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IFATCA'24

TPM Policy Review: Pronunciation of Words and Five Letter Naming Codes

Presented by TOC

SUMMARY

Review of existing TPM Policy COM 4.10 regarding Pronunciation of Words and Five Letter Name Codes (5LNC). As the amount of 5LNC dwindle there is a desire to start to utilize numbers within fixes, but this does not come without some complexity and concern that need to be considered.

1. INTRODUCTION

1.1. Clarity in radiotelephony communications is critical to safety. The pronunciation, similarity, and proximity of fixes can all play into whether communication is understood.

1.2. Current IFATCA policy dictates that waypoints should be pronounceable. There has been an increasing number of fixes created which utilize numbers or may be otherwise difficult to pronounce. The concern is the limited resource of 5 letter fixes will run out, and with these increases that it may be sooner than previously thought.

1.3. Currently ANSPs source their waypoints/fixes from their ICAO Region utilizing the International Codes and Routes Designators (ICARD) database. There are issues with incorrect utilization and duplication within the database.

1.4. The ICAO Air Navigation Commission (ANC) approved the Job Card IFPP.022.01 upon request by the Instrument Flight Procedure Panel (IFPP)– *"Enhancement and accuracy of the International Codes and Route Designators (ICARD) system, and resolution of duplicated five-letter name codes 5LNCs"* for review.

1.5. Among methods to contend with this dwindling resource includes the utilization of numbers within fixes.

1.6. TOC seeks to ensure IFATCA policy remains harmonized with current international practices.

2. DISCUSSION

2.1. Five Letter Naming Code (5LNC) was developed in the 1970s from a set of combinations between the United States Federal Aviation Administration (FAA) and ICAO. These lists were shared with the respective ICAO Regional Offices. These fixes are maintained in a database called ICARD. From the ICAO Five-Letter Name-Codes (5LNC) Guidelines, "A five-letter name-code (5LNC) shall be assigned when a significant point is required for a position not marked by the site of a radio navigation aid and is used for ATC purposes."[1]

2.1.1. Five Letter Alpha Numeric Code (5ANNC) is much like 5LNC but also factors in numbers. The best practices for utilization of 5ANNCs are still being considered.

2.1.2. During the Eurocontrol 7th RNP Approach implementation Support Group (RaiSG) in 2014 there were concerns raised about the general harmonization of rules for utilization of 5ANNC within RNAV SID/STAR and IAP designations which may not be supported and result in a weakening of ICAO Doc 8168.[2]

Current Policy

2.1.3. Current IFATCA Policy COM 4.10[3] regarding 5LNC reads:

> **Pronounceable names should be reserved for waypoints that are used in voice communications.**

2.1.4. The original paper, "*Pronunciation of Words and Five Letter Naming Codes*" that generated the IFATCA policy was presented at the 2016 Las Vegas Conference. The goals of the paper were the necessity to alleviate confusion in the spoken word between ATCOs and flight crews. This sentiment remains strong and valid, but since 2016 additional concerns have been raised. Since the time of presentation, ICAO and other organizations have been continually reviewing this topic.

ICAO Documents

2.2. Within Annex 11, there are several important points regarding designators names and structure laid out. Annex 11 was updated in 2018, which is after the last IFATCA analysis on the topic.

2.2.1. ICAO Annex 11 covers when significant points are established and what they are:

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[1] ICAO, Five-Letter Name-Codes (5LNC) Guidelines (2017). Montreal, Canada.

[2] Todorov, Tihomir. (2022) Significant points not marked by the site of a radio navigation aid [PowerPoint Slides] https://www.icao.int/EURNAT/Other%20Meetings%20Seminars%20and%20Workshops/ICAO%205ANNC%20-%205LNC%20Workshop/ICAO%205ANNC%20Wshop%20PR02.pdf

[3] IFATCA Technical and Professional Manual (2023).

> 2.15 Establishment and identification of significant points
>
> 2.15.1 Significant points shall be established for the purpose of defining an ATS route or instrument approach procedure and/or in relation to the requirements of air traffic services for information regarding the progress of aircraft in flight.
>
> 2.15.2 Significant points shall be identified by designators.
>
> 2.15.3 Significant points shall be established and identified in accordance with the principles set forth in Appendix 2.
>
> *Annex 11, Appendix 2 15th Edition*

2.2.2. Additionally, within Annex 11, Appendix 2 sets to expand upon the above section with the rules for the designator selections, including pronounceability.

> 3. Designators for significant points not marked by the site of a radio navigation aid
>
> 3.1 Where a significant point is required at a position not marked by the site of a radio navigation aid, and is used for ATC purposes, it shall be designated by a unique five-letter pronounceable "name-code". This name-code designator then serves as the name as well as the coded designator of the significant point.
>
> Note.— The principles governing the use of alphanumeric name-codes in support of RNAV SIDs, STARs and instrument approach procedures are detailed in the PANS-OPS (Doc 8168).
>
> 3.2 The name-code designator shall be selected so as to avoid any difficulties in pronunciation by pilots or ATS personnel when speaking in the language used in ATS communications.
>
> Examples: ADOLA, KODAP
>
> 3.3 The name-code designator shall be easily recognizable in voice communications and shall be free of ambiguity with those used for other significant points in the same general area.
>
> 3.4 The unique five-letter pronounceable name-code designator assigned to a significant point shall not be assigned to any other significant point. When there is a need to relocate a significant point, a new name-code designator shall be chosen.
>
> In cases when a State wishes to keep the allocation of specific name-codes for reuse at a different location, such name-codes shall not be used until after a period of at least six months.
>
> 3.5 States' requirements for unique five-letter pronounceable name-code designators shall be notified to the Regional Offices of ICAO for coordination.
>
> 3.6 In areas where no system of fixed routes is established or where the routes followed by aircraft vary depending on operational considerations, significant points shall be determined and reported in terms of World Geodetic System — 1984

(WGS-84) geographical coordinates, except that permanently established significant points serving as exit and/or entry points into such areas shall be designated in accordance with the applicable provisions in 2 or 3.

Annex 11, Appendix 2 15ᵗʰ Edition

2.2.3. The question of what a significant reporting point is further expanded upon within Annex 11, Appendix 2.

5. Significant points used for reporting purposes

5.1 In order to permit ATS to obtain information regarding the progress of aircraft in flight, selected significant points may need to be designated as reporting points.

5.2 In establishing such points, consideration shall be given to the following factors:

a) the type of air traffic services provided;

b) the amount of traffic normally encountered;

c) the accuracy with which aircraft are capable of adhering to the current flight plan;

d) the speed of the aircraft;

e) the separation minima applied;

f) the complexity of the airspace structure;

g) the control method(s) employed;

h) the start or end of significant phases of a flight (climb, descent, change of direction, etc.);

i) transfer of control procedures;

j) safety and search and rescue aspects;

k) the cockpit and air-ground communication workload.

Annex 11, Appendix 2 15ᵗʰ Edition

Utilizing the above significant points must factor in the type of services rendered, the complexity, procedures utilized and more.

2.2.4. There are concerns regarding Annex 11 Appendix 2 and the publication of the COMMISSION IMPLEMENTING REGULATION (EU) 2020/469, which amended EU 373/2017. It should be noted that these sentiments are concerning EU regulation thus are just within that continent. The associated materials saw a shift in language from shall to

should which results in a weakening of the provisions, downgrading it from a standard to a recommended practice.[4]

2.2.5. It should be noted that ICAO is preparing updates to Annex 11 are in process.

2.2.6. There are additional ICAO documents that pertain to 5LNC and 5ANNC which have been created or updated in the interim since the determination of the original policy.

2.2.7. ICAO Doc 8168[5] (PANS OPS) in its 2020 update, within the section on publication, detailed the provision for waypoint naming, including 5ANNC:

1.6 WAYPOINT NAMING

1.6.1 Waypoints used in support of RNAV SIDs, STARs and instrument approach procedures shall be designated by either a unique, five-letter, pronounceable "name-code" or a five-alphanumeric name-code. The following principles apply:

a) waypoints shall be designated by a five-alphanumeric name-code only if they are used for waypoints unique to one aerodrome that has a properly assigned four-letter location indicator (in accordance with Doc 7910);

b) in the following cases a unique, five-letter, pronounceable "name-code", in accordance with Annex 11, shall be applied:

1) final waypoint of a SID;

2) initial waypoint of a STAR;

3) waypoints common to more than one terminal control area or used in a procedure common to more than one airport which are not used for en-route; and

4) waypoints for ATC purposes.

ICAO Doc 8168, Seventh Edition

2.2.8. This document does stipulate how waypoints could be utilized in RNAV SIDs, STARs and instrument approach procedures. Among the principles are that the waypoints are to use the 4-letter airport code as is found in ICAO Document 7910.

2.2.9. ICAO Document 10066, PANS Aeronautical Information Management (PANS-AIM), was produced in 2018 and further details the naming protocol for significant points[6]:

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[4] ICAO. (2022) 5LNC/5AANC [PowerPoint Slides]
https://www.icao.int/EURNAT/Other%20Meetings%20Seminars%20and%20Workshops/ICAO%205ANNC%20-%205LNC%20Workshop/ICAO%205ANNC%20Wkshop%20Outcomes.pdf
[5] ICAO. (2020). Doc 8168, Procedures for Air Navigation Services — Aircraft Operations Volume II, Construction of Visual and Instrument Flight Procedures (7th ed.).
6 ICAO. (2018). DOC 10066: Procedures for Air Navigation Services: Aeronautical Information Management (First). International Civil Aviation Organization.

> ENR 4.4 Name-code designators for significant points
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> #AIP-DS# A list of alphabetically arranged name-code designators (five-letter pronounceable "name-code") established for significant points at positions not marked by the site of radio navigation aids, including:
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> 1) name-code designator;
>
> 2) geographical coordinates in degrees, minutes and seconds of the position;
>
> 3) reference to ATS or other routes where the point is located; and
>
> 4) remarks, including supplementary definition of positions where required.
>
> *ICAO PANS AIM, First Edition*

2.2.10. ICAO Provisional DOC 9426, Air Traffic Services Planning Manual, included a desire to raise awareness that different language speakers may say words differently. It should be noted that this document dates back to 1984[7].

> 4.4.5 The question of designation of SIDs and STARS is covered in Annex 11, Appendix 3. However, in selecting designators in accordance with these provisions, care must be taken to ensure that no confusion will arise in their practical use in voice communications because of close similarities between different designators. It may also be necessary to consider pronunciation problems caused by the fact that pilots with different mother tongues may pronounce designators differently in their voice communications with the ATC unit assigning a SID or STAR.
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> *ICAO Doc 9426, First Provisional Edition*

Incidents

2.3. The crash of American Airlines Flight 965 on 20 December 1995, demonstrates a confluence of many of the issues above, particularly the duplication in the database. Another facet is having the charts match what is known so as to avoid confusion. The crew of flight 965 was cleared direct Rozo Non-Directional Beacon (NDB) which was demonstrated on their chart as simply "R". Unknown to the crew, "R" in their database was tied to a different NAVAID using the same frequency, "Romeo." The aircraft commenced a turn to the errant NAVAID, which was located 150 NM away from their intended point. Whilst in the mountainous terrain outside of Cali, Colombia it was a mere 87 seconds until the terrain warnings began in the aircraft. The unfortunate conclusion of the flight is with controlled flight into terrain.[8]

2.4. In September 2023 in the United Kingdom the National Air Traffic Services (NATS) experienced what was deemed a one in fifteen million outage. This shutdown was triggered after two fixes on the same route an aircraft filed shared the same name. This

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[7] ICAO (1984). DOC 9426 Air Traffic Services Planning Manual. (First Provisional Edition).

[8] Ranter, H. (n.d.). ASN Aircraft accident Boeing 757-223 N651AA Buga. https://aviation-safety.net/database/record.php?id=19951220-1

resulted in the system shifting to a fail-safe mode. The result was over 1,500 flight cancellations and many more delayed. [9]

Pronounceable

2.5. The crux of the evaluation is what is deemed pronounceable. Letters and numbers are both unto their own, but as used in a single point may not be.

2.5.1. The ICARD database uses algorithms to determine pronounceability and there are chances this system could be updated to include more 5LNCs.

2.5.2. When utilizing 5ANNC in creation of fixes the necessity to utilize the fix in radiotelephony as compared to use in planning and CPDLC should be considered.[10]

2.5.3. Additionally, homophones or near homophones should be considered as these can cause confusion in radiotelephony.

2.5.4. Pronunciation may experience additional complexity based on the controller and/or pilot's respective accents.

2.5.5. Working memory consists of the information that will be immediately utilized. This type of memory consists of 7 +/- 2 memory slots. These numbers may be more applicable in a lab environment rather than that of a workplace with many concurrent tasks and distractions. The need to hold this information must also be held through the time that a readback can be confirmed. An item or piece of data consists of a single "thing", such as a digit in a phone number. Several things may be lumped together to create a chunk of information and thus take up less of this working memory. As an example, the fix AZELL is one piece of information. Whereas a fix such as KD54U consists of 5 separate data points. This one fix alone can come close to utilizing the working memory capacity. When issuing clearances, the general recommendation Is that a controller issue no more than three items of information (example: altitude or heading) in a singular clearance. This limit in working memory should be considered in any implementation.[11]

2.5.6. Even though some fixes may be pronounceable per the above criteria that does not mean that it would alleviate potential confusion. In some instances, a traditional latitude and longitude pairing could be pared down to 5 characters. For example, 2 South, 30 East could be shorted to 2S30E. This could cause potential confusion if that were a fix along the route of flight.

2.5.7. Moving forward in ICAO JOB CARD 022.01: 5ANNC vs 5LNC there is an expressed awareness of the utilization of 5ANNC through many ANSPs. Even though ICAO does

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[9] Morrison, R. (2023, September 6). *Rare data error in NATS air traffic control system caused UK flight chaos*. Tech Monitor. https://techmonitor.ai/technology/networks/rare-data-error-in-nats-air-traffic-control-system-caused-uk-flight-chaos

[10] Winker, Robert. (2022) New 5ANNC Category [PowerPoint Slides] https://www.icao.int/EURNAT/Other%20Meetings%20Seminars%20and%20Workshops/ICAO%205ANNC%20-%205LNC%20Workshop/ICAO%205ANNC%20Wshop%20PR03.pdf

[11] Pruchnicki, S., Christopher, B., & Burian, B. K. (2011) Human factors issues of Navigation Reference System waypoints. In Proceedings of the 16th International Symposium on Aviation Psychology. Dayton, OH: Wright State University.

not stipulate 5ANNC it is not only being used in charts but in verbal telephony as well. As the high demand on the finite database continues, they express that 5ANNC may be the easiest methodology to meet this need. [12]

ICARD

2.6. The ICARD database was developed in the 1970's as a method to track and disperse waypoints by region. Since that time aviation has continued to grow exponentially which has caused a continual draw on the finite resources within the database.

2.6.1. Within the ICARD database there are currently 290,000 5LNCs and some 126,000 more available. So, it is possible to have over 400,000 5LNC within the database. In Europe for example there are 54,000 available for selection in the database, with 27,500 assigned.

2.6.2. The current database is not populated within all of the AIPs in all 193 of the states, an estimate of only 60% of 5LNC in use are reported within the ICARD.[13]

2.6.3. The issue of duplicates within the ICARD database was addressed with ICAO State Letter 2017/101.[14] During the 2017 review some 3,905 duplicates were identified. States were to implement the 5LNC Duplicate Resolution Rules and submit updated information to their respective regional offices to resolve the matter. There are still challenges in getting member states to coordinate their databases with the ICARD system. This adds complexity to the attempts to resolve duplication, homophones, and near homophones.

2.6.4. In 2018 at the **Third Meeting of the Advanced Inter-Regional ATS Route Development Task Force** in Amman, Jordan there were some instances of trans-regional use where it was found that the common fixes were in triplicate or even in some cases in quadruple. There were also additional awareness issues raised on the similar codes within proximity.

"ICAO State Letter AN 11/45.5-17/101, dated 11 August 2017, notified contracting States of the 5LNC-related difficulties causing potential safety-related issues. The State Letter identified the following issues related to 5LNC:

a) The significant number of duplicated codes including codes in triplicate and in quadruplicate;

b) Similar sounding codes in close proximity or on the same flight plan route; and

c) Differences between 5LNC data registered in ICARD and published in national Aeronautical Information Publications (AIPs)" [15]

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[12] ICAO INSTRUMENT FLIGHT PROCEDURE PANEL. (18 to 29 September 2023). *JOB CARD 022.01: 5ANNC vs 5LNC*.

[13] Hofstetter, Isabelle. (2022) 5LNC/5AANC [PowerPoint Slides] https://www.icao.int/EURNAT/Other%20Meetings%20Seminars%20and%20Workshops/ICAO%205ANNC%20-%205LNC%20Workshop/ICAO%205ANNC%20Wshop%20PR01.pdf

[14] *Ibid.*

[15] ICAO. (2018). TRANS - REGIONAL DUPLICATED FIVE-LETTER NAME CODES UPDATE. Agenda Item 7: Aeronautical Data and Other Relevant ATM Safety Issues.

2.6.5. Additionally, there have been issues with compliance with Annex 11 provisions for uniqueness which has led to operational issues. This is further compounded by lack of an enforcement system and a malfunctioning ICARD. [16]

2.6.6. As different procedures continue to develop, with increasing complexity the need to utilize additional 5LNC may also go up in kind. The question raised by the United Kingdom Civil Aviation Authority is to start by tackling the lack of 5LNC. Whether it was apparent or perceived. This would be a multi-pronged approach including encouraging states to review and relinquish unwanted codes. Also, a review of some of the existing rules within 5LNC such as the use of different letter arrangements such as double letters (AMEXX) or triple consonants (POTTR). Also, consideration could be placed on the current distance limitation for codes that could be made available. [17]

2.6.7. Even with homophone tools, they are imperfect and can allow similar sounding fixes to slip through. For example, within the United States there are fixes called ZMBAR and ZUMBR. These fixes are a mere 40 NM apart. It would also be a struggle for a crew to clearly understand which was being stated.

Fix Id ▲	State	Description
ZMBAR	WEST VIRGINIA	39-07-53.8000N 079-19-34.8200W

Fix Id ▲	State	Description
ZUMBR	VIRGINIA	38-32-38.2800N 078-58-18.4800W

2.6.8. As is attested by the fix above there are some instances where triple consonants, rather than the standard ICARD formatting, are already in use within fixes with ZUMBR. This is not a singular utilization with fixes in use that counter the ICARD formatting in existence like HVNNN and FUBRR.

2.6.9. In 2017 a group was set up by the Coordination Group of the European Aviation System Planning Group (EANPG COG) to evaluate several factors. The group explored both availability and pronounceability of the available fixes within ICARD as well as identifying other issues.

2.6.10. Some of the major findings of the group feature the potential need for additional drawing on the database as the amount of PBN procedures increases, within the European market the need for VFR reporting points to be brought up to EASA compliance, and the need to assess duplicates. [18]

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[16] ICAO INSTRUMENT FLIGHT PROCEDURE PANEL. (18 to 29 September 2023). *JOB CARD 022.01: 5ANNC vs 5LNC*.

[17] Shirley, Guy et al. (2022) ICAO FIVE ALPHA-NUMERIC NAME CODES WORKSHOP [Power Point Slides] https://www.icao.int/EURNAT/Other%20Meetings%20Seminars%20and%20Workshops/ICAO%205ANNC%20-%205LNC%20Workshop/ICAO%205ANNC%20Wshop%20PR06.pdf

[18] ICAO. (2022) 5LNC/5AANC [PowerPoint Slides] https://www.icao.int/EURNAT/Other%20Meetings%20Seminars%20and%20Workshops/ICAO%205ANNC%20-%205LNC%20Workshop/ICAO%205ANNC%20Wkshop%20Outcomes.pdf

Examples Involving 5ANNC

2.7. Within the United States there is a grid system referred to as the Navigation Reference System (NRS). This gridding overlies the mainland USA and has a systematic approach toward the number of waypoints that otherwise lacked names. These fixes are also utilized within Area Control.[19]

2.7.1. The United States system utilizes a method wherein every fix on the grid begins with a K, the United States ICAO code. The second letter is named for the ACC wherein the fix is located, such as I for Indianapolis. This is followed by a third and fourth character for the latitude increment for a number between 01 and 90. And the final character is a longitude identifier starting at the prime meridian and from west to east the lettering begins with A and repeats every 26 degrees. So for example KI51M.[20]

2.7.2. This system was created to, "ensure a user-friendly system." Some of the considerations were that the fixes be easy to communicate, be intuitive, require minimal changes to the ground automation, and be easier to use than citing full latitude/longitude.

2.7.3. There are some concerns that remain such as the potential for frequency congestion, the need to voice each individual letter/number as opposed to a one to two syllable word, and more. At the time of the report (2011) there failed to be reports of concern on the time to verbalize these points as sent via various reporting methodologies.[21]

2.7.4. Eurocontrol also has started an investigation (ATM Procedures Development Sub Group – APDSG 85) into the justification of using 5ANNC in operations as well as the changes to NETOPS and ICAO HQ Panel in the future. The desire is the same or greater level of safety as is provided within the current framework of Annex 11, Appendix 2.

2.7.5. A focus group was assembled to analyse local use of 5ANNC including a variety of stakeholders. The group focused on the current rules and practices as well as the principles of use during each phase of flight. APDSG 85 worked to develop comprehensive justification materials to present. There was a focus on the use of 5ANNC in IAP, STAR, identifying hazards, and mitigations thereof.

2.7.6. With regard to existing ICAO rules and standards for 5LNC and 5ANNC the group proposed a set of assumptions for use of 5ANNC in ATC operations. The group sought to consider hazards and mitigations associated for each 5ANNC convention. The assumption lists the group proposed included use of 5ANNC in ATC Operations and apply conventions as listed below:

"2. ASSUMPTIONS FOR USE OF 5ANNC IN ATC OPERATIONS

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[19] Pruchnicki, S., Christopher, B., & Burian, B. K. (2011) Human factors issues of Navigation Reference System waypoints. In Proceedings of the 16th International Symposium on Aviation Psychology. Dayton, OH: Wright State University.

[20] FAA, Order JO 7350.9EE - Location Identifiers 1281–1287 (2023). Washington, DC.

[21] Pruchnicki, S., Christopher, B., & Burian, B. K. (2011) Human factors issues of Navigation Reference System waypoints. In Proceedings of the 16th International Symposium on Aviation Psychology. Dayton, OH: Wright State University.

2.1 The following assumptions are established for the use of 5ANNC in ATC operations and apply to all naming conventions selected:

a) 5ANNC are not used as initial waypoint of a STAR.

b) 5ANNC are not used as final waypoint of a SID.

c) ATC first allocate/issue a STAR to aircraft, before issuing a direct routing instruction to a 5ANNC waypoint along a STAR.

d) ATC first assign the IAP to a flight before issuing a direct routing instruction to a 5ANNC way point along the IAP.

e) Designating IAF, IF or FAF as 5ANNC is avoided, in particular when they are regularly used in operations to route aircraft direct to.

f) Direct routing instructions from en-route environment to a fix designated by 5ANNC in the terminal airspace is avoided

g) Pronunciation of the 5ANNC is performed in accordance with ICAO Annex 10, Volume II.

h) Pilots and controllers closely adhere to read-back and hear-back of 5ANNC."

2.7.7. Some of the potential benefits include a great number of new name codes being available, additional information could be embedded, and possibly elements being more intuitive.

2.7.8. As aircraft face CPDLC equipage mandates the challenges of read-back error may be made more of a moot point as the crew would instead be utilizing the text to execute.

Proposed Best Practices

2.8. From Robert Winker's presentation at the ICAO FIVE ANNC WORKSHOP (2022) there are several suggested prescriptions for best use of 5ANNC. As these fixes become more prevalent the utilization of consistent formatting worldwide or unique and identifiable names is desirable. They should be limited to use in CPDLC but not in radiotelephony between aircraft and ATC.

2.8.1. One proposal regarding 5ANNC design is to obtain consistency through using a format that has the first 2 characters derived from the nationality code of the State as assigned in ICAO Doc 7910. This would be followed by a third character to indicate the specific ACC/UAC facility it is assigned to. And conclude with a 2-digit number from 01-99. Utilizing this scheme would allot an extra 99 fixes to each ACC/UAC. A tool, with similar functionality to ICARD could be created to assist. An example of the above from Winker's presentation was Maastricht UAC Brussels UIR using EBY44 or Munich using EDM02.[22]

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[22] Winker, Robert. (2022) New 5ANNC Category [PowerPoint Slides]
https://www.icao.int/EURNAT/Other%20Meetings%20Seminars%20and%20Workshops/ICAO%205ANNC%20-%205LNC%20Workshop/ICAO%205ANNC%20Wshop%20PR03.pdf

2.8.2.   It should be noted that this increase of 99 waypoints would represent a sizeable increase in some smaller FIRs but would represent a relatively modest increase in larger FIRs.

2.8.3.   The results of this meeting were also shown in 5ANNC Workshop Outcomes. These included using unpronounceable codes within flight planning or ATS, amending the ICARD system to introduce new/updated pronounceable algorithms, clarifying the use of 5ANNCs for use in approach and terminal areas, as well as encouraging States to release unused 5LNCs.

2.8.4.   The future for 5LNC is being investigated through their Job Card 022.01. There will be studies to assess the current condition of 5LNC and the ICARD systems alongside their partners on ATMOPS, FLTOPS, and IFPP through 2024.   New ICAO provisions addressing uniqueness, pronounceability, and use of 5ANNC are expected for ENR and ATS (to include sound alikes and flight planning) in a post 2028 time period. [23]

2.8.5.   As of the writing of this paper IFPP is working on how to handle this lack of available viable 5LNC as the need for them continues to draw on the limited numbers. In utilization of 5ANNC to fill the deficit there are some practical matters to consider including how to reduce ambiguity within number use.

2.8.6.   "The naming conventions defined in various States for 5ANNC waypoints differ. By far, the most common is the type "LLDDD" where the initial two letters are the two last letters of the airport designator. A variety of meanings in the last three digits exist (L for letter, D for Digit). In an apparent attempt to mitigate the risk of a misinterpretation with headings, the number series of 001-360 is often avoided. Apart from the most common type (LLDDD), there are also examples of LLDDL, LLLLD, LLLDD or LDDLL. At this moment, a significant number of ANSPs allows or tolerates the use of 5ANNC in air-ground communications. Although rationalisation and revisiting some of the "pronounceability rules" may increase the availability of 5LNC, they are still of limited term nature (short to medium term solution). A forward thinking along the lines of PBN widespread implementation, combined with simplicity of the design and easy comprehension of the sequence of points in a SID/STAR or IAP could be effective in alleviating the pressure on the ICARD system and potentially the path to pursue in this matter. As the convention in the design of the codes for 5ANNC was not intended to serve air-ground voice communications, little consideration was given to the impact of pronouncing these codes in air ground communications. Adhering to the Annex 10 Volume 2 requirements, all these codes would imply spelling out character by character."[24]

2.8.7.   However, 5ANNC are utilized it is crucial that the utilization of numbers is not done in a vacuum within different ANSPs resulting later in duplication and confliction of these points.

Other Theories

2.9. As the database is depleted one proposition to consider would be the expansion of 5LNC to a theoretical 6LNC or even 7LNC. This idea is currently in a holding pattern though due

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[23] ICAO. (2022) 5LNC/5AANC [PowerPoint Slides]
https://www.icao.int/EURNAT/Other%20Meetings%20Seminars%20and%20Workshops/ICAO%205ANNC%20-%205LNC%20Workshop/ICAO%205ANNC%20Wkshop%20Outcomes.pdf
[24] ICAO INSTRUMENT FLIGHT PROCEDURE PANEL. (18 to 29 September 2023). *JOB CARD 022.01: 5ANNC vs 5LNC*.

to the limitations of current onboard aircraft database logistics. If this theory were to be employed there would be a few ways to consider including limiting their use to VFR waypoints. This would reserve the 5LNC for IFR flights. If there was a push for across-the-board utilization there would need to be awareness of the challenges of piecemeal implementation.

Back to the Policy

2.10. 5ANNC factors need to be considered moving forward, and how we will see them integrated into the system. The utilization of numbers seems to be the most straightforward method to increasing the number of fixes to satiate the needs of ANSPs.

2.10.1. Numbers are pronounceable, not as a singular word and may add syllables, but they are still able to be spoken and be clearly understood. In some cases, it may be easier to say EB535 than for a crew to differentiate ZUMBR and ZMBAR.

3. CONCLUSION

3.1. As there is a continued need to draw upon the ICARD database to utilize 5LNC there needs to be awareness that there are only a finite number of fixes which comply with current ICAO practices. The methodology for contending with this potential shortage must be considered.

3.2. Further, there needs to be awareness that if fixes are not being utilized then they should be returned to the database, and ways to increase the combinations of letters used would benefit ANSPs.

3.3. There are some occasions where utilizing 5ANNC make sense, but the selection of when and how numbers are used must be assessed.

3.4. Development of 5ANNC, if done in isolation, could result in duplication. There is a need for a methodology for use or database to track their use.

4. RECOMMENDATIONS

4.1. It is recommended that the following is added to existing COM 4.10 policy:

When 5ANNC are used, the following should be considered:
- Avoiding combinations which could be confused with instructions such as heading, speed, level etc.

- Waypoint names should be structured letters first, numbers second or numbers first, letters second. Mixed configurations are undesirable due to issues of memory and pronunciation.
- It is recommended that the letters used bear some sort of relationship to route, location or otherwise recognisable items for controllers, in order to aid memorisation and logical usage.

Usage of a 5ANNC database to prevent duplication should be a requirement.

And added to the Technical and Professional Manual.

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