of receiving these tones, and aeronautical stations which are required to communicate with SELCAL-equipped aircraft shall have SELCAL encoders that support all tones. The air navigation services providers (ANSPs) are requested to upgrade ground systems (flight planning and SELCAL encoder) to support global implementation of SELCAL32 by 3 November 2022 and should consider taking the necessary steps to be compliant with the Amendment.

In view of the aforementioned, a State Letter with Ref.: AN 7/64.2.2-20/127 and Subject: *Adoption of Amendment 91 to Annex 10, Volume III* addressing the expansion of the pool of SELCAL codes provided in **Attachment A** was circulated by ICAO on 9 December 2020, which required States to notify any disapproval before 22 March 2021, notify any differences and compliance before 3 October 2022, and consider the use of the Electronic Filing of Differences (EFOD) System for notification of differences and compliance, and provided essential steps to be followed by a State to implement the Amendment.

2/...

Your State/Administration is kindly reminded and requested to notify ICAO Headquarters (HQ) of **any differences and compliance** regarding Amendment 91 to Annex 10, Volume III before 3 October 2022, and copy your notifications to this Office by e-mail to [apac@icao.int](mailto:apac@icao.int) with copies to [ylo@icao.int](mailto:ylo@icao.int) and [wzhong@icao.int](mailto:wzhong@icao.int) to share your readiness status for the applicability of SELCAL32.

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



Tao Ma  
Regional Director

**Enclosures:**

Attachment A – ICAO State Letter Ref.: AN 7/64.2.2-20/127



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internationale

Organización  
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авиации

منظمة الطيران  
المدني الدولي

国际民用  
航空组织

Tel.: +1 514-954-8219 ext. 7130

Ref.: AN 7/64.2.2-20/127

9 December 2020

**Subject:** Adoption of Amendment 91 to Annex 10,  
Volume III

**Action required:** a) Notify any disapproval before  
22 March 2021; b) Notify any differences and  
compliance before 3 October 2022; c) Consider the use  
of the Electronic Filing of Differences (EFOD) System  
for notification of differences and compliance

Sir/Madam,

1. I have the honour to inform you that Amendment 91 to the *International Standards and Recommended Practices, Annex 10 — Aeronautical Telecommunications, Volume III — Communication Systems* was adopted by the Council at the sixth meeting of its 221st Session on 6 November 2020. Copies of the Amendment and the Resolution of Adoption are available as attachments to the electronic version of this State letter on the ICAO-NET (<http://portal.icao.int>) where you can access all other relevant documentation.

2. When adopting the amendment, the Council prescribed 22 March 2021 as the date on which it will become effective, except for any part concerning which a majority of Contracting States have registered their disapproval before that date. In addition, the Council resolved that Amendment 91, to the extent it becomes effective, will become applicable on 3 November 2022.

3. Amendment 91 arises from recommendations developed by the second meeting of the Communications Panel Data Communication Infrastructure Working Group (CP DCIWG/2). The proposal concerns the expansion of the pool of selective calling (SELCAL) codes.

4. The subject is given in the amendment to the Foreword of Annex 10, a copy of which is in Attachment A.

5. In conformity with the Resolution of Adoption, may I request:
- a) that before 22 March 2021 you inform me if there is any part of the adopted Standards and Recommended Practices (SARPs) amendments in Amendment 91 concerning which your Government wishes to register disapproval, using the form in Attachment B for this purpose. Please note that only statements of disapproval need be registered and if you do not reply it will be assumed that you do not disapprove of the amendment;
  - b) that before 3 October 2022 you inform me of the following, using the Electronic Filing of Differences (EFOD) System or the form in Attachment C for this purpose:
    - 1) any differences that will exist on 3 November 2022 between the national regulations or practices of your Government and the provisions of the whole of Annex 10, Volume III, as amended by all amendments up to and including Amendment 91, and thereafter of any further differences that may arise; and
    - 2) the date or dates by which your Government will have complied with the provisions of the whole of Annex 10, Volume III as amended by all amendments up to and including Amendment 91.

6. With reference to the request in paragraph 5 a) above, it should be noted that a registration of disapproval of Amendment 91 or any part of it in accordance with Article 90 of the Convention does not constitute a notification of differences under Article 38 of the Convention. To comply with the latter provision, a separate statement is necessary if any differences do exist, as requested in paragraph 5 b) 1). It is recalled in this respect that international Standards in Annexes have a conditional binding force, to the extent that the State or States concerned have not notified any difference thereto under Article 38 of the Convention.

7. With reference to the request in paragraph 5 b) above, it should be also noted that the ICAO Assembly, at its 39th Session (27 September to 6 October 2016), resolved that Member States should be encouraged to use the EFOD System when notifying differences (Resolution A39-22 refers). The EFOD System is currently available on the Universal Safety Oversight Audit Programme (USOAP) restricted website (<http://www.icao.int/usoap>) which is accessible by all Member States. You are invited to consider using this for notification of compliance and differences.

8. Guidance on the determination and reporting of differences is given in the Note on the Notification of Differences in Attachment D. Please note that a detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.

9. I would appreciate it if you would also send a copy of your notifications, referred to in paragraph 5 b) above, to the ICAO Regional Office accredited to your Government.

10. At the fifth meeting of its 204th Session, the Council requested that States, when being advised of the adoption of an Annex amendment, be provided with information on implementation and available guidance material, as well as an impact assessment. This is presented for your information in Attachments E and F, respectively.

11. As soon as practicable after the amendment becomes effective, on 22 March 2021, replacement pages incorporating Amendment 91 will be forwarded to you.

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

A handwritten signature in black ink, consisting of stylized Chinese characters, likely '柳芳' (Liu Fang).

Fang Liu  
Secretary General

**Enclosures:**

- A — Amendment to the Foreword of Annex 10, Volume III
- B — Form on notification of disapproval of all or part of Amendment 91 to Annex 10, Volume III
- C — Form on notification of compliance with or differences from Annex 10, Volume III
- D — Note on the Notification of Differences
- E — Implementation task list and outline of guidance material in relation to Amendment 91 to Annex 10, Volume III
- F — Impact assessment in relation to Amendment 91 to Annex 10, Volume III

**ATTACHMENT A** to State letter AN 7/64.2.2-20/127

**AMENDMENT TO THE FOREWORD OF ANNEX 10, VOLUME III**

Add the following elements at the end of Table A:

<i>Amendment</i>	<i>Source(s)</i>	<i>Subject</i>	<i>Adopted/Approved Effective Applicable</i>
91	Second meeting of the Communications Panel Data Communications Infrastructure Working Group (CP-DCIWG/2).	Amendment concerning the selective calling system (SELCAL).	6 November 2020 22 March 2021 3 November 2022

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**NOTIFICATION OF DISAPPROVAL OF ALL OR PART OF  
AMENDMENT 91 TO ANNEX 10, VOLUME III**

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

(State) \_\_\_\_\_ hereby wishes to disapprove the following parts of  
Amendment 91 to Annex 10, Volume III:

Signature \_\_\_\_\_

Date \_\_\_\_\_

*NOTES*

- 1) If you wish to disapprove all or part of Amendment 91 to Annex 10, Volume III please dispatch this notification of disapproval to reach ICAO Headquarters by 22 March 2021. If it has not been received by that date it will be assumed that you do not disapprove of the amendment. **If you approve of all parts of Amendment 91, it is not necessary to return this notification of disapproval.**
- 2) This notification should not be considered a notification of compliance with or differences from Annex 10, Volume III. Separate notifications on this are necessary. (See Attachment C.)
- 3) Please use extra sheets as required.

\_\_\_\_\_

**NOTIFICATION OF COMPLIANCE WITH OR DIFFERENCES  
FROM ANNEX 10, VOLUME III  
(Including all amendments up to and including Amendment 91)**

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

1. No differences will exist on \_\_\_\_\_ between the national regulations and/or practices of **(State)** \_\_\_\_\_ and the provisions of Annex 10, Volume III, including all amendments up to and including Amendment 91.

2. The following differences will exist on \_\_\_\_\_ between the regulations and/or practices of **(State)** \_\_\_\_\_ and the provisions of Annex 10, Volume III, including Amendment 91 (Please see Note 2) below.)

<b>a) Annex Provision</b> (Please give exact paragraph reference)	<b>b) Details of Difference</b> (Please describe the difference clearly and concisely)	<b>c) Remarks</b> (Please indicate reasons for the difference)
--	---	---

(Please use extra sheets as required)

3. By the dates indicated below, **(State)** \_\_\_\_\_ will have complied with the provisions of Annex 10, Volume III, including all amendments up to and including Amendment 91 for which differences have been notified in 2 above.

<b>a) Annex Provision</b> (Please give exact paragraph reference)	<b>b) Date</b>	<b>c) Comments</b>
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(Please use extra sheets as required)

Signature \_\_\_\_\_ Date \_\_\_\_\_

*NOTES*

- 1) If paragraph 1 above is applicable to your State, please complete paragraph 1 and return this form to ICAO Headquarters. If paragraph 2 is applicable to you, please complete paragraphs 2 and 3 and return the form to ICAO Headquarters.
- 2) A detailed repetition of previously notified differences, if they continue to apply, may be avoided by stating the current validity of such differences.
- 3) Guidance on the notification of differences is provided in the Note on the Notification of Differences and in the *Manual on Notification and Publication of Differences* (Doc 10055).
- 4) Please send a copy of this notification to the ICAO Regional Office accredited to your Government.

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**NOTE ON THE NOTIFICATION OF DIFFERENCES**  
(Prepared and issued in accordance with instructions of the Council)

1. *Introduction*

1.1 Article 38 of the *Convention on International Civil Aviation* (“Convention”) requires that a Contracting State notify ICAO any time it does not comply with a Standard in all respects, it does not bring its regulations or practices into full accord with any Standard, or it adopts regulations or practices differing in any particular respect from the Standard.

1.2 The Assembly and the Council, when reviewing the notification of differences by Contracting States in compliance with Article 38 of the Convention, have repeatedly noted that the timeliness and currency of such notifications is not entirely satisfactory. Therefore, this note is issued to reiterate the primary purpose of Article 38 of the Convention and to facilitate the determination and notification of differences.

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

1.4 Contracting States are, therefore, requested to give particular attention to the notification of differences with respect to Standards in all Annexes, as described in paragraph 4 b) 1) of the Resolution of Adoption.

1.5 Although differences from Recommended Practices are not notifiable under Article 38 of the Convention, the Assembly has urged Contracting States to extend the above considerations to Recommended Practices contained in Annexes to the Convention, as well.

2. *Notification of differences from Standards and Recommended Practices (SARPs)*

2.1 Guidance to Contracting States in the notification of differences to Standards and Recommended Practices (SARPs) can only be given in very general terms. Contracting States are further reminded that compliance with SARPs generally extends beyond the issuance of national regulations and requires establishment of practical arrangements for implementation, such as the provision of facilities, personnel and equipment and effective enforcement mechanisms. Contracting States should take those elements into account when determining their compliance and differences. The following categories of differences are provided as a guide in determining whether a notifiable difference exists:

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

- b) *A Contracting State's requirement is different in character or the Contracting State has established other means of compliance (Category B)\**. This category applies, in particular, when the national regulation and practices are different in character from the corresponding SARP, or when the national regulation and practices differ in principle, type or system from the corresponding SARP, without necessarily imposing an additional obligation; and
- c) *A Contracting State's requirement is less protective, partially implemented or not implemented (Category C)*. This category applies when the national regulation and practices are less protective than the corresponding SARP; when no national regulation has been promulgated to address the corresponding SARP, in whole or in part; or when the Contracting State has not brought its practices into full accord with the corresponding SARP.

These categories do not apply to Not Applicable SARP. Please see the paragraph below.

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

2.3 **Differences from appendices, tables and figures.** The material comprising a SARP includes not only the SARP itself, but also the appendices, tables and figures associated with the SARP. Therefore, differences from appendices, tables and figures are notifiable under Article 38. In order to file a difference against an appendix, table or figure, States should file a difference against the SARP that makes reference to the appendix, table or figure.

2.4 **Differences from definitions.** Contracting States should notify differences from definitions. The definition of a term used in a SARP does not have independent status but is an essential part of each SARP in which the term is used. Therefore, a difference from the definition of the term may result in there being a difference from any SARP in which the term is used. To this end, Contracting States should take into consideration differences from definitions when determining compliance or differences to SARPs in which the terms are used.

2.5 The notification of differences should be not only to the latest amendment but to the whole Annex, including the amendment. In other words, Contracting States that have already notified differences are requested to provide regular updates of the differences previously notified until the difference no longer exists.

2.6 Further guidance on the identification and notification of differences, examples of well-defined differences and examples of model processes and procedures for management of the notification of differences can be found in the *Manual on Notification and Publication of Differences* (Doc 10055).

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\* The expression "different in character or other means of compliance" in b) would be applied to a national regulation and practice which achieve, by other means, the same objective as that of the corresponding SARPs or for other substantive reasons so cannot be classified under a) or c).

3. *Form of notification of differences*

3.1 Differences can be notified:

- a) by sending to ICAO Headquarters a form on notification of compliance or differences; or
- b) through the Electronic Filing of Differences (EFOD) System at [www.icao.int/usoap](http://www.icao.int/usoap).

3.2 When notifying differences, the following information should be provided:

- a) the number of the paragraph or subparagraph which contains the SARP to which the difference relates\*;
- b) the reasons why the State does not comply with the SARP, or considers it necessary to adopt different regulations or practices;
- c) a clear and concise description of the difference; and
- d) intentions for future compliance and any date by which your Government plans to confirm compliance with and remove its difference from the SARP for which the difference has been notified.

3.3 The differences notified will be made available to other Contracting States, normally in the terms used by the Contracting State when making the notification. In the interest of making the information as useful as possible, Contracting States are requested to ensure that:

- a) statements be as clear and concise as possible and be confined to essential points;
- b) the provision of extracts from national regulations not be considered as sufficient to satisfy the obligation to notify differences; and
- c) general comments, unclear acronyms and references be avoided.

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\* This applies only when the notification is made under 3.1 a).

**IMPLEMENTATION TASK LIST AND OUTLINE OF GUIDANCE MATERIAL  
IN RELATION TO AMENDMENT 91 TO ANNEX 10, VOLUME III**

**1. IMPLEMENTATION TASK LIST**

1.1 Essential steps to be followed by a State to implement the amendment to Annex 10, Volume III:

- a) implement the necessary software and/or hardware SELCAL ground system upgrades;
- b) provide training to the radio operators on the new SELCAL code availability and identification of operational aspects of the rule-making process necessary to transpose the new and modified ICAO provisions into the national regulations taking into consideration the applicability date;
- c) drafting of the modification(s) to the national regulations and means of compliance;
- d) official adoption of the national regulations and means of compliance;
- e) filing of State differences with ICAO, if necessary;
- f) publication of significant differences in AIP, if necessary; and
- g) training of operational staff in the use of new provisions.

**2. STANDARDIZATION PROCESS**

2.1 Effective date: 22 March 2021

2.2 Applicability date: 3 November 2022

2.3 Embedded date(s): None

**3. SUPPORTING DOCUMENTATION**

3.1 **ICAO documentation:**

<b>Title/Doc no.</b>	<b>Type (PANS/TI/Manual/Circ.)</b>	<b>Publication date</b>
None		

3.2 **External documentation:**

<b>Title</b>	<b>External Organization</b>	<b>Publication date</b>
ARINC Specification 714A – Mark 4 Airborne Selective Calling (SELCAL)	ARINC	Available
RTCA DO-93A Minimum Operational Performance Standards (MOPS) for Airborne Selective Calling Equipment	RTCA	Available

4. **IMPLEMENTATION ASSISTANCE TASKS**

<b>Type</b>	<b>Global</b>	<b>Regional</b>
Workshops		PIRGs, RASGs

5. **UNIVERSAL SAFETY OVERSIGHT AUDIT PROGRAMME (USOAP)**

5.1 No changes are envisaged in the Protocol Questions (PQs).

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**IMPACT ASSESSMENT IN RELATION TO  
AMENDMENT 91 TO ANNEX 10, VOLUME III**

**1. INTRODUCTION**

1.1 Amendment 91 to Annex 10, Volume III is intended to address proposals developed by the second meeting of the Communications Panel Data Communication Infrastructure Working Group (CP-DCIWG/2) to amend Annex 10 — *Aeronautical Telecommunications, Volume III — Communication Systems, Part II — Voice Communication System*, related to the expansion of the pool of selective calling (SELCAL) codes.

**2. IMPACT ASSESSMENT**

**2.1 Amendment related to selective calling system (SELCAL)**

2.1.1 *Safety impact:* Positive. The potential for miscommunication and confusion on the part of the pilot and radio operator will be reduced.

2.1.2 *Financial impact:* Increase in costs for the industry. For air navigation services providers (ANSPs) operating aeronautical HF radio stations, there will be a one-time cost to upgrade the ground systems (flight planning and SELCAL encoder) to support the proposed SELCAL upgrade solution. Ground infrastructure software and/or hardware solutions are currently available from multiple sources to support the proposed SELCAL upgrade solution.

2.1.3 The cost will vary for each aeronautical radio station based on whether a stand-alone solution or an integrated solution is needed. In the first case it will be in the range USD 5 000 to USD 10 000. For integrated systems requiring software updates, this could increase by a factor of 5 to 10.

2.1.4 For aircraft operators, the provision of the proposed SELCAL upgrade will be offered as an option for new aircraft only; hence, the impact will be small.

2.1.5 *Security impact:* Negligible. Although SELCAL has no explicit security measures, the possibility of contacting multiple aircraft with only one code had increased the potential for interference from “nuisance” sources. This will be greatly reduced.

2.1.6 *Environmental impact:* None.

2.1.7 *Efficiency impact:* Positive. It will reduce the amount of miscommunication on the part of pilots and radio operators.

2.1.8 *Expected implementation time:* One to two years. With regard to States, suppliers of the SELCAL ground system upgrades (software and/or hardware) are currently available and implementation schedules will take less than two years. A survey of the ANSPs was completed in 2017 and showed an overwhelming support of the proposed SELCAL upgrade. The results also indicated that ANSPs

implementations would be completed in 2022. With regard to industry, Airbus and Boeing supported the standards development of the proposed SELCAL upgrade solution. Airbus and Boeing are expected to begin offering the SELCAL upgrade functionality on new aircraft being delivered after the 2020 timeframe, with some existing aircraft being already compatible with suitable software upgrades. Certified SELCAL avionics (software upgrade) availability will take 18 to 24 months.

— END —

**AMENDMENT 91**  
**TO THE**  
**INTERNATIONAL STANDARDS**  
**AND RECOMMENDED PRACTICES**  
**AND PROCEDURES FOR AIR NAVIGATION SERVICES**

**AERONAUTICAL**  
**TELECOMMUNICATIONS**

**ANNEX 10**  
**TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

**VOLUME III**  
**(COMMUNICATION SYSTEMS)**

The amendment to Annex 10, Volume III, contained in this document was adopted by the Council of ICAO on **6 November 2020**. Such parts of this amendment as have not been disapproved by more than half of the total number of Contracting States on or before **22 March 2021** will become effective on that date and will become applicable on **3 November 2022** as specified in the Resolution of Adoption. (State letter AN 7/64.2.2-20/127 refers.)

**NOVEMBER 2020**

**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

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

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

~~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

**TEXT OF AMENDMENT 91 TO**  
**INTERNATIONAL STANDARDS**  
**AND RECOMMENDED PRACTICES**

**AERONAUTICAL TELECOMMUNICATIONS**  
**ANNEX 10**

**VOLUME III**  
**COMMUNICATION SYSTEMS**

**TO THE CONVENTION ON INTERNATIONAL CIVIL AVIATION**

...

**PART II – VOICE COMMUNICATION SYSTEMS**

...

**CHAPTER 3. SELCAL SYSTEM**

**3.1 Recommendation.**— *Until 2 November 2022, where a SELCAL system is installed, the following system characteristics should be applied:*

- a) Transmitted code. Each transmitted code should be made up of two consecutive tone pulses, with each pulse containing two simultaneously transmitted tones. The pulses should be of 1.0 plus or minus 0.25 seconds duration, separated by an interval of 0.2 plus or minus 0.1 second.*
- b) Stability. The frequency of transmitted tones should be held to plus or minus 0.15 per cent tolerance to ensure proper operation of the airborne decoder.*
- c) Distortion. The overall audio distortion present on the transmitted RF signal should not exceed 15 per cent.*
- d) Per cent modulation. The RF signal transmitted by the ground radio station should contain, within 3 dB, equal amounts of the two modulating tones. The combination of tones should result in a modulation envelope having a nominal modulation percentage as high as possible and in no case less than 60 per cent.*
- e) Transmitted tones. Tone codes should be made up of various combinations of the tones listed in the following table and designated by colour and letter as indicated:*

<i>Designation</i>	<i>Frequency (Hz)</i>
<i>Red A</i>	<i>312.6</i>
<i>Red B</i>	<i>346.7</i>
<i>Red C</i>	<i>384.6</i>
<i>Red D</i>	<i>426.6</i>
<i>Red E</i>	<i>473.2</i>
<i>Red F</i>	<i>524.8</i>
<i>Red G</i>	<i>582.1</i>
<i>Red H</i>	<i>645.7</i>

<i>Red J</i>	716.1
<i>Red K</i>	794.3
<i>Red L</i>	881.0
<i>Red M</i>	977.2
<i>Red P</i>	1 083.9
<i>Red Q</i>	1 202.3
<i>Red R</i>	1 333.5
<i>Red S</i>	1 479.1

*Note 1.— It should be noted that the tones are spaced by Log-1 0.045 to avoid the possibility of harmonic combinations.*

*Note 2.— In accordance with the application principles developed by the Sixth Session of the Communications Division, the only codes at present used internationally are selected from the red group.*

*Note 3.— Guidance material on the use of SELCAL systems is contained in the Attachment to Part II.*

*Note 4.— The tones Red P, Red Q, Red R, and Red S are applicable after 1 September 1985, in accordance with 3.2.*

3.2 As from 1 September 1985 Until 2 November 2022, aeronautical stations which are required to communicate with SELCAL-equipped aircraft shall have SELCAL encoders in accordance with the red group in the table of tone frequencies of 3.1. After 1 September 1985, SELCAL codes using the tones Red P, Red Q, Red R, and Red S may be assigned.

3.1 As of 3 November 2022, **Recommendation.**— Where a SELCAL system is installed, the following system characteristics ~~should~~ shall be applied:

- a) Transmitted code. Each transmitted code ~~should~~ shall be made up of two consecutive tone pulses, with each pulse containing two simultaneously transmitted tones. The pulses ~~should~~ shall be of 1.0 plus or minus 0.25 seconds duration, separated by an interval of 0.2 plus or minus 0.1 second.
- b) Frequency stability. The frequency of transmitted tones ~~should~~ shall be held to plus or minus 0.15 per cent tolerance to ensure proper operation of the airborne decoder.
- c) Distortion. The overall audio distortion present on the transmitted RF signal ~~should~~ shall not exceed 15 per cent.
- d) Level stability. ~~Per cent modulation.~~—The RF signal transmitted by the ground radio station ~~should~~ shall contain, within 3 dB, equal amounts of the two modulating tones.

3.1.1 **Recommendation.**— As of 3 November 2022, modulation envelope. The combination of tones should result in a modulation envelope having a nominal modulation percentage as high as possible and ~~in no cases~~ not less than 60 per cent.

e) — 3.2 As of 3 November 2022, the Transmitted tones. ~~Tone codes should~~ shall be made up of various combinations of the tones listed in the following ~~Tables~~ Tables 3-1. They are ~~and~~ designated by colour and letter or number as indicated:—

**Table 3-1. SELCAL tones designated by colour and letter or number  
(applicable as of 3 November 2022)**

<i>Designation</i>	<i>Frequency (Hz)</i>
<i>Red A</i>	312.6
<i>Red B</i>	346.7
<i>Red C</i>	384.6
<i>Red D</i>	426.6
<i>Red E</i>	473.2
<i>Red F</i>	524.8
<i>Red G</i>	582.1
<i>Red H</i>	645.7
<i>Red J</i>	716.1
<i>Red K</i>	794.3
<i>Red L</i>	881.0
<i>Red M</i>	977.2
<i>Red P</i>	1083.9
<i>Red Q</i>	1202.3
<i>Red R</i>	1333.5
<i>Red S</i>	1479.1
<i>Red T</i>	329.2
<i>Red U</i>	365.2
<i>Red V</i>	405.0
<i>Red W</i>	449.3
<i>Red X</i>	498.3
<i>Red Y</i>	552.7
<i>Red Z</i>	613.1
<i>Red 1</i>	680.0
<i>Red 2</i>	754.2
<i>Red 3</i>	836.6
<i>Red 4</i>	927.9
<i>Red 5</i>	1 029.2
<i>Red 6</i>	1 141.6
<i>Red 7</i>	1 266.2
<i>Red 8</i>	1 404.4
<i>Red 9</i>	1 557.8

*Note 1.— ~~It should be noted that~~ The frequencies of the tones are spaced by Log-1 0.0450.0225 to avoid the possibility of harmonic combinations.*

*Note 2.— In accordance with the application principles developed by the Sixth Session of the Communications Division, the only codes at present used internationally are selected from the red group.*

*Note 3.— Guidance material on the use of SELCAL systems is contained in the Attachment to Part II.*

*Note 4.— ~~The tones Red P, Red Q, Red R, and Red S are applicable after 1 September 1985, in accordance with 3.2.~~*

3.23 ~~As from 1 September 1985~~ As of 3 November 2022, aeronautical stations which are required to communicate with SELCAL-equipped aircraft shall have SELCAL encoders that support all tones in

accordance with ~~the red group in the table of tone frequencies of 3.1. After 1 September 1985, SELCAL codes using the tones Red P, Red Q, Red R, and Red S may be assigned.~~ Table 3-1.

3.4 As of 3 November 2022, SELCAL codes using the tones Red T through Red 9 as given in Table 3-1 shall only be assigned to SELCAL-equipped aircraft with the capability of receiving these tones.

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