



IMPROVEMENTS ON ENGLISH LANGUAGE PROFICIENCY OF ATCO AND AFIS OPERATORS OF INFRAERO (ANSP)

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ABSTRACT

The International Civil Aviation Organization (ICAO) preconizes that English proficiency is a crucial element to the aviation safety requirements due to the constant interaction between air traffic controllers or Aerodrome Flight Information Service (AFIS) operators with aircraft pilots during international operations. Most Air Navigation Service Provider (ANSP) worldwide hires air traffic controllers (ATCO) that are already capable to reach level 4 or higher of ICAO English proficiency tests. To reduce the accidents rate is crucial to invest on safety improvements, and one of the indicators that can help is the level of communication between the interested parts. It's known that not all states have inside their ANSP all the air navigation employees with full capacity to offer an air traffic service with a flawless English. That's when ANSP need to invest on education programs to incentivize their operational workforce to study and improve knowledge to reach an operational English proficiency requirement. This article identifies the need of the creation of an English language study group inside Infraero to respond DOC 9835 to spread Aviation English knowledge alongside with phraseology and Plain English to offer better and safe air traffic service to all stakeholders. By following the methodology of a permanent group of work with a defined subject, that will concentrate efforts on the results of the development of courses, pedagogical activities and focused on exchange experiences with other institutions that are experts on the topic. The objective is to complement the operational employees' formation and ensure air navigation and aviation safety conditions. The result achieved was a sequence of managerial actions to support the practices allowing more professionals to attain and maintain ICAO level 4 of English proficiency or higher.

Keywords: ICAO, English, Proficiency, Communication, Safety.

1. INTRODUCTION

Aviation English proficiency it is one of the pillars for communication between two speakers (Air Traffic Service operator and flight crew) that are from different nations. The International Civil Aviation Organization (ICAO) is very clear on DOC 9835 - Manual on the Implementation of ICAO Language Proficiency Requirement when establishes the guidelines of capacitation and control of the level of English proficiency of the Aerodrome Flight Information Service operators, Air Traffic Controllers, and pilots.

Communication between pilots and controllers is the foundation of air traffic control (ATC; Hopkin, 1995), yet air-ground communication is in many respects the weak link of the system, with many accidents attributed to improper or misunderstood communications (Morrow, Lee, & Rodvold, 1993; Nolan, 1999; Prinzo, 1996; Prinzo & Britton, 1993).

Aeronautical Safety is deeply dependent on the procedures adopted by all operational and non-operational stakeholders and actors that are involved in aviation.

English proficiency is one important key factor in the operation of a safe and reliable air navigation system.

Brazil is a South American country with one of the greatest aircraft fleets of world and the potential to lead the aeronautical industry in our region. But despite of that, the educational system on English capacitation of our population is very incipient. In some countries around the world, it is part of the culture of the educational system the introduction from the basic education to the superior level the teaching of a second language, and this does not occur in Brazil.

According to DOC 9835, in 1998 ICAO Assembly identified an increase of number of accidents where the language proficiency of the pilot or the air traffic controller were casual or a contributing factor for the accidents. And with the reduced number of accidents caused by mechanical failure, the attention was focused on the human factor, on DOC 9835 is expressed: *“Communication is one human element that is receiving renewed attention”* because of its complexity and high possibility of different interpretations of the same topic

depending on the way that communication is done.

To maintain the levels of Safety on the highest patterns, Infraero, following the recommendations of the Brazilian Airspace Control Department - DECEA, decided to implement an English proficiency capacitation program, to respond the recommendations of the superior authorities and obviously to ensure Safety among the air navigation system that they are responsible.

Aeronautical phraseology was for many years a great tool for the aeronautical crew members and air traffic services providers, because it contains lot of expressions that synthetize situations and make the communication happen. But with the growth of traffic and different kind of normal and abnormal situations, ATCO and AFIS operators alongside with pilots cannot rely only on phraseology, they need to perform a seamless communication in English to give and receive commands that can assure the Safety of air navigation operations.

Since in our country we face the problem on English capacitation, our entities needed to act to provide this knowledge to our ATCO and AFIS operators. There are two programs, that Infraero took to increase the ICAO level of proficiency of its operators:

- Intensive English Language Training Program for Air Navigation – IPNA;
- Immersive English Course at FAA at Oklahoma.

This article refers to the reality of Brazil’s ANSP *“Empresa Brasileira da Infraestrutura Aeroportuária”* – Infraero which despite of providing airport infrastructure it also provided an Air Navigation Service that managed several Towers, Radios, Procedural APP and Radar APP until June of 2021. Infraero had a number of 666 Air Traffic Controllers and 141 AFIS operators, not all of them work at an operational position by the year of 2021. Some of them develop administrative procedures that are inherent to the Air Navigation process. These professionals are responsible for conducting the majority of civilian air traffic service in a country with continental dimensions with huge borders with other Latin American countries and a tremendous oceanic area to deal with.

This study will analyze the efforts that were already implemented by Infraero and DECEA in Brazil to respond DOC 9835 in order to spread the Aviation English knowledge alongside with phraseology and Plain English to offer better and safe air traffic service to all stakeholders and propose some reviews of the methods used by these agents on English capacitation of the interested parts in order to raise the level of consciousness to the Safety importance of having a select group of employees inside Infraero that are capable to face and solve air navigation demands in another language rapidly and safely.

2. METHODOLOGY

Infraero has been adopting and maintaining an English language training system for Air Navigation for years, and this company needs a study that covers and propose a methodology that will be able to take advantage of the already trained workforce. Which means, to offer an opportunity for the talents that the company has in the EPTA (Air Traffic and Service Telecommunications Provider Station) network, especially the employees with ICAO level 6 and 5 to share their knowledge, but since Infraero was struggling economically, this help was expected to be volunteer, becoming “less attractive”. By the better use of such a specialized workforce, through the development and growth of professionals the study proposes the creation of a group of studies aimed at applying a more economical and efficient training modality.

The proposed Infraero English language study group will do research and will be responsible for creating trainings, workshops, specific events to establish an internal culture in Air Navigation, aiming at encouraging and sensitizing air traffic controllers and AFIS operators to the importance of safety and excellence of this subject for the flight service provided in Brazilian aviation.

This permanent work group composed by those employees with high English proficiency capacity that will volunteer themselves to be part of Group of English Study ICAO Level 4 (GESIL4). They will receive the benefits of being instructors at the company.

Currently IPNA, which is the main English capacitation program of Infraero, has generated a constant occurrence of overtime due to the study modality adopted. It is proposed to follow an action plan that follows the recommendations coming from the Air Navigation regulatory agency, the Airspace Control Department - DECEA, creating an internal solution for the cost and low adherence to the training program in question.

The trainings initially aim to attend the same IPNA target audience with all levels of English, but with mandatory participation through the availability of operational scales, thus creating an internal training as occurred with the Quality process in the Air Navigation Safety Management System - SMS.

To examine the situation of the target audience of this paper, a survey was applied among Infraero’s operators with the objective of understand the importance of English proficiency.

In this way, a Google Form with 25 questions named “Importance of English language proficiency for Infraero Air Traffic Controllers and AFIS Operators” was elaborated, to run a diagnosis of information and opinions/impressions of air traffic controllers of APP, Towers and AFIS operators about the significance of the English language in their professional and personal life, their opinion about the methodologies used by Infraero to train and capacitate the operators and finally to ask some questions about what others methodologies could be used to develop their language skills.

The survey was directed to ATCO and AFIS operators from Infraero in the period of September 2020 to February 2021. The population of the survey was 807 employees. There were 172 answers to the form, the sample error was 5% and the confidence interval was 90%.

The following 8 graphics illustrates important information concerning topics of age range, level of education, domain of the English language, confidence when speaking on radiotelephony in English, importance of learning a language to work in aviation, and other topics.

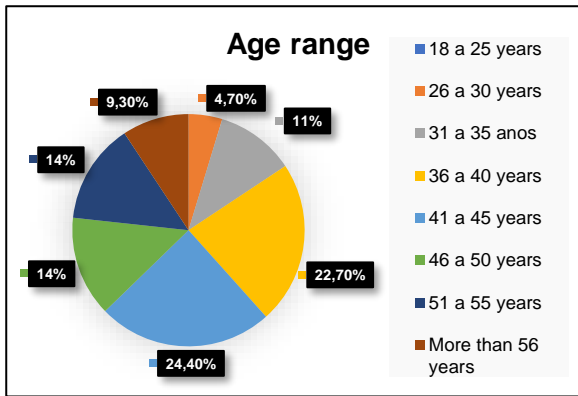


Figure 1 - Survey question 2. Source: Own elaboration.

Regarding the age range, there is a very diversified scenario in the sample where none of the employees who answered the survey declared to be between 18 and 25 years old. 4.70%, equivalent to 8 answers, declared to be 26 to 30 years old. 11%, equivalent to 19 respondents, declared to be 31 to 35 years old. 22.70%, or 39 people, declared to be 36 to 40 years old. The majority 24.40% (42 people) stated they were between 41 and 45 years old. 14% (24 people) confirmed being 46 to 50 years old. 14% (24 people) declared they were between 51 and 55 years old. And finally, 9.30% (16 people) of the interviewees reported being over 56 years old.

From the sample who answered the survey, 84.40% has the age above 36 years, which reinforces the hypothesis of Infraero's having an old public to deal with when it comes for starting to train the English language for ATS.

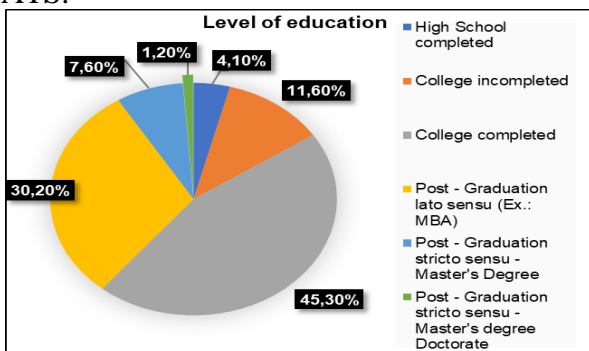


Figure 2 - Survey question 3. Source: Own elaboration.

According to the answers about the level of education, 4.10%, corresponding to 7 people, responded that they still have the same level of education required for the position of ATCO or AFIS operator since the public contest to work at Infraero. 11.60% (20 people)

stated that they had an incomplete college degree. 45.30% (78 people) affirmed having completed the higher education level. An interesting fact is that 30.20% (52 people) of the interviewees have a lato sensu post-graduation degree. 7.60% (13 people) stated that they had a stricto sensu post-graduation - master's degree. Finally, 1.20% declared they had a stricto sensu post-graduation - doctorate. These data reveal a sample of mature professionals who have been specializing, mostly encouraged by the financial benefit related to the incentive to study that Infraero pays to its professionals.

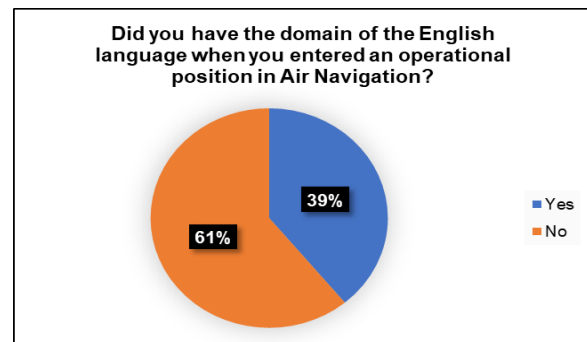


Figure 3 - Survey question 4. Source: Own elaboration.

61% (105 people) reported that they were not proficient in English when they entered an operational position in air navigation. And 39% (67 people) stated that they were proficient in the language when they occupied an operational position. This means that a high number of people recently hired by Infraero entered air navigation without being able to communicate in English. This demonstrates the need for stricter criteria for hiring, such as requiring the TOIC exam (as in foreign countries) or applying during the selection of the position the English language as an eliminatory content.

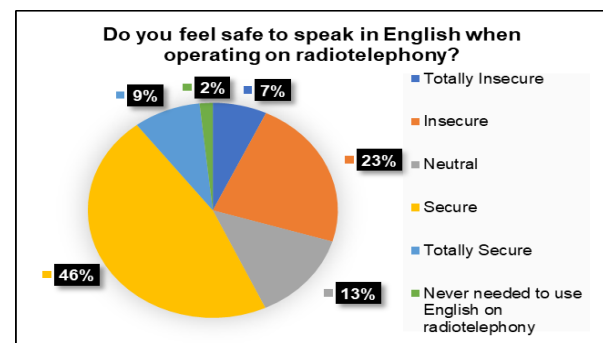


Figure 4 - Survey question 12. Source: Own elaboration.

In the graph above it is illustrated the confidence levels of operators when operating in English in radiotelephony. 46% (80 people) feel secure. As well as 9% (15 people) feel totally secure. On the other side, 7% (12 people) declares that they feel totally insecure to operate in English, 23% (39 people) state that they feel insecure to operate and 13% (23 people) report feeling neutral to the situation and 2% (3 people) never needed to use English on radiotelephony. This portrait shows how operators feel when facing the language barrier combined with a complex professional activity that demands a lot of mental load. The diffusion of the culture of English language practice is necessary to raise the confidence levels of air navigation operational employees and consequently increase the levels of safety.

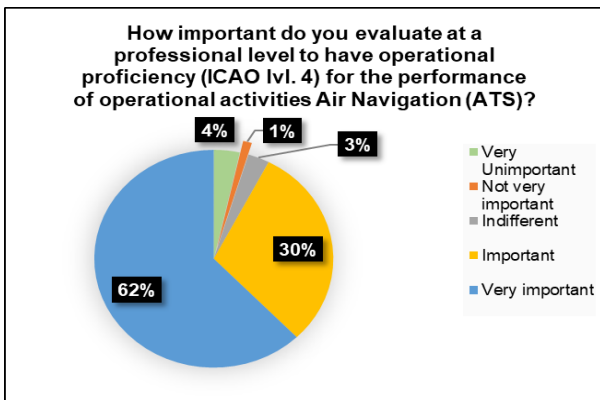


Figure 5 - Survey question 15. Source: Own elaboration.

4% (6 people) considered it very unimportant to have operational proficiency (ICAO level 4) to work in air navigation. 1% (2 people) evaluated that it is not very important to have operational proficiency in English. 3% (5 people) think that it is indifferent to have ICAO level. But for 30% (52 people) of the respondents, it is important to have the operational level proficiency. And finally, 62% (107 people) assure that it is very important to have ICAO operational level 4. This means that even though the employees do not have a deep knowledge of the English language, they understand that at the professional level there is a great need to have a level of English that helps in the performance of air traffic service. It was registered the fact that there are still air navigation operators who declares that professionally, mastering a

foreign language cannot contribute to a better performance of the profession.

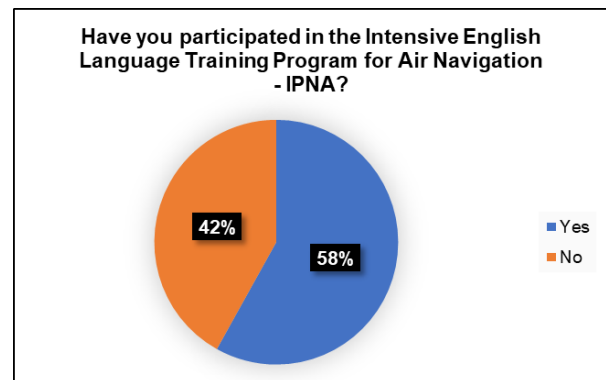


Figure 6 - Survey question 18. Source: Own elaboration.

Although IPNA has been implemented for some years now, a good number of air navigation employees, specifically ATCOs and AFIS operators have not yet had the opportunity to participate in an intensive English language training program. It is known that many times the non-participation is because EPTA is not the target audience of the program, consequently a good number of employees may not have had the opportunity to participate in such training. Which reinforce that due to financial problems, Infraero was able to focus the English trainings only at international airports. Of the interviewees, 58% (100 people) answered that they had already taken the IPNA, and 42% (72 people) stated that they had not had the chance to take the IPNA yet. This shows the need to expand both the target audience and the scope of this training program to include a larger number of operators who need English language training.

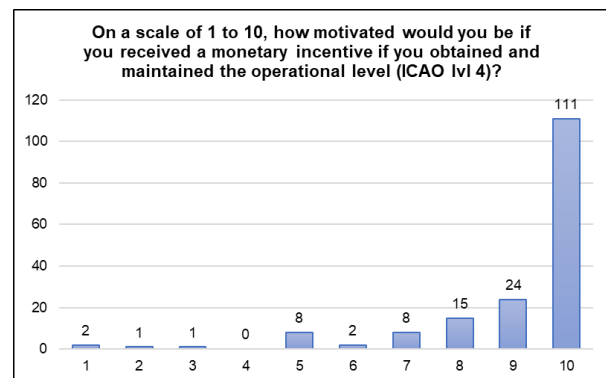


Figure 7 - Survey question 20. Source: Own elaboration.

This question meets one of the proposed objectives for improving English language

communication for ATCOs and AFIS operators of this article. And it reflects not only a reality, but also a need that the operators have for both English proficiency and an incentive to achieve and maintain it. It is known that there will be an increase in costs, but the survey and the research indicate that this is one of the best tools to maintain acceptable levels of English proficiency among Infraero operators. This demand has not been conquered within Infraero for external and specific reasons, but for Nav Brasil this is a plausible proposal, since it is a future air navigation company. By granting a financial incentive for employees who reach levels 4, 5 or 6 of ICAO, a large number of employees, as shown in the chart above, will be trained to master the language, thus creating a positive chain of knowledge.

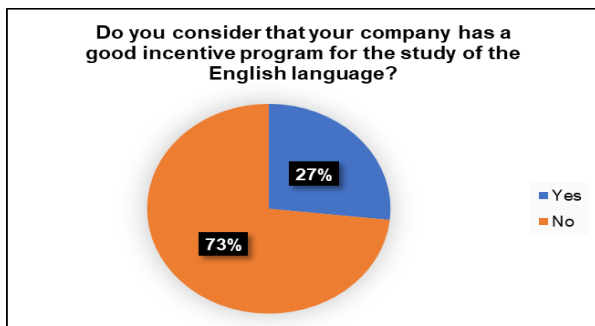


Figure 8 - Survey question 24. Source: Own elaboration.

The policy of study incentives through reimbursement present in the IPNA is considered by 27% (46 people) of those interviewed as a good incentive program by Infraero. However, for 73% (126 people) the company does not offer a good study incentive program for practicing English. This represents the immediate need for a review and reformulation of how to improve the way employees are supported to develop and maintain their language skills.

By the data collected with the survey it can be deduced that Infraero were facing difficulties with the operational crew (ATCO and AFIS operators) considering English Proficiency capacitation. Even with the measures taken until the moment of the present research, this study concludes that complementary actions must be executed by the managers of the Superintendence of Air Navigation of Infraero.

3. MANAGERIAL ACTIONS OF INFRAERO

The strategy on English Proficiency for air navigation operators inside Infraero, must establish priorities and elevate the level of charge through rigorous application of tests. Another point to be evaluated is to evolve inside the operators the culture of the importance of having a second language to work in the aviation business, in this case English is fundamental and it is an obligation by ICAO. Today, there is no setback to not having an English proficiency level of 4 (Operational) or higher. Even though, due to characteristics of our country (continental dimensions with a non-native population in the English language) and the fact that most employees inside Infraero are in a high age group and were hired when English was not a requirement, this management peculiarity created a lack of proficiency on the language.

The following topics will describe a set of operational guidelines and below the topic there is the explanation of how each of them will be performed on this study. They will compose a portfolio of actions to be developed and applied in the future.

- Creation of a permanent group of work to develop English capacitation courses, pedagogical activities and exchange experiences;

On this article it is proposed that a group of remarkable English instructors, professors, researchers that already works among Infraero's ATCO and AFIS operators, most of them with ICAO Proficiency level 5 or 6, to be part of the Group of English Study ICAO Level 4 (GESIL4). The objective is to complement our operational employees' formation and ensure air navigation and aviation safety conditions by applying small courses to develop the level of English of those operators that are having unsatisfying results on EPLIS (SISCEAB - Brazilian Airspace Control System - English Language Proficiency Examination). In a way that the most experienced (ICAO level 6) will train other operators with lower level of proficiency and creating a chain of knowledge.

To fulfill the objective the GESIL4, which is an Air Navigation initiative, the

members will have access to all English capacitation resources inside Infraero and will propose new methodologies to approach the teaching of English to the necessities and requirements of the operators. The strategy is to train the ATCO and the AFIS operators at Infraero with lower costs than the ones used until nowadays and more effectively.

On this pandemic time, we were instigated to find new solutions, and the remote work has broken many paradigms, so that now the costs of moving a team to develop or apply a language course can be reduced, after all the process can be done via videoconference. Thus, all travel and accommodation costs can be reduced to optimize the whole training process, including the possibility of inviting professionals from other countries or cities to contribute to the aviation English language proficiency process.

- Organization of the event “Phraseology Week” in 2021 with the suggestion of the focus on English language;

From 2018 to 2019 the DONA (Infraero’s Air Navigation Superintendence) executed an action called Phraseology Week after the conclusion of a working group that decided, due to lack of investments, a complete training of phraseology could not be able to be applied on all EPTA of Infraero around Brazil.

Due to the short period of time and budget restrictions, the working group established as a standard format of the event, a workshop for ATC and AFIS operators operating in Control Towers, Approach Controls and/or AFIS. In order to provide the themes to be observed at the workshop and to raise awareness among the target audience, the monitoring tools already consolidated in the network should be used. The tools must provide real data to enrich the content of the event to be held and contribute to the recycling of information for operators and may also serve as a good source of material for the elaboration of the workshop.

The event can include lectures on the theme, advertisements via e-mail, murals etc. It should include an awareness lecture with the operations area of the airport, using examples occurred in the locality or that are of knowledge of other EPTA, subsidized by the Safety Management System (SMS).

For 2021, it was encouraged, as a suggested theme, managers and employees involved in the process to focus on English Language Phraseology and its applications in ATC and AFIS, in addition to those contained in the legislation of DECEA MCA 100-16 Air Traffic Phraseology, such as: the impacts that not knowing the English language can have on air navigation operations, possible consequences such as incidents and accidents, and the lack of English language proficiency, as well as the lack of English phraseology can affect the SMS performance.

- Encourage the use of the air traffic control simulator for the training of situations of use of the English language in addition to the phraseology;

In the past years Infraero bought computers and a software to execute trainings on 3D simulators on the EPTA that has Control Towers. On the same package there are communication devices that can simulate ATC communications between ATCO and pilots, this ambient is suitable for the practice of English phraseology and other types of proficiency training.

As a recommendation of this study, and by knowing of this installed computational infrastructure, each EPTA that has these devices should develop inside their training program of the ATCO an instruction plan to build an environment where the trainers may familiarize with authentic traffic situations and English phraseology as well as critical and normal situations with this foreign language.

- Analysis of IPNA program and EPLIS;

The IPNA is a program created by Infraero with the objective to make feasible the training of employees in the Air Navigation area who perform operational activities directly related to oral communication, in the use of the English language, subsidizing their participation in English language courses, in teaching institutions, until they reach the Advanced Level of knowledge in the language or Operational Level 4 in EPLIS (whichever comes first), applied by DECEA/ICEA, as established by ICAO.

On the present study, access to the IPNA archives were granted and it was possible to reach information about the students that are

performing the trainings to prepare themselves to the EPLIS examination applied by DECEA/ICEA during the year of 2012 and access to a historic of performance of the students on EPLIS from 2007 to 2012. The EPLIS exam that is composed of 2 phases: the first phase is done on the computer and consists of 30 questions with 3 alternative answers, with the statement and alternatives in Portuguese and the audio of the question in English. The test lasts 70 minutes and the candidate is ready for the next phase if he/she gets 2/3 of the test (20 questions) right. In the second phase, the candidate is interviewed by two professionals, one interlocutor and one evaluator, who measure the candidate's performance in the use of general English, but with an aeronautical focus, in speaking and understanding, according to the descriptors of the Scale of English Language Proficiency Levels established by ICAO.

- Review of IPNA Manual;

The IPNA program is one of the main initiatives of Infraero on English capacitation and it is important in many aspects, but the time has come to Infraero managers reanalyze the prerogatives inside the program's manual like its forces and weakness and resubmit it with new rules.

The items of the IPNA manual needs to be discussed on creating manners to make the employee to take the training more seriously through clauses in the manual that provide for greater punishments and that require the enrolled employee to fulfill the full course load of the program which is 48 months. One of the problems that this program deals with is about disconnection and reimbursement. In some cases, the employee leaves the program without a fair justification and all the money invested on its capacitation is lost. There's a necessity to define ways to prevent that Infraero loses its investment on the capacitation of the student. So, it needs to be clear that even when the participant of the program fulfills the entire course load, if he or she was not approved on EPLIS examination they would have to reimburse all the investment and the overtime hours back to Infraero.

- Study to establish new rules for financial bonus as an incentive for operators that attain the ICAO Operational Level (Level 4) or above;

Infraero has a development program with incentives for employees who have undergraduate, graduate and master's degrees to study through financial compensation of a percentage on the base salary.

It is evidence that both the International Civil Aviation Organization, the Airspace Control Department and Infraero carry out English language training projects through specific programs for both air traffic controllers and aeronautical telecommunication station operators who can reach different levels (from 1 to 6) of English language proficiency after taking ICAO exams. Ideally, operators should reach operational proficiency level (4) or higher.

The proposition that this study provides is that Infraero, if applicable, starts to offer a financial incentive, a bonus in salary, to operational employees who reach ICAO proficiency levels 4, 5 and 6. Thus, the bonus in the employee's salary, under these conditions, will allow the employee to be recognized for the personal effort made to achieve the required level, and consequently, if he loses the qualification he will lose the bonus.

Currently the percentage of the educational incentive that Infraero offers varies according to the employee's level of education. If the employee occupies a mid-level position and has a college degree, an additional 7% of base salary is provided. If the employee occupies a senior position and holds an MBA or specialization, an additional 9% of base salary is provided. If the employee has a master's or doctorate degree, the additional base salary is 11%.

The present study proposes a similar logic of bonification for the ICAO English language proficiency level:

- An additional of R\$ 200,00 on base salary for the ATCO or AFIS operator who reach ICAO English proficiency level 4;
- An additional of R\$ 300,00 on base salary for the ATCO or AFIS operator who reach ICAO English proficiency level 5;

- An additional of R\$ 400,00 on base salary for ATCO or AFIS operator who reach ICAO English proficiency level 6.

The above proposal is not only the most desired by the employees, but also the most daring since it involves high costs for the company.

- Organization of English training courses in company;

Infraero has the content for Air Navigation, specifically for IPNA and EPLIS that is hosted inside an educational platform of Infraero called Infr@educ from Infraero University. This ambient is based on Moodle technology and is designed for distance learning mode.

In a first analysis, the costs involved in the process of organizing English training courses in company would not bring a very significant cost for Infraero, since it only requires hiring an English teacher to analyze the content of the digital platform and guide a regular employee to make the macro adjustments. The problem is that on the platform the contents are partly disorganized and outdated, requiring a dedicated work group to update all the material.

4. CONCLUSION

With the present study, it can be deduced that there are obstacles for improving English language communication inside the Brazilian public company and the main one is the human factor combined with financial restrictions and this is a difficult scenario to overcome, this premise was present on Infraero's reality.

Analyzing the data and the impressions collected during the research, it was possible to realize by the results that the employees are not deep interested on study of the English language applied to aviation purposes. One of the reasons for this is that being Brazil a country with continental dimensions, some localities are on cities or regions more remotes with poor interaction with international air traffics which can contribute to the sensation that having English proficiency is not important.

Another point is that Brazil has a cultural difficulty for being a country that teaches basic education, in general only in Portuguese, this

condition affects the quality of the specialized work force offer. This combined with the resistance that older employees in the company have in learning a new language, makes the scenario even more problematic to overcome.

Since 2013 Infraero do not hires professionals, and the current work force are becoming old, and with less incentive to study they will remain in the same condition. Infraero does not have spare employees to replace others vacancy and the impression is that the model managed by the company for some locations, was used only to obtain overtime by those enrolled in the IPNA, with poor operational results.

There are many activities that requires the Infraero's Air Navigation Superintendence - DONA attention, but one accident is responsible for changing all the process and highlight deficient aspects that were hidden. This article emphasizes a latent problem that is gradually increasing and that can be a contributing factor to an aircraft incident or accident as foreseen in ICAO documents. It is important that this financial issue is quickly resolved to enable training programs to be implemented to protect operators and the air traffic service. Perhaps this was one of the intentions of NAV Brasil's (Brazilian public company responsible for civilian air navigation services since June of 2021) idealizers when they proposed the creation of the company after Infraero faces its inner issues, to protect the Brazilian air navigation system.

On this research, a specific limitation was the access of data regarding the costs of the courses that were already implemented at Infraero and the historic about the IPNA program. The period that was analyzed was from 2007 to 2012. Even with the request of data to the corresponded area, the study was limited to this period. That is the importance of the survey, to subsidize this article with recent information and impressions from the English capacitation process by the ATCO and AFIS operators of Infraero.

To conclude, the situation that brought limitation to the present research was certainly the pandemic. Performing the research remotely made it quite difficult to have direct access to key people for the process of obtaining information and data that would compose this work. Even so, it was possible to

describe on this article decisions that occurred in the management of the English language training process at Infraero.

For future opportunities this article instigates Infraero / Nav Brasil to the possibility to establish partnership with other public organs such as ANAC that has the same responsibility on capacitating in English language pilots and civil aviation stakeholders and interact closely with the English capacitation areas of DECEA, ICEA and its organisms of research in the field of linguistics specific for aviation and air navigation.

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