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Enhancing Aviation Safety through Effective English Language Communication under the ICAO Requirements: Regulatory Challenges

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Aviation safety is critically dependent on effective communication, particularly in the English language, which serves as the international language of aviation. This paper explores the significance of proficient English language communication among aviation professionals and its impact on operational safety. Effective communication in aviation involves various factors such as lack of accent, perfect listening skills, effective hearback and readback procedures, and more. Additionally, English language efficiency in aviation is closely related to emotional stability and the ability to manage stress, both of which are crucial in highpressure environments. The research will also look into the regulatory challenges faced by the aviation industry in standardizing and enforcing language proficiency requirements by the International Civil Aviation Organization and other international institutions. Through a thorough review of existing regulations, industry practices, and case studies, this paper highlights the steps taken to improve communication skills among pilots, air traffic controllers, and other key aviation professionals.

Keywords

English Language Proficiency, ICAO, Civil Aviation English, Phony Language, Cockpit Crew, Air Traffic Control Officer

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I. Introduction

With English functioning as the exclusive language for aviation, the industry's safety is highly dependent on having effective communication on board and on the surface. Therefore, effective English language communication has a fundamental role in preventing accidents/incidents¹ and maintaining efficient operations in the aviation sector. Linguistic human errors are recognized to be the primary or secondary causes of more than 75% of aviation accidents/incidents (likewise in the maritime navigation industry).² The importance of enhancing aviation safety and overcoming the challenges from English communication is highlighted by the various ways in the aviation industry.

Similarly, to any industry, effective communication is crucial in aviation to ensure the safe implementation of daily operations. In addition, pilots, air traffic controllers, and other aviation staff are all professionals who depend on clear communication to build trust with one another and also with the passengers. As English has become a unifying language globally, linguistic standardization is not merely for convenience; it is a fundamental aspect of aviation safety.

The dominance of English in aviation dates back to the early days of commercial air travel when the need for a common language became evident amidst the proliferation of international flights. In international aviation [mainly between the cockpit crew (pilot-in-command, first officer)³ and air traffic control officers (ATCOs)] verbal communication takes place "in the world language of aviation." Why is English the main form of communication in the light that the official languages of the United Nations (UN) and its relevant specialized agency, the International Civil Aviation Organization (ICAO) are English, French, Spanish, Russian, Arabic, and Chinese?⁴ This means that all of the above are the official languages of civil aviation, but they were not adopted at the same time.⁵ As safety is the utmost priority, the need for the

5 International Conference on the Authentic Trilingual Text of the Convention on International Civil Aviation (1944), ICAO Doc. 8876; Protocol on the Authentic Trilingual Text of the Convention on International Civil Aviation. Buenos

According to ICAO Annex 13 on Aircraft Accident and Incident Investigation, the definitions of "accident," "incident" and "serious incident" are interpreted by the contracting States. See ICAO, ANNEX 13 - AIRCRAFT ACCIDENT AND INCIDENT INVESTIGATION 1-3 (2020).

² ERIK HOLLNAGEL, HUMAN RELIABILITY ANALYSIS: CONTEXT AND CONTROL 1-350 (1993).

³ In the early time of aviation, till the end of the 20th century, on wide-bodied aircraft, the cockpit crew was added to the navigation officer and flight engineer.

⁴ The norm text of the Chicago Convention was drafted in English. At the same time, the equally authentic versions in French and Spanish languages were opened for signature in Washington, D.C. See Chicago Convention on International Civil Aviation (2006), ICAO Doc. 7300/9, https://www.icao.int/publications/Documents/7300_9ed.pdf.

communication of information in one language predominated, so that the English language has become prevalent.

Undoubtedly, English language dominated since English is spoken in the great majority in the aviation industry. Obviously, it was impossible on a flight, for example, from London (LHR) to Bangkok (BKK) to speak to every air controller in their specific language. It was in the 1950s that the English language became universally international in aviation, although this practice has not been regulated officially under an international treaty until today. Nevertheless, English has become the "lingua franca" of commercial aviation, as professionals are required to speak it all over the world.⁶ Currently, dozens of versions of English are differentiated due to local dialects, which involves further risks.⁷ Therefore, all pilots and air traffic controllers need to have basic communication skills and to be familiar with the professional vocabulary of aviation both in their languages and in English.⁸

The primary purpose of this research is to explore the significance of proficient English language communication among aviation professionals and its impact on operational safety. It will also look into the regulatory challenges faced by the aviation industry in standardizing and enforcing language proficiency requirements by the International Civil Aviation Organization (ICAO) and other international institutions. By delving into the regulatory challenges and procedural intricacies related to language use in aviation, this research aims to provide valuable insights into how regulatory frameworks can be optimized to foster a safer and more efficient operational environment. This article is composed of six parts, including an Introduction and Conclusion. Part two explores the critical role that English language proficiency plays in aviation safety. Part three examines the ICAO's language proficiency standards. Part four analyzes a series of aviation accidents and incidents in which deficiencies in English language communication were identified as contributing factors. Part five addresses current and emerging solutions aimed at improving aviation communication and mitigating language-related risks.

Aires (1968); Protocol Relating to an Amendment to the Convention on International Civil Aviation (Final Clause Russian Text), ICAO Doc. 9208; Protocol Relating to an Amendment to the Convention on International Civil Aviation (Final Clause Arabic Text), ICAO Doc. 9664; Protocol Relating to an Amendment to the Convention on International Civil Aviation (Final Clause Chinese Text), ICAO Doc. 9722, https://www.icao.int/isbn/lists/publications/isbn.aspx.

6 ATTILA SIPOS, INTERNATIONAL AVIATION LAW: REGULATIONS IN THREE DIMENSIONS 50-1 (2024).

7 A. Boschen & R. Jones, Aviation Language Problem: Improving Pilot-controller Communication, in INTERNATIONAL PROFESSIONAL COMMUNICATION CONFERENCE PROC. 291-9 (2004), https://ieeexplore.ieee.org/document/1375313.

8 R. Jones, Miscommunication between Pilots and Air Traffic Control, 27:3 LANGUAGE PROBS. & LANGUAGE PLAN. 233-48 (2003).

II. The ICAO's Requirements for Aviation Communication

A. Overview

"For pilots and air traffic controllers to communicate clearly and efficiently around the world, a universal aviation language had to be established."⁹ The main rule is that the pilots are responsible for following the controllers' instructions unless such instructions put the aircraft and its occupants at risk.¹⁰ As a result of understanding that language barriers are human errors that could vastly affect flight safety, the ICAO prescribed the requirement for pilots, air traffic controllers, and aeronautical station operators to take an English language proficiency test. Because these aviation professionals are involved in international operations, they are required to demonstrate the ability to speak and understand English on a proficiency level 4 according to the ICAO's language proficiency rating scale.¹¹

The ICAO's Aviation English Language Test Services (AELTS) facilitates the Organization's formal recognition of the aviation English tests that comply with its Language Proficiency Requirements.¹² While English language communication is widely acknowledged as crucial, the challenges surrounding its regulation have commanded increasing attention. By understanding key moments in the aviation communication process, we seek to highlight the areas for improvement and innovation. The various aspects of English language communication with regard to aviation safety are examined, focusing on rules, procedures, and practical effects. Identifying research issues is vital to address the gaps and challenges in the regulation of aviation communication.

As in any human activity, communication plays an integral function, especially from the perspective of aviation safety. Issues related to communication have made up a significant portion of the entries in the NASA's Aviation Safety Reporting System (ASRS) database¹³ since it was first established. "Over 70% of the reports to the ASRS database between 1976 and 1981, the first five years of the reporting system,

12 Id

⁹ Lina Peralta, The Importance of English Language Proficiency in Aviation, Uniting Aviation (June 16, 2024), https:// unitingaviation.com/news/safety/the-importance-of-english-language-proficiency-in-aviation.

 $^{10 \} Id$

¹¹ ICAO, Aviation English Language Test Services, https://www.icao.int/safety/OPS/OPS-Tools/Pages/AELTS.aspx.

¹³ Aviation Safety Reporting System (ASRS), ASRS Program Briefing, https://asrs.arc.nasa.gov/docs/ASRS_ ProgramBriefing.pdf.

were either directly or indirectly related to communication issues and problems."¹⁴ This system collects voluntarily submitted reports of aviation safety incidents and situations by pilots, controllers, and other aviation professionals. It utilizes the information within these reports to identify systemic deficiencies and disseminate alert messages to relevant parties capable of addressing and rectifying the regulation of these issues.¹⁵

B. "Readback" and "Hearback" Issues

Some multiple strategies and techniques can be implemented to enhance the effectiveness of communication between air traffic controllers and pilots and, furthermore, as between cabin crew and passengers, while some issues faced were also related to heavy accents and readback/hearback procedures. In other words, "readback" and "hearback" issues are critical problems in aviation-related communication.

1. Readback

"Readback" occurs when a pilot repeats a clearance or instruction given by Air Traffic Control (ATC) to confirm that it was understood correctly. In this situation, four major patterns of causal sources for pilot errors in their readbacks were identified.

Table 1. Four Major Patterns of Causal Sources for Pilot Errors in their Readbacks

No	Major Patterns	Pilot Errors
1	Several types of call-sign similarities	For example: Anagrams: DEC – DCE; 152 – 125; or Final identical figures/letters: ABC 45 MU – ABC 76 TU; Parallel figures/letters: 1458 – 1478; Block figures/letters: KLM or KLN, etc. ¹⁶

- 15 The Aviation Safety Reporting System (ASRS) was founded in 1976. This system, created by NASA, plays a crucial role in the ongoing efforts by governments, the industry, and individuals to sustain and enhance aviation safety. See ASRS, Program Briefing, https://asrs.arc.nasa.gov/overview/summary.html.
- 16 Richard Lawrence, EUROCONTROL Call Sign Similarity Project (2015), https://www.icao.int/MID/Documents/2015/ CSC%20WG1/1-CSS%20Project%20Overview.pdf.

¹⁴ Paul Krivonos, Communication in Aviation Safety: Lessons Learned and Lessons Required, 2007 REGIONAL SEMINAR OF THE AUSTRALIA AND NEW ZEALAND SOCIETIES OF AIR SAFETY INVESTIGATORS PROC. (June 9-10, 2007), https://asasi.org/ wp-content/uploads/2021/05/Communication_in_Aviation_Safety_Paul_Krivonos.pdf.

2	Only one pilot is listening on ATC frequency	Today, there is a two-pilot (dual) operation, which means the pilots in the cockpit share responsibilities to fly the aircraft, monitor all the aircraft instruments, and help provide a safe flight from beginning to end. This condition can become more demanding in the future as the SIPOs (Single Piloted Operations) or Extended Minimum Crew Operations (eMCO) will be instituted in the aviation industry. These new operational models imply plenty of challenges ¹⁷ but also command more attention from a linguistic perspective.
3	Slips of mind and tongue	There are typical communications problems such as failure to plan clear communication of the message; failure to test meaning (receiver) or understanding (transmitter); failure to listen and failure to demonstrate understanding (receiver), etc. ¹⁸ The typical human errors in this area included being advised of traffic on another flight level and accepting the information as clearance to that flight level; the classic "one zero" and "one thousand" mix-ups; the L/R (left/right) confusion in parallel runways; the interpretation of "maintain two five zero" as an altitude rather than an airspeed limitation. ¹⁹
4	Mind-set, pre- programmed for, and expectancy factors	The pilots who request "higher" or "lower" tend to be spring-loaded to "hear what they wanted to hear" upon the receipt of a blurred call sign transmission. ²⁰

Source: Compiled by the author

Such a set of incidents included "traffic conflicts, altitude busts, crossing restrictions not made, heading/track deviations, active runway transgressions, and mix-ups of take-off clearances and parallel runways."²¹

2. Hearback

"Hearback" is the process during which the ATC listens to a readback and confirms its accuracy.²² Hearback deficiencies diffused into a tangle of erratic, randomly overlapping causal circumstances. But the underlying problem seems to be the sheer

21 Id.

22 Id.

¹⁷ Khalid Binsultan & Attila Sipos, Pilot Shortage Problem-solving with Extended Minimum Crew Operation (eMCO), in 5TH INT'L AVIATION MGMT. CONF. PROC. (2024), https://link.springer.com/book/9783031895524.

¹⁸ SKYbrary, Verbal Communication, https://skybrary.aero/articles/verbal-communication.

¹⁹ Bill Monan, Readback Hearback, ASRS Directline (1991), https://asrs.arc.nasa.gov/publications/directline/dl1_read. htm.

²⁰ Id.

volume of traffic: the 9 a.m.-5 p.m. rush of departures/arrivals; the behind-the-scenes tasks of landlines, mobiles, and hand-offs; the congested frequencies with "stepped on" transmissions; the working of several discrete frequencies; and, at times, the time-and attention-consuming repeats of call-ups or clearances to individual aircraft. These activities, together with human fallibilities of inexperience, distractions, and fatigue set the stage for hearback failures. Indeed, a series of pilot narratives recognized controller "overload," "working too many aircraft," "overwork" and frequency saturation.²³

When examining the proficiency and efficiency of English language communication, more than one factor is to be studied. Having clear communication in aviation leads to minimalizing the chances of any misunderstanding or misinterpretation that could possibly lead to an accident or incident. It was suggested that controllers should restrict their messages to three instructions to help pilots receive and comprehend the information accurately. In order to identify the required English skills for the industry, anecdotal evidence was collected from pilots, which suggested that the manner in which controllers delivered their messages, such as rate of speech and accent, contributed to miscommunications.²⁴ Therefore, working towards improving aviation security and safety based on regulatory achievements and challenges is a longitudinal process with careful studies of approaches and techniques.

III. Language Protocols and the Phonetic Alphabet

Air transport is one of the most rigorously regulated industries. The excellent figures of aviation safety in air transport may be attributed not only to the speedy development of technology, but also to the extremely rigorous and comprehensive rules, standards, and their observance. This complex system of rules stipulates obligations for the key performers of the aviation industry, basically determining their activity.

In air transport, this is always and under all circumstances the most important aspect. Aviation safety is its top priority, which cannot be contested. It may not be the object of compromise. Aviation safety is based on facts, can be measured, and is one of the most important indices of the industry's judgement. Aviation has unequalled

23 Id.

²⁴ See generally Dominique Estival ET AL., Aviation English: A Lingua Franca for Pilots and Air Traffic Controllers 1-214 (2016).

safety indices in the world. Their ground is the comprehensive regulatory activity of the ICAO, the transplantation of international rules to the national level, their consistent implementation, and the enhanced control of the surveillance capacity of the ICAO's 193 Member States'²⁵ civil aviation authorities.²⁶

Nearly all articles of the Chicago Convention on International Civil Aviation (1944) concern aviation safety and its wide-scale accomplishment. At the same time, the Convention barely mentions aviation security.²⁷ Aviation safety and security, despite their close relationship, differ from each other fundamentally. Although in both areas, the dual purpose of the law-maker is preventing or averting danger and thereby saving lives as well as protecting property, we are dealing with two sharply distinct areas between aviation safety and aviation security.

"Aviation safety" means a system of capabilities, in which the performers in the industry can react effectively and competently to eventual emergencies related to operation and upkeep, as a result of which no accidents or flying incidents occur. Regarding the fact that safety is never 100%, from a practical viewpoint, it is more pragmatic to use the phrase "no avoidable or as few as possible accidents or incidents occur."²⁸

"Aviation security" is a system of capabilities, due to which the performers of the industry can provide effective and competent protection to aircraft on the ground or in the air, to the passengers and crew on board the aircraft or on the grounds of airports, to the ground-staff and third persons on the ground vis-à-vis unlawful acts endangering their security.²⁹

Beyond the difference between the notions, aviation safety prevails via the completion of mainly international and transparent regulatory tasks, while aviation security, although its effect is global, consists primarily of tasks of protection to be tackled nationally. The system of aviation safety rules is accessible and knowable for everyone, whereas the security rules constitute a closed system, excluding access to

²⁵ Chicago Convention, Date of Deposit of Instrument of Ratification or Notification of Adherence, https://www.icao.int/ publications/documents/chicago.pdf.

²⁶ UK CIVIL AVIATION AUTHORITY, AIRCRAFT CALL SIGN CONFUSION EVALUATION SAFETY STUDY 1-48 (2000), https://www.caa.co.uk/publication/download/12744. See also ICAO, Summary of Discussion, First Meeting of the Call Sign Confusion Ad-Hoc Working Group (CSC WG/1) (Feb. 16-8, 2015), www.icao.int/MID/Documents/2015/CSC%20 WG1/Final%20SoD.pdf.

²⁷ What is more, the word "security" - in a completely different sense - appears only once in the provisions of the Convention, although aviation security follows safety figures as the second most significant strategic pillar and a constant challenge for ICAO. See Chicago Convention, pmbl. It reads: "...yet its abuse can become a threat to the general security."

²⁸ Henri Wassenbergh, Safety in Air Transportation and Market Entry, 23:2 AIR & SPACE L. 58-81 (1998).

²⁹ SIPOS, supra note 6, at 233-4.

internal confidential information for those not concerned. However, the safety and security of international civil aviation may only be effective if these two prominent areas cooperate continually and support each other unconditionally.³⁰

The English letters and numbers in the messages exchanged in the live voice are pronounced clearly and without misunderstanding, because the phonetic alphabet is widespread worldwide and has not been changed since its introduction in the 1950s. Communication between controllers and pilots is based on knowledge of the English language and takes place in the so-called phonetic language, which is defined according to strict rules. The name itself comes from the English word radiotelephony. Its creation and the creation of its rules were prompted by the intention to avoid misunderstanding: although the language of aviation is basically English, there are about 150 dialects of this "world language," and in addition to this, there is the accent, which determines how we pronounce words.

The phonetic alphabet of the ICAO and the International Telecommunication Union (ITU) (both the specialized agencies of the UN) is also known as the NATO phonetic alphabet (actually the International Radio-Telephony Spelling Alphabet).³¹ The 26 code words of the alphabet are assigned to the 26 letters of the English alphabet – in alphabetical order:

A – Alfa	N – November
B – Bravo	O – Oscar
C – Charlie	P – Papa
D – Delta	Q – Quebec
E – Echo	R – Romeo
F - Foxtrot	S – Sierra
G – Golf	T – Tango
H – Hotel	U – Uniform
I – India	V - Victor
J – Juliett	W – Whiskey
K – Kilo	X – X-ray
L – Lima	Y – Yankee
M – Mike	Z – Zulu

In this way, the identification of what is being said is clear to the participants in the

³⁰ Id.

³¹ The 'NATO' alphabet was standardised by the NATO member countries back in the 1950s to allow an accurate exchange of radio messages between air, naval and army forces of all the NATO member nations. They had to make sure that each chosen word sounded different to the others, and was easily pronounceable by speakers of all the European languages, not just in English. It is now very widely used by all types of "professional communicators" including air traffic control, the police and other emergency services, shipping, etc. and in all types of business. See Amherst Walkie Talkie Centre, Standard Phonetic Alphabets Used for Radio & Telephone, https://www.walkie-talkie-radio.co.uk/information/radio-standard-nato-phonetic-alphabet.

communication, even if their native languages are different. The code words are so different from each other that the chance of their being misunderstood is quite small.

The flight crew (cockpit and cabin crew) and the ground professionals use the English "phonetic alphabet," i.e., the uniform English aviation language for communication during flight. The common language is a safety "tool" in aviation. The introduction of the phonetic alphabet was necessary because the standard expressions are short, which is crucial with respect to the increasing traffic. In addition, the wellformulated messages transmit the information more precisely by leaving no place for misunderstandings. Standard expressions reduce the risk of mixing up words with similar pronunciation. The English phony is a descriptive language containing special expressions and formulation rules. The requirements are strict because a considerable part of accidents is a result of human errors.³²

Numerous incidents may be traced back obviously to incorrect English. According to the Unites States Federal Aviation Administration (FAA) report, nearly 70% of the "commercial" aviation accidents occurring between 1990 and 2002 were associated with some manner of cockpit crew or supervisory errors. However, the "percentages differed slightly when air carrier (45%) and commuter/air taxi (75%) aviation accidents were considered separately."³³ Recently, nearly 75% of civil and military aviation accidents around the globe have been attributed to human errors at various levels.³⁴ The errors can be distinguished as decision errors, skill-based errors, and perceptual errors. Therefore, while speaking, if names, abbreviations, or acronyms (registration marks, ICAO codes of airports, waypoints, the navigation aids) with dubious spelling need to be spelt, communication has to take place in accordance with the ICAO "phonetic alphabet." It is very important to use the phony correctly since the communicated information and instructions greatly affect safe operation and efficient control of air traffic.³⁵

It can be generally stated that all identifiers containing letter combinations must be read according to the ICAO language standards.³⁶ Examples of identifiers include private aircraft call signs (YRTGM: Yankee Romeo Tango Golf Mike), navigational transmitters and points (e.g., TPS, Tango Papa Sierra), ATIS, or automatic transmitter

35 SIPOS, supra note 6, at 51.

³² Scott Shappell et al., Human Error and Commercial Aviation Accidents: A Comprehensive, Fine-Grained Analysis Using HFACS 2-3 (FAA, 2006), https://www.faa.gov/sites/faa.gov/files/data_research/research/med_humanfacs/ oamtechreports/200618.pdf.

³³ Guohua Li et al., Factors Associated with Pilot Error in Aviation Crashes, 72:1 AVIATION SPACE & ENVIL MED. 52-8 (2001).

³⁴ Kamaleshaiah Mathavara and Guruprasad Ramachandran, Role of Human Factors in Preventing Aviation Accidents: An Insight, in AERONAUTICS - NEW ADVANCES 1 (Zain Anwar Ali & Dragan Cvetković eds., 2022).

³⁶ ICAO, Language Proficiency, http://www.icao.int/safety/OPS/OPS-Section/Pages/Language-proficency.aspx.

identification (say B, Bravo), taxiway identifiers (e.g., A0, Alpha Zero).³⁷ Many clauses deal with the correct use of words and phrases in the language of the phony. To name just a few of the dozens: the words yes and no are not used in aviation. Instead, "affirm" means yes, correct, while "negative" means no, incorrect, not permitted.

Roger (in the early phonetic alphabet, R, as the precode for Romeo) means I have received and understood the last message, and Wilco (will comply) means I have received, understand your message and will act accordingly. These words are not substitutes for reading back, as the pilot cannot respond in this way to instructions, permissions, or any message that requires reading back from the tower, nor can he answer questions this way. In other words, the only correct form of "I hear and understood you" is Roger – the expressions copied that, okay is not standard and cannot be used!³⁸

It is also worth mentioning the numbers: these are usually communicated by reading out the digits one after the other, for example, 6312, i.e., Six Three One Two. The exception is when it comes to round hundreds or thousands, so 3000 – three thousand, 3500 – three thousand five hundred (but: 3501 – Three Five Zero One). The common words double or triple are not allowed to be used when a number occurs several times in a row. Subsequently, 511 is Five One One (and not five double one), while 777 is "Seven Seven Seven" (i.e., not triple seven). The words, to and for, are not said when it comes to altitude or direction, because these can be confused with the numbers two and four. For example, it is correct to descend to altitude four thousand (descend to four thousand meters, and not descend to altitude four thousand), or turn right heading one eight zero (turn right heading one eight zero), and not turn right to heading one eight zero.

ATC in all countries is obligated to provide control in English. In addition to English, French, Spanish, Russian, Arabic, and Chinese can also be used, but only in those countries where these are official languages. These are called ICAO languages. In France, for example, French can be used alongside English for IFR flights - flights at high altitudes, relying solely on instruments and tower instructions - in which case the controllers and French pilots communicate with each other in their native language. However, the controller must provide English-speaking controls to foreign pilots.

Similarly, Spanish is used in Spain, Venezuela, Argentina, and everywhere else where it is the official language. But in Germany and Austria, German cannot be used [only for flights carried out according to Visual Flight Rules (VFR)], because it

37 Id.

³⁸ Matthew Stibbe, Roger, wilco: when communications need to be crystal clear, GREEK Boss (Apr. 24, 2021), https://geekboss.com/blog/clear-communications.

is not an ICAO language. In the case of domestic VFR flights, the country's language can be spoken, for example, Polish in Poland – of course, only according to strict regulations. For the US, the rules are not set by the ICAO, but by the FAA. These differ somewhat from those in Europe. We will return to some of these later, but in the meantime, it is worth mentioning some of the Flight Safety Foundation³⁹ or the FAA's recommendations for tower-pilot communication:⁴⁰

For example, the most important element of communication between a pilot and ATC is mutual understanding. Brevity is important, so contact should be limited to the shortest possible time. The controller must be aware of all the circumstances in order to properly perform their duties. The pilot must know exactly what the controller expects of their side. They should be vigilant in monitoring ATC radio communications in traffic situations that require high concentration, especially when on an active runway and/or conducting a final approach before landing.

The FAA even sets out in writing the correct use of the microphone, drawing attention to the fact that the microphone should be close to the lips and that a short pause may be necessary after pressing the button, so that the first word can be understood. It mentions the radio test, i.e., the request for information on how well the pilot's or controller's communications can be heard. Independently of the aviation authority, we note that the general answer is two numbers: the first measuring the volume of the transmission; the second measuring its clarity on a scale of one to five. For example, four-by-two means: good volume, but the transmission can only be understood in some places. Five by five means: loud and clear.

To maintain the highest level of aviation safety, various aspects of communication must be studied. As discussed earlier, effective and successful English language communication lies on a huge spectrum of both verbal and non-verbal factors among air traffic controllers and/or flight crew and passengers. Even though English has been agreed upon as an international working language, less than 15% of the world speaks English as a native language. Therefore, it is safe to assume that "among pilots and controllers the percentage of native speakers is below 30%."⁴¹ Regardless of the ICAO's attempts to set firm English proficiency tests and training programs for flight

³⁹ Flight Safety Foundation, FSF ALAR Briefing Note 2.3: Pilot-Controller Communication, SKYbrary (2005), at 1-8, https://skybrary.aero/sites/default/files/bookshelf/852.pdf.

⁴⁰ Aeronautical Information Publication, Amendment 3, at 57-61, 38.8, https://www.faa.gov/air_traffic/publications/ media/aip_amd3.pdf.

⁴¹ Hinnerk Eißfeldt, Increasing Aviation Safety by Assessing English Language Proficiency among Aviation Professionals, 25th INTL CONG. AERONAUTICAL SCI. PROC. 1 (2006), https://www.researchgate.net/publication/225019611_Increasing_ aviation_safety_by_assessing_english_language_proficiency_among_aviation_professionals.

crew and other professional staff to avoid miscommunication between partners engaged in radio communication, this did not prevent linguistic unskilfulness from playing a significant role in incidents or accidents. Three ways can be contributing factors in accidents and incidents by language: (1) incorrect use of standardized phraseologies; (2) lack of plain language proficiency; and (3) the use of more than one language in the same airspace.⁴²

According to the ICAO, annually, more than 1100 passengers and crew lost their lives in accidents between 1976 - 2000, in which investigators established that language had played a contributory role.43 These days, the number of deaths in accidents involving international civil flights is well below 1,000 persons annually. Just an example, in 2015, 136 people lost their lives,⁴⁴ and in 2017, 44 passengers and 35 people staying on the surface met with fatal accidents (a total of 79), which is a novel, exceptional achievement considering the volume of traffic.⁴⁵ The study holds paramount importance in the aviation industry as it addresses effective communication as a crucial aspect of safety enhancement. With the increasing globalization of air travel and the diverse linguistic backgrounds of aviation professionals, proficient English language communication is indispensable for ensuring clear and accurate exchanges of information. Multiple tests and language assessments were created to ensure safety in aviation and reduce the chances of accidents and incidents. An example is the English Listening Test (ELT), which was developed in 1993 when the German Aerospace Center (DLR) oversaw the selection of international air traffic controller applicants for EUROCONTROL.⁴⁶ The test was divided into four sections/ parts: Simple Meaning (12 Items), Numbers (10 Items), Vocabulary (12 Items) and Complex Meaning (12 Items). To control the impact of the mother tongue in the sample, all relevant steps of test development were performed twice, including or

44 In the statistics, the International Air Transport Association (IATA) intentionally did not include the tragedy of Germanwings Flight 9525 (Airbus A320), when on March 24, 2015, the co-pilot of the airline crashed into a mountain with the intent of committing suicide, which caused the death of 150 people. Likewise, the IATA did not take into account the loss of the MetroJet Flight 9268 (Airbus A321) either, in which 224 persons died because the airplane exploded due to a terrorist attack on October 31, 2015. See IATA, Safety Report 2015 (2016), at 6, https://www.iata.org/ contentassets/4d18cb077c5e419b8a888d387a50c638/iata-safety-report-2015.pdf.

⁴² ICAO, MANUAL ON THE IMPLEMENTATION OF ICAO LANGUAGE PROFICIENCY REQUIREMENTS, 1.1.2 (2010), https://skybrary. aero/sites/default/files/bookshelf/2497.pdf.

⁴³ European Cockpit Association, ICAO New Language Proficiency Requirements: A Safety Priority for SEPLA (Feb. 3, 2006), https://www.eurocockpit.eu/news/icao-new-language-proficiency-requirements-safety-priority-sepla.

⁴⁵ David Shepardson, 2017 safest year on record for commercial passenger air travel - groups, REUTERS (Jan. 2, 2018), https://www.reuters.com/article/world/2017-safest-year-on-record-for-commercial-passenger-air-travel-groupsidUSKBN1EQ17E.

⁴⁶ Eißfeldt, supra note 41, at 3.

excluding native speakers.⁴⁷ Successful flight operations depend on more than just knowing how to fly an aircraft. In the past, flight safety used to be at risk because of poor or sometimes incorrect communication between the crew and air traffic control (ATC). Since this communication can become routine, it can be hard to analyze. ⁴⁸

The idea behind making communication more uniform is to cut down on misunderstandings, but it does not always work. As different researchers have come to different conclusions on the topic, it is also discussed that the ICAO's requirements do not fulfill or target "the necessary professionally important qualities ensuring the reliable radio exchange in the non-native language in emergency situations."49 In addition, some researchers stated that different emotional aspects must also be taken into consideration to guarantee better results.⁵⁰ "The Institute of Aviation and Space Medicine Research has shown that in critical conditions, when the nervous and emotional load of operators of particularly complex control systems increases sharply, 20% of them cannot assess the situation, and therefore, do not make decisions, 10% make wrong decisions, 22% fall into a stupor and do not act, 34% perform unnecessary actions and only worsen the situation."51 That is directly related to effective English language communication and aviation safety in situations where either the flight crew, air traffic controllers, pilots or staff are non-native English speakers. ATC must not only demonstrate standard language skills, but they must also be trained to maintain emotional stability in extreme situations, as well as train their memory to perceive and retain information correctly when needed. Some of these terms include "emergency," "malfunction," "defect," "fault" and "alert." Thus, it is highly important to have English language proficiency with a view to maintaining aviation safety. Therefore, utilizing the correct English language and communicating smoothly will also reduce the chances of accidents or incidents in aviation.

47 Id.

50 Id.

51 Id. at 4.

⁴⁸ Charles Alderson, Air Safety, Language Assessment Policy, and Policy Implementation: The Case of Aviation English, 29 ANN. Rev. APPLIED LINGUISTICS 168 (2009).

⁴⁹ Nataliia Glushanytsia et al., English for Aviation Safety: Language Training Methodology, 17:1 ASIAN ESP J. 8 (2021), https://www.academia.edu/47855431/English_for_Aviation_Safety_Language_Training_Methodology.

IV. Regulatory Challenges and Procedures

Various challenges highlight the need for ongoing training in terms of English language communication in aviation. The purposes of regulating these challenges and establishing certain procedures ensure that all aviation personnel, regardless of their native language, can communicate efficiently and effectively in English. According to the European Union Aviation Safety Agency (EASA) "in aviation, English language problems are a significant safety risk. An ICAO review of 28,000 incident/accident reports found that communication was a factor in over 70% of the occurrences."⁵²

Additionally, it stated that most of the obstacles faced in language proficiency with regard to aviation derive from people speaking English as a second language. As a result, these individuals need more time, money, and effort to enhance their level of English proficiency to pass the ICAO language proficiency exam established for them. When it comes to factors affecting proficiency, it is not only limited to grammar and/or pronunciation, but to rapid speech by air traffic control officers (ATCOs) which contributed to communication failures of misundersting call signs and altitude changes. The most often cited contributing factors in communication problems involving similar call-signs are related to human factors: Controller accent (34%); Controller speech rate (28%); Pilot distraction (25%); Pilot expectation (22%) and Pilot fatigue (20%).⁵³ The ICAO advises maintaining a speech rate of 100 words per minute, equivalent to roughly 4.1 syllables per second.⁵⁴ However, research indicates that American ATCOs typically speak at an average rate of 6.1 syllables per second. Additionally, native English-speaking pilots may be speaking 50% faster than the ICAO's recommended pace.⁵⁵

In addition, communication issues are intensified by cognitive load, which is the amount of information the brain has to process at a given moment. As this load increases, the brain's capacity to process language diminishes, affecting both native and non-native English speakers. This is not merely a matter of language proficiency; it relates to how the human brain operates under pressure. Moreover, crucial information is often conveyed in radiotelephony during the most demanding

⁵² John Franklin, Aviation Language: A Shared Responsibility, EASA (Sept. 26, 2023), https://www.easa.europa.eu/ community/topics/aviation-language-shared-responsibility.

⁵³ EUROCONTROL, Air-Ground Communication Safety Study: Causes and Recommendations (2006), at 37, 4.3.2, https://skybrary.aero/sites/default/files/bookshelf/162.pdf.

⁵⁴ EASA, Conversation Aviation: Starting Positive Conversations about Safety (2023), at 3, http://www.easa.europa.eu/ community/system/files/2023-11/Conversation_Aviation_03_print.pdf.

stages of flight, such as take-off, altitude changes, final approach, and landing. These are the moments when clear communication is vital, but the brain has limited "spare capacity" for processing language during these high-pressure phases.

With regard to the ICAO Manual on the Implementation of the ICAO Language Proficiency Requirements,⁵⁶ which was developed based on the expertise of the Board and members of the International Civil Aviation English Association (ICAEA),⁵⁷ one of the main language requirements to pass the test is to use work-related language that is relevant to the operation. That mainly concerns the type of language required for effectively managing non-standard, abnormal, or emergency situations, where standardized phraseology is inadequate. The ICAO Manual mentions that "standardized phraseology shall be used in all situations for which it has been specified. Only when standardized phraseology cannot serve an intended transmission, plain language shall be used,"⁵⁸ thereby referring to the fact that in certain situations the standard phraseology does not serve air traffic controllers or staff in terms of guaranteeing successful communication.

In radiotelephony communications, both standardized phraseology and plain language are used, often within the same message. The ICAO's standardized phraseology consists of clear, concise, and internationally agreed-upon messages, specifically designed by aviation experts for routine situations and common emergencies. Unlike plain language, which can vary in meaning based on culture and context, these set phrases are designed to convey a precise operational meaning. Since standardized phraseology accounts for the majority of radiotelephony transmissions, it should be understood as an essential operational tool, which cannot be overemphasized. However, improper use of this phraseology can negatively impact the safety of procedures.⁵⁹

A. The ICAO Language Proficiency Rating Scale

The ICAO has an English language proficiency rating scale ranging from 1 to 6. This is used in the contracting States of the ICAO as standards for PPL, CPL, and ATPL Licenses.

⁵⁶ ICAO, supra note 42.

⁵⁷ Established in Europe in 1991 as a worldwide, non-partisan, non-profit association for the industry. Members are from the active community of operators, and English language professionals are from more than 75 States.

⁵⁸ ICAO, supra note 42, at 5.1.1.1.

⁵⁹ ICAO, MANUAL OF RADIOTELEPHONY (2007), https://aviation-is.better-than.tv/icaodocs/Doc%209432%20-%20Manual% 200f%20Radiotelephony/DOC%209432%20-%204%20ed.%202007.pdf.

Level 1 – Pre-Elementary; Level 2 – Elementary; Level 3 – Pre-Operational; Level 4 – Operational (minimum for PPL, CPL or ATPL – retest in 3 years); Level 5 – Extended (retest in 6 years); Level 6 – Expert (no further retest required).⁶⁰

Level 4 is the minimum for an aviation professional license holder. The ICAO mandates that pilots and air traffic controllers (aviation professionals) with Level 4 (operational) language proficiency undergo reassessment every three years. Those at Level 5 must be reassessed every six years, while those at Level 6 do not require further assessment of their English language skills. An operational proficiency of Level 4 is considered the minimum standard for advancing to higher levels. The key advantage of maintaining high international standards in aviation English is ensuring clear communication between the crew and air traffic controllers, especially when non-standard terminology is used.⁶¹

Furthermore, the Skybrary website has publicized a list of certain aviation accidents or incidents that took place where a language issue was considered to be a contributing factor to the occurrence. One of the stated accidents was as follows:

[O]n 12 November 1996, an Ilyushin IL-76TD and an opposite direction Boeing 747-100 collided head-on at the same level in controlled airspace destroying both aircraft and causing the loss of 349 lives. The investigation concluded that the IL-76 had descended one thousand feet below its cleared level after its crew had interpreted ATC advice of opposite direction traffic one thousand feet below as the reason to remain at flight level (FL) 150 as a re-clearance to descend to this lower level. As a result, fifteen Safety Recommendations relating to English language proficiency, crew resource management, collision avoidance systems, and ATC procedures were made.⁶²

Despite the existence of standardized language guidelines set by the ICAO, which are outlined in the Aeronautical Telecommunications⁶³ and the Manual of Radiotelephony,⁶⁴ 44% of pilots indicated that they encountered non-standard

64 ICAO, supra note 59, at 1-102.

⁶⁰ SKYbrary, English Language Proficiency Requirements, https://skybrary.aero/articles/english-language-proficiencyrequirements; My Aviation English, ICAO Rating Scale, https://myaviationenglish.com/welcome/icao-rating-scale.

⁶¹ ICAO, *supra* note 42, at 4.3.2 & 5.3.2.1-5.3.2.2.

⁶² SKYbrary, supra note 60.

⁶³ ICAO, Annex 10: Aeronautical Telecommunications, Volume II- Communication Procedures including those with PANS Status (2001), at 1-96, www.icao.int/Meetings/anconf12/Document%20Archive/AN10_V2_cons%5B1%5D. pdf.

phraseology at least once during each flight. Common problems included incorrect use of the phonetic alphabet, such as saying, "Nectar" instead of "November," and the use of incomplete or non-standard call signs. These issues included incomplete or inaccurate information, ambiguous wording, delayed message transmission, unclear language, and lack of proper monitoring by the intended recipient. Such communication errors pose significant safety risks, emphasizing the critical need for using standardized language and procedures in aviation to reduce ambiguity and ensure clear and effective communication between pilots and controllers.⁶⁵

An International Air Transport Association (IATA) study highlighted the widespread issue of non-standard and ambiguous phraseology used by ATC, which was reported as the most significant communication challenge by 2,070 airline pilots. The report confirmed that "the use of standardized phraseology is one of the most fundamental factors in the process of communication as it allows efficient and effective communication that prevents barriers in language, while simultaneously reducing the risk of misunderstanding."⁶⁶ In terms of the procedures or steps that need to be taken in order to better or enhance the efficiency of English language communication, the ICAO has studied various conducive methods and training approaches. Some of these were the following:

- Utilizing technology to help guarantee clear Air Traffic Control (ATC) communications;
- Expanding the duration of training;
- Consistent use of a communicative approach to teaching English language implementation in an aviation setting;
- Monitoring the students' and trainees' progress;
- Enhancing learner motivation;
- Application of training activities and content;
- Monitoring the feedback provided;
- High-stakes testing methods;
- •Sensitivity towards specific groups and their needs (mainly those who speak English as a second language);
- •Safety, Human Factors and Crew Resource Management (CRM).

⁶⁵ Dale Wilson, Hearing - and understanding the spoken word is crucial to safe flight, Flight Safety Foundation (Oct. 20, 2016), https://flightsafety.org/asw-article/failure-to-communicate.

⁶⁶ IATA, Phraseology Study (2011), www.iata.org/contentassets/7a5cd514de9c4c63ba0a7ac21547477a/phraseologyreport-ed-1-2011.pdf; Sonia Bush, A Qualitative Phenomenological Study Exploring Aviation Communication Experiences of North American Pilots 36 (Ph.D. dissertation, Walden University, 2021), https://scholarworks.waldenu. edu/cgi/viewcontent.cgi?article=10974&context=dissertations.



Figure 1: Building Effective Communication Skills in Aviation Training⁶⁷

All these methods and approaches were based on longitudinal studies and research carried out to achieve better results. It is also noted how crucial it is to have trainees practice using the ICAO Rated Speech Samples, as well as studying the social and personal impact of aviation English training on the learners.

V. Procedures for Enhancing English Language Communication in Aviation

Effective communication between ATC and pilots is essential for ensuring flight safety and efficiency. ATC relies heavily on clear and precise radio communication to manage air traffic, especially during critical phases such as take-off and landing. At these times, all pilots in the vicinity must be fully aware of their position and intend to maintain safe separation and prevent collisions

Miscommunication in these contexts can lead to serious, potentially fatal accidents, making it imperative that radio transmissions are both clear and easily understood. While a solid understanding of the English language is important, pilots must be also proficient in the specific phraseology required in aviation. Where daily English might render the number "270" as "two-seventy" or "two-seven-oh," for example, pilots must articulate it as "two-seven-zero" to avoid confusion. Although this specialized language may initially seem challenging for student pilots, it becomes second nature with experience, forming a critical component of safe flying practices.⁶⁸ In aviation,

⁶⁷ Faster Capital, Enhancing Communication Skills in Aviation Training, https://fastercapital.com/topics/enhancingcommunication-skills-in-aviation-training.html.

⁶⁸ Learn to Fly, English Language Skills and Radio Phraseology: Effective Communication in Aviation (Aug. 1, 2023),

English serves as the global standard for communication, making it crucial for all professionals, such as pilots, air traffic controllers, and ground staff, to communicate effectively. Recognizing this importance, they are offered extensive training designed to improve language skills tailored to aviation scenarios. Effective communication in aviation encompasses several key aspects.⁶⁹

1. Safety Considerations: Accurate and clear communication is critical to avoid misunderstandings that could lead to hazardous situations during flights.

2. Regulatory Requirements: ICAO requires a specified level of English proficiency for aviation personnel to ensure a consistent understanding of international operations. Requires development of ICAO provisions concerning standardized English language testing requirements and procedures.

3. Operational Efficiency: Mastery of English facilitates smoother interactions between international teams and ground staff, promoting faster decision-making and problem-solving.

Recent research has increasingly focused on communication errors in aviation, yielding diverse findings on how they affect pilot performance.⁷⁰ It found that pronunciation errors rarely hindered communication in simulations, particularly among speakers of similar languages, in English as a lingua franca setting. In contrast, some authors have highlighted the dangers of imprecise communication, emphasizing its potential to cause fatal accidents.⁷¹ The other experts observed the relationship between flight conditions (speed of ATC transmission, amount of information transmitted, workload, and radio frequency congestion) and communication accuracy, namely, a decline in communication clarity when pilots faced information overload.⁷² An interesting approach found that pilots, despite external communication challenges, prioritize tasks, attention, and flight safety.⁷³ Collectively, these studies stress the importance of

https://learntofly.edu.au/english-language-skills-and-radio-phraseology-effective-communication-in-aviation; Hayani Hamzah et al., *Communication Competence in Pilot-Controller Interactions: Repair and Accommodation Strategies*, 22:3 GEMA ONLINE J. LANGUAGE STUD. 176-95 (2022).

69 ICAO, supra note 42, at 1-3, 1.4.2.

70 Gökhan Demirdöken & Derin Atay, Enhancing Aviation English Competency: A Simulation-based Approach for Aspiring Pilots, 76:1 ENG. SPECIFIC PURPOSES 106-21 (2024).

71 Malila Prado, The Pragmatics of Aeronautical English: an investigation through Corpus Linguistics [A Pragmática do inglês aeronáutico: uma investigação pela Linguística de Corpus], 29:2 J. LANGUAGE STUD. [Revista de Estudos da Linguagem] 4 (2021); Noriko Ishihara & Malila Prado, The Negotiation of Meaning in Aviation English as a Lingua Franca: A Corpus-Informed Discursive Approach, 105:3 Mod. LANGUAGE J. (2021).

72 Brett Molesworth & Dominique Estival, Miscommunication in General Aviation: The Influence of External Factors on Communication Errors, 73:4 SAFETY SCI. 75 (2015).

73 Alexander Thorpe et al., Pilot Errors: Communication Comes Last, 149:5 SAFETY SCI. (2022), https://www.sciencedirect. com/science/article/abs/pii/S0925753522000261. English proficiency for pilots, making comprehensive language training essential to prevent miscommunication-related accidents.

"Lexical knowledge"⁷⁴ is also vital for pilots, as it was suggested that understanding specific vocabulary is the key to group identity and effective communication.⁷⁵ Aviation English learners need robust vocabulary training, a topic explored by two researchers who found that memory-based vocabulary learning led to better outcomes.⁷⁶ These efforts underscore the need to support student pilots' vocabulary growth, which is why we explore the impact of simulation-based vocabulary training. Simulation training helps students apply theoretical knowledge in practical settings. The use of simulations, traditionally applied in flight training, for language learning in aviation is unfortunately limited.⁷⁷

Additionally, integrating technology into vocabulary extension will be of great help. Artificial intelligence (AI) is increasingly influential in aviation, impacting areas like flight planning, navigation, weather forecasting, and maintenance. It also supports aviation communication through technologies like automated speech recognition, natural language processing, and voice synthesis, which can reduce human error and improve communication clarity.⁷⁸

AI enables new interaction methods, such as between pilots and aircraft systems or air traffic controllers and unmanned aerial vehicles (UAVs). To improve communication in this AI-driven context, it is essential to understand AI's capabilities, interact effectively with AI agents, and stay alert to potential malfunctions. The globalization of the aviation industry has also created an even larger barrier to overcoming certain miscommunications. Language barriers and cultural differences can impact message comprehension, trust, and rapport. To address these challenges, enhancing communication skills is crucial, including language proficiency, intercultural competence, and empathy. Mastery of aviation-specific phraseology and familiarity with idiomatic expressions are essential. Equally important is understanding the cultural norms of communication partners and adapting communication style accordingly, while showing respect, avoiding stereotypes, and

^{74 &}quot;Lexical knowledge" refers to the understanding and use of words and vocabulary in a language.

⁷⁵ Averil Coxhead, Academic Vocabulary, Writing and English for Academic Purposes: Perspectives from Second Language Learners, 43:1 RELC J. 137-45 (2012).

⁷⁶ Derin Atay & Cengiz Ozbulgan, Memory Strategy Instruction, Contextual Learning and ESP Vocabulary Recall, 26:1 ENG, SPECIFIC PURPOSES 39-51 (2007).

⁷⁷ Id.

⁷⁸ Faster Capital, Aviation Communication Training Services: How to Improve Your Communication Skills in Aviation, https://www.fastercapital.com/content/Aviation-Communication-Training-Services--How-to-Improve-Your-Communication-Skills-in-Aviation.html.

fostering appreciation for diversity.79

Moreover, in the aviation industry, effective communication goes beyond verbal and written forms, encompassing non-verbal modes such as gestures, facial expressions, and body language, as well as visual media like images, videos, graphs, and charts. These multimodal forms of communication provide supplementary cues and feedback, enhancing clarity and understanding. For instance, non-verbal gestures convey emotions, while graphs can present data efficiently. To improve communication, one must learn to effectively integrate these multimodal elements with verbal and written forms, choosing the most suitable method for each context and purpose.

Speech training is crucial to enhance the effectiveness of English language communication. It has been studied that not only phraseology and grammar but also voice projection and articulation are of extreme importance. According to an article on the Everyday Speech website,⁸⁰

Pilots rely on communication to receive and transmit vital information to air traffic controllers, crew members, and other aircraft. Any communication breakdown can lead to misunderstandings, errors, and potentially dangerous situations. Pilots face unique challenges in communication, such as dealing with high levels of background noise, time constraints, and complex aviation terminology. Therefore, it is imperative for pilots to develop clear and concise speech to ensure effective communication in all situations.

Therefore, it has been highlighted that "Speech Training" must be one of the requirements of aviation English communication. "Speech training is a specialized form of training that focuses on improving communication skills, including speech clarity, pronunciation, voice projection, vocabulary, and listening comprehension."⁸¹

Speech training is crucial for pilots to enhance their communication in highpressure situations, minimizing the risk of miscommunication and improving flight safety. Effective communication depends on clear pronunciation, articulation, and strong voice projection to counter background noise. As mentioned above, mastery of aviation-specific terminology and vocabulary is also essential, as it ensures that pilots communicate clearly with colleagues and air traffic control. Additionally, strong listening and comprehension skills are critical to understanding instructions

⁷⁹ Atay & Ozbulgan, supra note 76.

⁸⁰ Everyday Speech, Enhancing Communication Skills for Pilots: A Deep Dive into Speech Training (2024), www. everydayspeech.com/sel-implementation/enhancing-communication-skills-for-pilots-a-deep-dive-into-speech-training.

and maintaining situational awareness. Through such training, pilots can effectively manage communication tasks in dynamic environments.⁸²

To further develop these skills, pilots can employ several strategies. Practicing pronunciation through specific speech exercises, such as tongue twisters, can help improve articulation. Voice projection exercises, like projecting from the diaphragm and adjusting tone, aid in speaking clearly over cockpit noise. Expanding aviation vocabulary through reading manuals and using flashcards enhances understanding of industry-specific language. Active listening exercises, such as summarizing radio transmissions, build comprehension skills. Overcoming communication challenges, including background noise, time constraints, and accents, requires the use of noise-canceling headsets, concise communication, and familiarity with various accents encountered during flight operations. By integrating these multimodal techniques and taxonomy, pilots and air traffic controllers can communicate more effectively and maintain a high level of situational awareness and build a more standardized approach to the investigation and reporting of language factors in any aviation scenario.⁸³

A comprehensive systematic review of approximately 5,000 aviation accident reports, conducted by researchers at Embry-Riddle Aeronautical University,⁸⁴ has uncovered significant insights into the role of communication in aviation safety. The study, which covers reports from 1990 to 2012, reveals that language factors frequently emerge as critical, yet often subtle, elements in the chain of events leading to aviation disasters.⁸⁵ This discovery highlights a challenge for investigators, who may struggle to identify and address communication-related issues that are not immediately apparent. It must be noted that the necessity for enhanced support for accident investigators, including improved tools and training to better analyze and address potential language factors.⁸⁶

82 Id.

86 Id.

⁸³ ELIZABETH MATHEWS ET AL., LANGUAGE AS A FACTOR IN AVIATION ACCIDENTS AND SERIOUS INCIDENTS: A HANDBOOK FOR ACCIDENT INVESTIGATORS 9-10 (2023).

⁸⁴ James Roddey, Groundbreaking Book Examines Role of English Language Proficiency in Airline Accidents, ERAU NEWS (Mar. 9, 2020), https://news.erau.edu/headlines/groundbreaking-book-examines-role-of-english-languageproficiency-in-airline-accidents.

⁸⁵ Id.

VI. Conclusion

In fact, numerous aviation accidents and incidents have been linked to communication problems, indicating the need for strict language proficiency standards. We have tried to help improve safety by enhancing communication standards. In conclusion, enhancing aviation safety through effective English language communication involves addressing regulatory challenges, improving training programs, and understanding the multifaceted nature of communication in aviation. The lawmakers must minimize the risk in the operation field and new language standards and rigorous requirements are needed to ensure the safety of global air travel.

The ICAO requires aviation professionals (flight crew, air traffic controllers) to take English language exams to prove their capabilities to communicate during ground and flight operations. This kind of skill is crucial for safe operation. Anyhow they are not "machines," they know the rules, and they have licenses to work but tend to forget or ignore these rules with time due to other internal or external effects, whatever. These situations may cause accidents or incidents, which is a grave concern. Therefore, aviation safety is a top priority and jeopardizing it cannot be an alternative. As it has been introduced, human errors affect the safety records of the civil aviation industry to the utmost.

Therefore, paying more attention to communication challenges has always been a point at issue and the proper solutions lie not only in regulation but more in training (education), and practical matters. Primarily, applied linguists are involved in teaching and research, the content of which is highly relevant to the broader aviation community. The operational training for aviation personnel often lacks adequate English language instruction, which is essential for effective communication in diverse aviation environments. This gap increases the potential for miscommunication, given especially that aviation English lacks native speakers.

The ICAO introduced language proficiency requirements for the global aviation industry in 2003. While these standards have been adopted by the Member States, there remains a lack of uniformity in training and testing protocols. On top of that, there is insufficient safety oversight in the implementation of these standards, leading to discrepancies in testing protocols across different countries. This is a major issue as civil aviation surveillance together with the ICAO safety oversight audits are the key to guaranteeing a safer environment for licensed flight crew, ATCOs, and other aviation ground professionals. As the global demand for pilots continues to rise, this inconsistency in language proficiency standards poses a growing concern from the viewpoint of aviation safety.

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