

THE POTENTIAL IMPACT OF A VOLUNTARY NON-PUNITIVE SELF REPORT
PROGRAM UNDER THE BRAZILIAN'S CIVIL AVIATION AUTHORITY SCOPE

by

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This Capstone Project was prepared and approved under the direction of the
Group's Capstone Project Chair, Dr. Peter O'Reilly
It was submitted to Embry-Riddle Aeronautical
University in partial fulfillment of the requirements
for the Aviation Management
Certificate Program

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Abstract

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The key recommendation from this study is to purpose the Brazilian National Civil Aviation Authority evaluation over the implementation of a new voluntary and non-punitive safety reporting program, with a different scope from the current one. The voluntary self-reporting programs in place in the USA, Europe and Australia should be used as a regulatory reference and the program development and implementation should be executed in close coordination with the different industry stakeholders.

To access if the current Brazilian State Safety reporting system meets ICAO requirements and its effectiveness, the researchers accessed pertinent aviation safety regulatory legislation. Additionally, to access if the current Brazilian State Safety reporting system is effective, the researchers conducted a survey among 488 airline pilots operating under RBAC 121, and

interviewed the other two stakeholders involved, the safety managers of both ANAC and Brazilian Airlines.

The data found conclude that airline pilots have a culture of self-reporting and the stakeholders interviewed understand that Brazil has a reporting system with the opportunity for further development on important features to make it more effective and raise its level of contribution to flight safety.

Finally, the researchers recommend that there should be an update to the current Brazilian Aviation Authorities voluntary reporting system, in a way that the National CAA be assured to access all the content of each report, but only after the dissemination of the concepts of Just Culture across ANAC and Brazilian Civil Aviation. This update must be created and maintained by system stakeholders focusing on improving the Brazilian Operational Safety Program (PSO-BR).

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Chapter I

Introduction

This research project intends to study the enhancement of the Aviation Safety Report system in the scope of the Brazilian Civil Aviation Authority, ANAC (Agência Nacional de Aviação Civil). The aim is to analyze foreign CAAs (Civil Aviation Authorities) that implemented Aviation Safety Report Programs with an innovative or non-conventional strategy on gathering sensitive information contained on a voluntary and non-punitive program. Besides that, the authors accessed the Brazilian airline pilot's willingness to report their errors to their National CAA.

Brazil has a continental size, making the airline industry a vital industry to connect regions and move people and goods. For this reason, Brazil has the largest airline industry in South America, having more than 600 aircraft registered by the airlines for passenger transportation (ANAC, 2020) and employing more than 5,000 pilots (ANAC, 2020).

According to data from the SIPAER panel, from 2010 to 2021, when it comes to flight safety, we can get an idea of an accident panorama of the last ten years.



Figure 1 – Brazilian panorama of accidents in the last 10 years. Source: CENIPA

From this panorama, these accidents can be divided between accident, major accident, and incident. Another interesting division is by aviation segment that, in the scope of this work, is focused at commercial aviation.

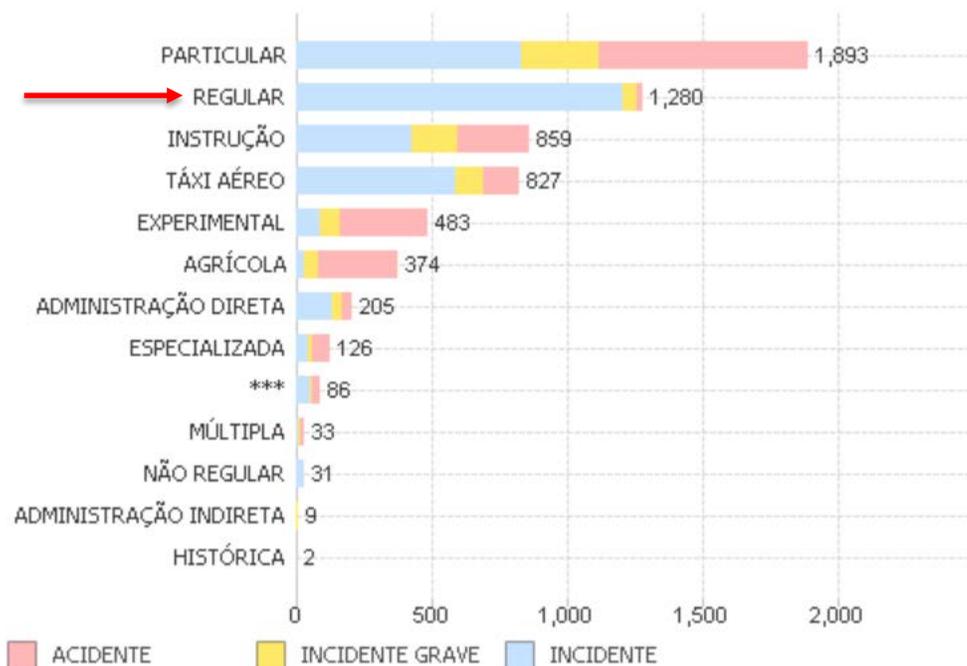


Figure 2 - Accident, serious incident, and incident by aviation segment (Brazil).

Source: CENIPA

Brazil is a contracting state of the International Civil Aviation Organization - ICAO, and it has a solid record in terms of aviation safety. It is rated as Category 1 in FAA's International Aviation Safety Assessment (IASA) Program and presents an excellent ICAO standards implementation level in terms of Safety Oversight.

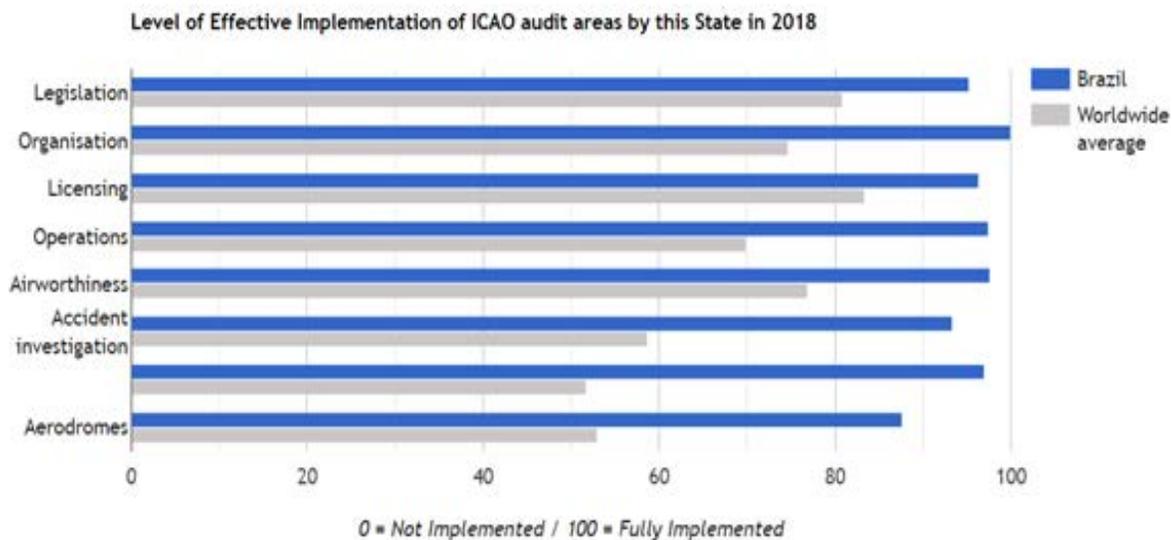


Figure 3 - Comparison of Brazilian Level of Effective Implementation of ICAO SARPs vs World Average. Source: ANAC

Despite this strong performance in terms of safety, the researchers analyzed if Brazil has some room for improvements in the scope of the state safety program. Especially regarding the hazard identification process through a voluntary non-punitive safety-reporting program.

Our project intends to research the implementation of a non-punitive Aviation Safety Report program in the scope of the Brazilian Civil Aviation Authority (ANAC - Agência Nacional de Aviação Civil). Analyzing different non-punitive Aviation Safety Report programs from foreign CAAs (Civil Aviation Authorities) serve as a benchmark for developing the Brazilian Civil Aviation Authority non-punitive Safety Report program.

In the research about non-punitive Safety Reporting, we focused on the Brazilian Civil Aviation Authority Safety Management System regulation. First, the researchers compared it to the FAA Safety regulations and other Civil Aviation Authority non-punitive safety reporting

programs. Then, after assessing three distinct aviation safety regulations, the FAA Aviation Safety Action Program (ASAP) appeared to be relevant in terms of safety reporting. Therefore, that could be used as a framework and theoretical lens for the proposed research.

Problem Statement

The researchers identified possible enhancements on the Brazilian State Air Safety Report (ASR) system. Currently, there is no voluntary Self-Report program in place under the scope of the Brazilian Civil Aviation Authority. Therefore, this project approached programs of this type which are already in place, like the FAA ASAP, the Australian Transport Safety Board (ATSB) Aviation Self Reporting Scheme (ASRS), and the EASA Confidential Safety Reporting program. The aim is to offer a benchmark to help with adjustments to the current Brazilian State Air Safety Report system.

This research also seeks to understand if the implementation of a non-punitive Voluntary Safety Self-Report Program by ANAC could contribute to the Brazilian state safety data information collected through voluntary channels, satisfying the Annex 19 section 5.1. requirements (SDCPS – Safety Data Collection and Processing Systems)

Project Definition

Aviation Safety Management has been evolving since the very first flight attempts. It has changed dramatically throughout the years to adapt to new technologies and materials and increase human performance in this high-risk environment. The most recent change in Aviation Safety Management was introduced by the International Civil Aviation Organization (ICAO) in 2010. It is called the Safety Management System (SMS).

The SMS is defined by ICAO “as a systematic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedure” (International Civil Aviation Organization, n.d.). In addition, it should establish “a learning culture within an aviation organization that continually seeks and analyzes information, then turns that information into action that eliminates or mitigates safety risks, before they become unwanted events” (Federal Aviation Authority, 2021).

For a Safety Management System to be effective, States (through the State Safety Program - SSP) and organizations (using SMS framework) must develop a process for hazard identifications and data collection. One of the essential methods for hazard identification is voluntary safety reporting. The front-line personnel perform this process better than managers since they observe hazards as part of their daily activities.

The encouragement of a solid safety culture could be based on a strong self-reporting system. According to ICAO DOC 9859 - Safety Management Manual (Fourth Edition, 2018), safety culture is identified as "how people behave in relation to safety and risk when no one is watching" (3.1.1). Therefore, the safety culture is determined by people’s behavior and how they will manifest it.

According to the ICAO Safety Management Manual, whether organizations or individuals are willing to report their experiences and errors is mainly dependent on the perceived benefits and disadvantages associated with the act of reporting (International Civil Aviation Organization, 2018).

The National Civil Aviation Authority has a crucial role to play in the reporting of safety issues. It is required from the ICAO Contracting States the implementation of

regulations that support and encourage a positive safety culture. More importantly, states should ensure the protection of safety data, safety information, and sources, “especially if the information provided is self-incriminating” (International Civil Aviation Organization, 2018).

Project Goals and Scope

This research project’s goal is to explore the potential benefits of implementing a non-punitive voluntary safety report by the Brazilian Civil Aviation Authority. The result is expected to contribute to Brazil's National aviation safety, bringing value to the airline industry, managers, pilots, and other aviation professionals. Finally, this project could benefit the passengers, so-called users, or clients. In the end, the more the airline industry safety indicators get better, the more the airline industry thrives.

Therefore, this study intends to identify gaps (if any exists) between the Brazilian regulations and the ICAO recommendations for their Contracting States regarding voluntary safety report systems. Our analysis also give theoretical reasoning for implementing a non-punitive voluntary safety report system by the Brazilian Civil Aviation Authority. This will be achieved through the examination of regulations from other National Civil Aviation Authorities.

Brazil is one of the signatory members of ICAO and operates a vast commercial fleet. This association can bring the potential exchange of valuable lessons learned from the Safety Reports. These lessons can contribute to aviation safety in many other states. All the major airlines in Brazil operate under the RBAC 121, the ANAC regulation for public air transport operations with airplanes with a maximum certified passenger seating configuration of over 19 seats or maximum payload capacity above 3,400 kg. According to this regulation, airlines must

have their own Safety Report Programs. Highly reliable organizations, such as those involved in aviation, carry out very complex jobs and consistently minimize risks while maintaining a commitment to safety at all levels.

These commitments help to establish a “culture of safety.” With that comes the Just Culture concept, which fortifies an environment without the focus of guilt, where individuals can report mistakes or undesired occurrences without fear of reprimand or punishment. Employees should be encouraged to collaborate to seek solutions to safety issues along with an organizational commitment.

According to Bienefeld and Grote (2012), in the article “Silence that may kill”: “By interviewing employees from a variety of organizations,” Milliken et al. (2003) developed a framework of reasons for silence. More recently, Detert and Edmondson (2011) came up with a comparable framework of reasons for speaking up. Regardless of whether the focus of the investigation was on silence or on speaking up, the authors of both studies argued that so-called implicit voice theories determine whether people speak up or not. Implicit voice theories are subjective beliefs about when, what, and to whom it is appropriate to speak up. These theories have their origin in people’s social upbringing and can be influenced by organizational culture and collective sense-making, as well as by group norms and team climate”. Speak up, or reporting requires a resilient and trustable system.

Contributions Expected from the Study / Importance of Topic

The project will attempt to bring the perspective of the airline industry's main stakeholders about the implementation of a non-punitive safety report by the Brazilian Civil Aviation Authority. For this purpose, an online questionnaire will be distributed among airline

pilots operating under the RBAC 121 regulations. In addition, a structured interview will also be done with Airline Safety Managers, Union Representatives, and Brazilian Civil Aviation Managers.

As an ICAO contracting State, Brazil should “implement and enforce SARPs contained in the Annexes to the Convention” of 1944 (ICAO, 2006). In addition, ICAO Annex 19 - Safety Management, requires that the contracting states “shall establish a voluntary safety reporting system to collect safety data and safety information not captured by the mandatory safety reporting system” (ICAO, 2016).

Although it is a requirement established in the Brazilian civil aviation agency regulations that airlines must have a voluntary reporting program, the agency has not yet implemented its voluntary safety reporting program. Therefore, the Brazilian state may not be complying with the requirement set out in ICAO Annex 19. Still, more importantly, it may be failing to receive information relevant to flight safety. This is supported by the fact that the action plans - which results from each processed report - have a direct positive impact on aeronautical operational safety.

According to CENIPA data, it is possible to observe the number of reports received per year from 1999 to 2016.

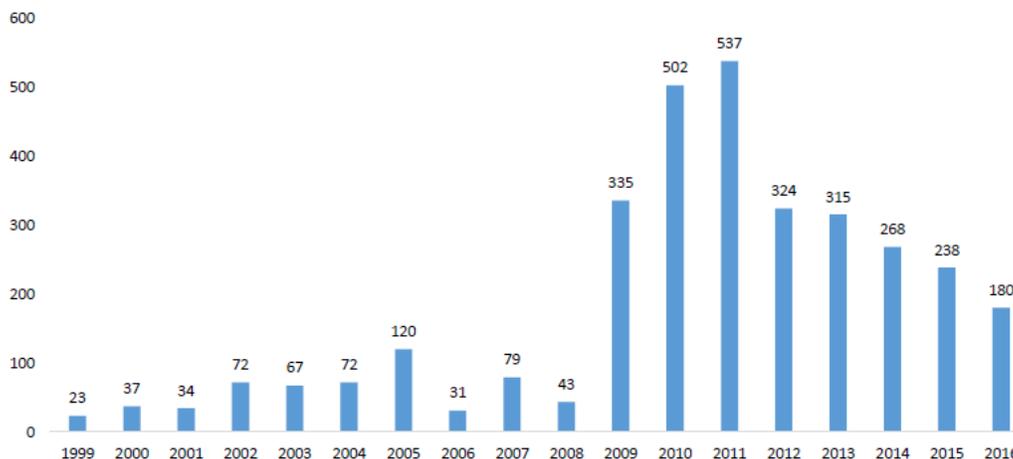


Figure 4 - Total reports per year (1999-2016). Source: CENIPA

Of this total of reports, when divided by areas, 47% of the reports are from pilots considering all segments of civil aviation.

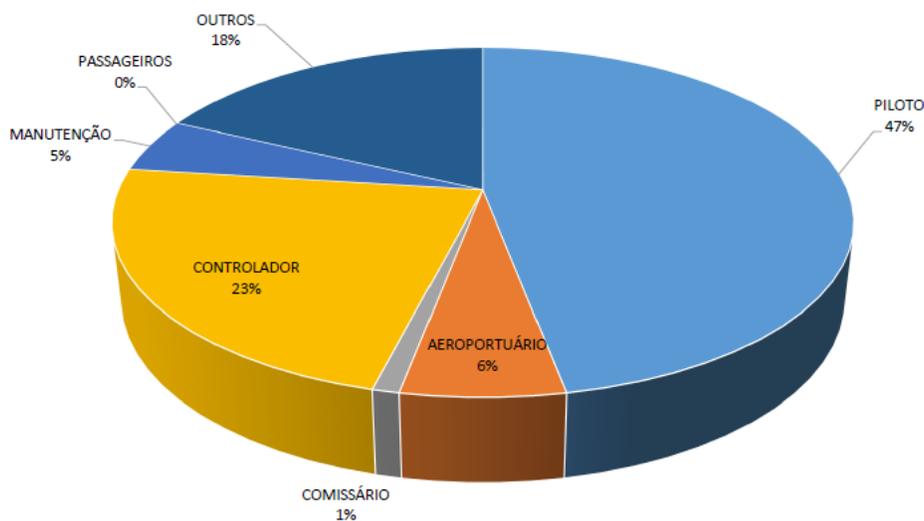


Figure 5 - Origin of RCSV - Who is reporting?. Source: CENIPA

When analyzing this CENIPA data by aviation segment, it is possible to notice that 25% comes from regular aviation and most reports come from general aviation, with 44%.

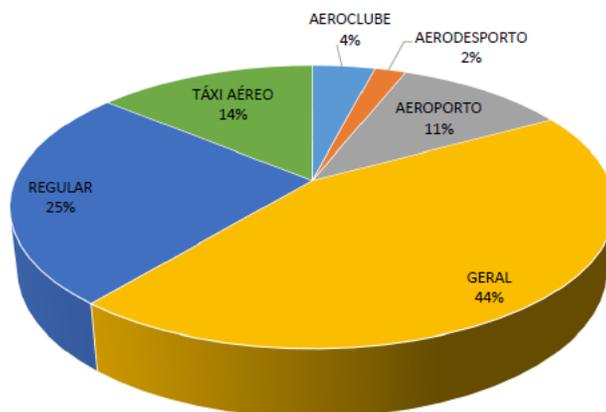


Figure 6 - RCSV by industry segment. Source: CENIPA

Additionally, besides the surveys and interviews conducted, the research project will aim to identify the perception and credibility among stakeholders. This will be done to guarantee supportive evidence if ANAC chooses to go ahead with the implementation of a non-punitive safety report program.

Thus, this project aims to contribute:

- To improve the Brazilian aviation industry safety;
- To promote a positive safety culture;
- To suggest new approaches to collaborate with ANAC efforts into Responsive Regulation
- To understand what are the main factors that would motivate pilots to report their own errors in a non-punitive reporting system; and
- To enhance the hazard identification process by the Brazilian Civil Aviation Authority.

Research Questions

These are the questions our research seeks to answer:

- Is the Brazilian CAA observing the requirement of Annex 19?
- Would a program like ASAP fulfill the requirements of both ICAO and Brazilian CAA legislation regarding the hazard identification and risk management program?
- Could this new Brazilian Safety Report program improve the pilot's willingness to report Safety issues to the Brazilian CAA?
- Would Brazilian airlines be willing to be part of a "tripartite" agreement with ANAC and SNA to open a new channel for a volunteer, confidential and self-report ASR program?
- With specific regulation and application, would airline pilots be more likely to be credible about non-punitive reporting system?

Aviation Occurrences A term used to describe events that are not classified as incident or accident

Air Safety Report A report or form to collect information on actual or potential safety deficiencies during air operations

Findings	A term used to record non-compliance with Civil Aviation legislation
Just Culture	A term used to describe when the punishment is totally unbound of the situations in which punishment is applicable and promotes learning from mistakes.
ICAO Contracting States	A term used to define States which have ratified or adhered to the Chicago Convention by the provisions of its Chapter XXI
Non-Punitive Reporting	Definition including citation, as needed.
SMS	Safety Management System, A term used to a formal, top-down, organization-wide approach to managing safety risk and assuring the effectiveness of safety risk controls. It includes systematic procedures, practices, and policies for the management of safety risk. (FAA Order 8000.369).

List of Acronyms

ANAC	Agência Nacional de Aviação Civil (Brazilian Civil Aviation Authority)
AQD	Aviation Quality Database
ASAP	Aviation Safety Action Program
ASIPAER	Advisory Services for the Aeronautical Accident Prevention System
ASO	Alerta de Segurança Operacional (Air Safety Alert)

ASR	Air Safety Report
ASRS	Aviation Self Reporting Scheme (Australia)
ATSB	Australian Transport Safety Board
BI	Business Intelligence
CAA	Civil Aviation Authority
CASA	Australian Civil Aviation Authority
CENIPA	Centro de Investigação e Prevenção de Acidentes Aeronáuticos (Brazilian National Aeronautical Accidents Investigation and Prevention Board)
CMA	Continuous Monitoring Approach
COMAER	Brazilian Air Force Command
EASA	European Aviation Safety Agency
FAA	Federal Aviation Administration
FAA AC	Federal Aviation Administration Advisory Circular
ICA	Air Force Command Instructions
ICAO	International Civil Aviation Organization
IFALPA	International Federation of Air Line Pilots Associations
INSAG	International Nuclear Safety Advisory Group
NSCA	<i>Normas do Comando do Sistema da Aeronáutica</i> (Air Force Command Rules)
NTSB	National Transport Safety Board
PSO-BR	<i>Programa de Segurança Operacional- Brasil</i> (Brazilian State General Safety Operational Program)

PSOE-ANAC	<i>Programa de Segurança Operacional Específico da ANAC</i> (ANAC specific Safety Operational Program)
PSOE-COMAER	<i>Programa de Segurança Operacional Específico do COMAER</i> (Brazilian Air Force Command specific Safety Operational Program)
RASO	<i>Relatório Anual de Segurança Operacional</i> (Annual Operational Safety Report, from ANAC)
RBAC	<i>Regulamento Brasileiro de Aviação Civil</i> (Equivalent to the FAR for the FAA)
RCSV	<i>Relatório ao CENIPA para Segurança de Voo</i> (Report to CENIPA for Flight Safety)
RELPREV	Prevention Report
SARP	Standards and Recommended Practices
SDCPS	Safety Data Collection and Processing Systems
SIPAER	<i>Sistema de Investigação e Prevenção de Acidentes Aeronáuticos</i> (Brazilian Aeronautical Accident Investigation and Prevention System)
SMS	Safety Management System
SNA	<i>Sindicato Nacional dos Aeronautas</i> (Brazilian Pilots Union)
SSM	Safety Management Manual
SSP	State Safety Program
USOAP	Universal Safety Oversight Audit Program
VDRP	Voluntary Disclosure Reporting Program

Plan of Study

We begin by introducing the Safety Management System concepts and the role of each ICAO contracting state in establishing the State safety policies and procedures regarding a non-punitive safety reporting program. The relevance of such a program for aviation industry safety is then explored using ICAO regulations and other Civil Aviation Authorities as a benchmarking for assessing current Brazilian Civil Aviation Reporting Systems, identifying gaps, and potential benefits of implementing such a program.

Then, the potential benefits will be validated using a research questionnaire and interviews with the leading airline industry safety managers and stakeholders like pilots' association and CAA safety managers. This research's results will be presented and discussed. Finally, we will conclude by presenting the main gaps in the Brazilian Civil Aviation Regulation, the potential benefits of implementing a non-punitive safety reporting program and suggesting topics for further investigations.

Chapter II

Review of the Relevant Literature

Aviation is a highly regulated industry with a solid regulatory basis. For this reason, it can present several challenges for the implementation of new procedures or recommendations.

This literature review will cover the following aspects:

- State Safety Program: as a way of introducing the theme involving hazard identification, risk management, and the leading role of regulatory agencies.
- The Brazilian Civil Aviation Safety Oversight: understanding the way the Brazilian State is structure and how both Aviation Authorities work together in the Oversight of the Brazilian Aviation industry.
- Actual Status of Brazilian CAA on Safety Management: approaches the status of the Brazilian CAA regarding external audits and how the Brazilian State ASR program is inserted into the SMS context.
- The Role of a Reporting Program under the Scope of an SMS: this section describes how relevant they are for organizations and civil aviation authorities.
- Safety Culture and Safety Reporting: the focus on incident and accident prevention, and on continuous improvement through reporting.
- Just Culture and Human Factors: a brief contextualization of the importance of the establishment of a positive culture of confidence and collaborative community attitude towards the common goal of safety enhancement.
- The Risk Management Cycle of Voluntary Report and the Importance of Reporting Confidentiality: This section describes the process and flow of information in the risk

management of a voluntary report and also the relevance of the confidentiality under the scope of a voluntary reporting program.

- Federal Aviation Authority - Aviation Safety Action Program: better understanding the policy of the American regulatory specifications and comparing it to what we have in Brazil.
 - FAA Voluntary Report Gathering Strategy and Regulatory Support for Confidential Reports: approaches different FAA report gathering programs, complementary to ASAP (Aviation Safety Action Program) but each one with its own purpose. Besides it, the authors accessed the law protection over confidential reports available in USA and Brazil.
- Other Authorities Non-Punitive Safety Reporting Programs: better understanding the policy of two other aviation authorities (EASA and Australian), assessing what is available from authorities in other countries.
 - International Federation of Air Line Pilots Associations Perspective on Non-Punitive Safety Reporting Programs: approaches a stakeholder view of reporting programs. Pilots are just one class of frontline personnel dealing with unwanted situations in aviation daily activities. Therefore, essential for filling reports, which feeds the program.
- Brazilian Authorities current types of Air Safety Reports: describes six types of report programs under the scope of three different Brazilian aviation authorities.
- The Potential of the ASO and "Flight Alerts": approaches two ANAC disclosure documents disseminating safety recommendations emitted by ANAC, based on hazards identified by other means than safety report programs.

State Safety Program

In general terms, item 8.2.2.1 of Doc 9859 (ICAO, 2018) defines State Safety Program (SSP) as “An SSP is an integrated set of regulations and activities aimed at improving safety.”

After World War II, the United States invited other nations to debate the next steps in world aviation development. This invitation was extended to several countries. It became known worldwide as the first International Civil Aviation Conference, simply the Chicago Convention. This historic conference laid the foundation for standards and procedures for peaceful global air navigation in a safe and orderly manner. It also formalized the creation of the International Civil Aviation Organization (ICAO), defined by DOC 7300 (Convention on International Civil Aviation). In this context, “each Contracting State has complete autonomy over the airspace above its territory and the portion of water adjacent to its territory”. (DOC 7300, 2006).

ICAO would be responsible for organizing and supporting the intensive international cooperation that the fledgling global air transport network would require. In this context, safety is the highest priority of the ICAO Strategic Objectives (GASP, DOC 10004).

As defined in DOC 7300, Article 37, each contracting State must ensure the adoption of practices following regulations and standards, so that the focus is always on the safety of air operations. In pursuit of this standardization, ICAO adopted the use of Annexes to the Chicago Convention.

Under ICAO (DOC 9734), each ICAO Annex presents specifications known as International Standards and Recommended Practices (SARPs).

“States shall promulgate a comprehensive and effective aviation law, commensurate with the size and complexity of their aviation activity and consistent with the requirements contained in the Convention on International Civil Aviation, to enable the oversight and management of civil aviation” (ANNEX 19, 2016). In this context, according to the ANNEX 19, States shall establish relevant authorities or agencies, supported by sufficient qualified personnel, and provided with adequate financial resources. In addition, each state authority or agency shall have stated safety functions and objectives to fulfill its safety management responsibilities. Also, according to Annex 19, each State shall establish a State Safety Program (SSP) for the management of safety in the State to achieve an acceptable level of safety performance in civil aviation.



An SSP is a management system for the management of safety by the State. According to Doc 9859 (Figure 5-1 - ICAO, 2018). “Typical safety data and safety information sources,” the SSP is just one of the many types of safety information that the state must manage.

Figure 7: ICAO Contracting State responsibilities. Source: ICAO

The Contracting States must implement and optimize the SARPs contained in the Annexes to ensure the safety and regularity of operations worldwide. “Chapter 3 of Annex 19 contains SARPs related to the safety management responsibilities of States. This includes the establishment and maintenance of a SSP intended to manage safety in an integrated manner.” (ICAO Doc 9859, 2018 - Item 8.1.1).

The ICAO Safety Management Manual (Doc 9859) defines that the focus on safety management is to proactively mitigate safety risks before they result in aviation accidents and incidents. Through implementing safety management, States can manage their safety activities in a more disciplined, integrative, and focused manner. In addition, possessing a clear understanding of its role and contribution to safe operations enables a State, and its aviation industry, to prioritize actions to address safety risks, this will allow agencies to manage their resources more effectively for the optimal benefit of aviation safety.

The ICAO Safety Management Manual (DOC 9859) establishes that each State is responsible for creating voluntary event reporting. Furthermore, they are encouraged to establish other safety data collection and processing systems to collect safety information. This is to identify an incident or accident that the final report may not capture. According to ICAO DOC 9859 (ICAO, 2018) "The effectiveness of a state's safety management activities is strengthened when implemented in a formal and institutionalized way through an SSP and thorough safety management systems (SMSs) for its service providers."

The SSP is responsible for facilitating and promoting the voluntary reporting of events that could affect aviation safety by adjusting their applicable laws, regulations, and policies, as necessary.

In the case of a voluntary reporting system, it shall be operated under safety protection laws. This allows for the report author's confidentiality to be ensured. Further, organizations need to have an appropriate disciplinary policy accessible to all. It should also be widely understood. The disciplinary policy should clearly indicate what behaviors are unacceptable. The policy should also indicate how the organization will respond in such cases. It needs to be

applied fairly, reasonably, and consistently. Finally, organizations and individuals are more likely to report their experiences and errors in an environment where they will not be judged or mistreated by their peers or employers.

Overall, organizations and individuals must believe they will be supported when reporting situations in the interest of safety. This includes organizational and personal errors and mistakes. An increase in the confidential report rates, as well as a decrease in anonymous reports, usually, indicate the organization's progress towards creating a more positive safety culture.

The Brazilian Civil Aviation Safety Oversight

The Brazilian Civil Aviation System management is under the responsibilities of two different organization of the Brazilian State. The Brazilian Civil Aviation Authority is responsible for the supervision of the Civil Aviation as a whole, including aerodromes, airlines, design organizations and manufacturers of aeronautical products, pilots and maintenance workshops, as well as security against acts of unlawful interference and economic regulation, among other aspects. The Air Force Command (COMAER) is the aeronautical authority and under its structure the Department of Airspace Control (DECEA) provides the air traffic control service and the CENIPA is the central piece of the Brazilian Aeronautical Accident Investigation and Prevention System investigation authority.

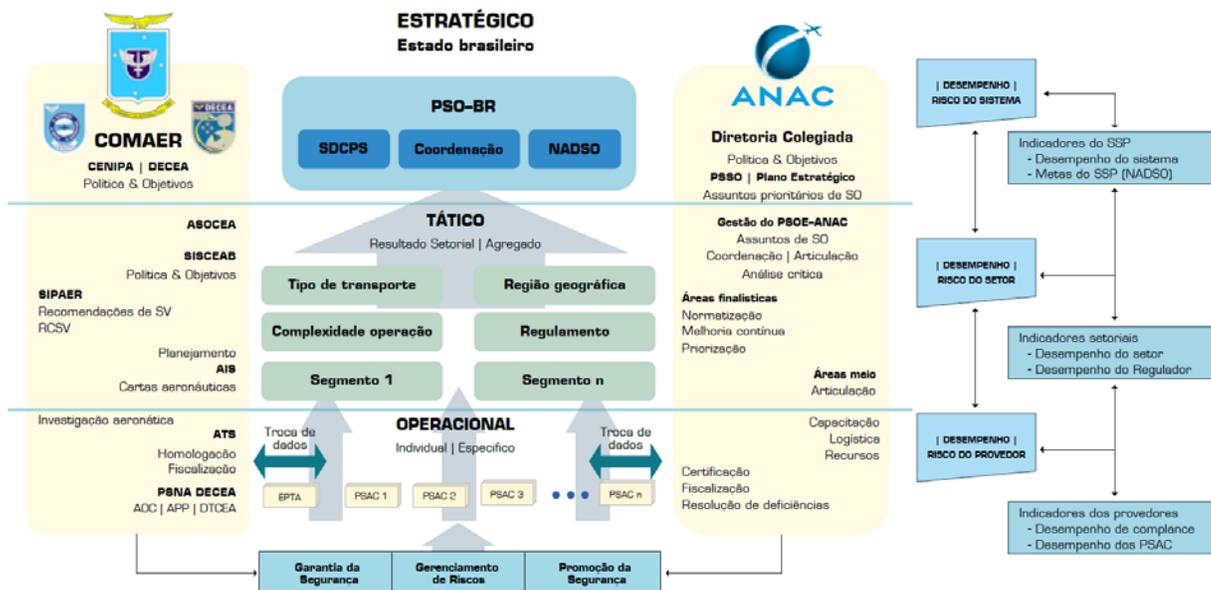


Figure 8 - Structure of the Brazilian Civil Aviation Management. Source: ANAC

The governance of the Brazilian Civil Aviation system requires a permanent coordination between these two authorities as both of them have responsibilities and obligations as established in the Programa de Segurança Operacional – BR (Brazilian Operational Safety Program).

For the purposes of this project, the most important aspect that should be highlighted is the fact that the only voluntary reporting program in the Brazilian state is under the supervision of CENIPA, through the RCSV (Brazilian State Confidential Report on Operational Safety) program. For this purpose, on August 23, 2021, the Ordinance No. 5.754/COMAER/ANAC was published, which establishes the Provisions on the Reporting System for the Brazilian Civil Aviation. This document defines the criteria for sharing information between CENIPA and ANAC and, for the objective of this study, the item 5. Voluntary Reporting program is the most relevant, as extracted below:

5.4 Reporting to the Center for Investigation and Prevention of Aeronautical Accidents - CENIPA for Flight Safety (RCSV) is an integral part of the Brazilian State's voluntary reporting

system, and, as a source of the Aeronautical Accident Investigation and Prevention System - SIPAER, it has its protection guaranteed by Law No. 12.970, of May 8, 2014.

5.5 The RCSV will receive primary treatment by CENIPA, and operational safety information will not be made available prior to de-identification.

5.6 The information collected through the RCSV has as its main purpose the survey of statistical data to support analysis and actions to improve operational safety.

Due to the characteristics of the RCSV described above, mainly the fact that the information will not be made available for risk management process prior to de-identification (even though to ANAC), the RCSV program does not have the characteristics that could make it a non-punitive self-report program that could be adopted or adapted by ANAC for this purpose. In other words, this de-identification process ends up removing the possibility of non-punitiveness by the agency and also might not allow the timely management of information.

Actual Status of Brazilian CAA on Safety Management

According to ANAC RASO 2019 (Relatório Anual de Segurança Operacional, or Annual Operational Safety Report), within the scope of the Brazilian State, the Brazilian CAA is responsible for presenting activities related to the USOAP-CMA (Universal Safety Oversight Audit Program – Continuous Monitoring Approach). This is the Program through which the ICAO monitors the fulfillment of the safety oversight obligations by its Member States (ICAO, 2021).

In addition, the Brazilian CAA also acts on the Management of Operational Safety recommendations arising from the final investigation reports of occurrences produced by

CENIPA. This Brazilian organization is the equivalent to the NTSB (National Transport Safety Board).

In this context, according to the RASO 2019 Report, the Brazilian CAA presented excellent performance indicators related to safety management, as shown in the graph below. The Report compares the percentage of effective implementation in the USOAP Program with the volume of air traffic in each State. States in the same region are represented by the same color.

In the figure, Brazil is highlighted, in the upper right corner, where the countries with a large volume of air traffic and a high degree of adherence to international safety standards are located, according to the ICAO audit carried out in 2015 and 2018 (ANAC, 2020, p. 10).

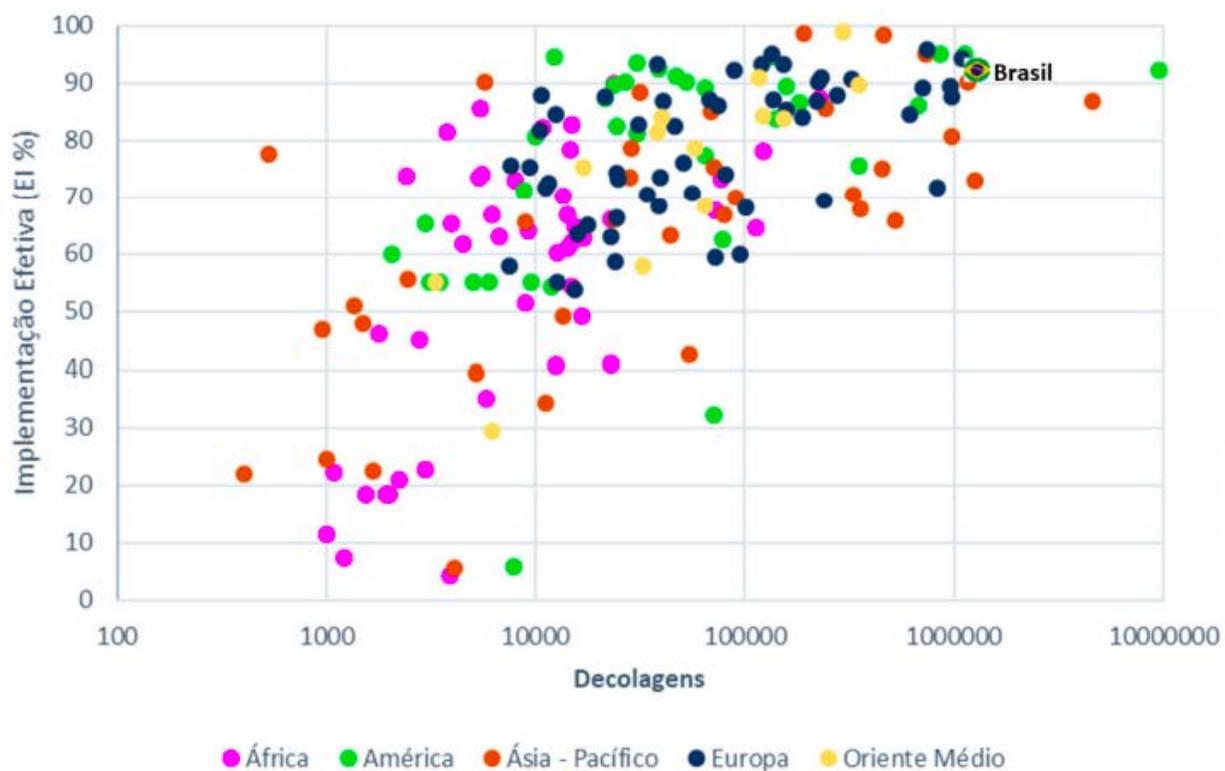


Figure 9: Degree of adherence to international safety standards. Source: ICAO

On its website, ANAC (2021) lists five key processes of an SMS, reproduced below:

- **Report on Safety Issues and Events:** a process of data and information acquisition related to safety.
- **Identification of Hazards:** a set of activities aimed to identify dangers related to the organization.
- **Risk Management:** a standardized process for evaluation and definition of actions to risk control.
- **Performance Measurement:** management tools developed to evaluate if the safety objectives of the organization were achieved.
- **Safety Guarantee:** a set of activities used to standardize the delivery of services according to the criteria of performance established.

Among other tools and programs, the FAA ASAP is an example of Safety Report program which a CAA uses to systematically manage the aviation operational risk. The System utilizes a standardized process of hazard categorization, to continuously evaluate risks and enhance the KPIs related to operational safety. The usage of Business Intelligence (BI) tools is necessary to manage the vast amount of information generated in this activity.

The Role of a Reporting Program Under the Scope of an SMS

According to the FAA, SMS is defined as “The formal, top-down business approach to managing safety risk, which includes a systemic approach to managing safety, including the necessary organizational structures, accountabilities, policies and procedures”.

SMS is a method of flight safety management with the objective of understanding and mitigating operational risks in a systemic manner, by hazards identification. Voluntary and non-punitive reporting consists of an approach, a section of an SMS aimed at improving flight safety. That being said, the safety reporting programs are part of the foundations of any Safety Management System.

Safety Culture and Safety Reporting

The concept of safety culture began after the Chernobyl disaster in 1986. According to the International Nuclear Safety Advisory Group (INSAG), "INSAG concluded that the need to create and maintain a 'safety culture is a precondition for ensuring nuclear power plant safety. The concept of 'safety culture' relates to a very general concept of dedication and personal responsibility of all those involved in any safety-related activity at a nuclear power plant". Operating under strong organizational safety culture requests all the company levels involved. "Safety culture presupposes total psychological dedication to safety, which is primarily created by the attitude of the administrative staff of the organizations engaged in the development and operation of nuclear power plants" (INSAG-7).

Experts say that the crash of the Continental Express flight 2574, due to structural failure in flight caused by inadequate maintenance, was the most important marker of safety culture in the United States (NTSB, 1992).

According to Chilakalapudi (2016), "the purpose of safety reporting in the aviation industry is to ensure that an organization receives safety-related information which could then be used to manage and improve safety within that organization. (Davies, 2015; Cicero, 2008).

As cited earlier in this study, the ASR processing is a manner to acquire sensitive information. According to Hudson (2008), there are three methods that are used in acquiring

information for risk management: reporting, audits and accidents and major incidents. Therefore, ASR processing is part of a proactive approach type of risk management.

Generally, an "in-house" ASR workflow runs like depicted in picture below.

ASR process flow



Figure 10: Typical Aviation Safety Report Process.

As in the example above, the Brazilian CAA does not interact at any time with the process. Professionals who wish to report threatening situations cannot do so directly to the Brazilian state if that were their wish. Later in this study, the options available to the flight professional who wants to fill out some type of safety report within the scope of the Brazilian aeronautical authorities will be approached.

Pilots (or employees) generate safety reports. In turn, reports can produce "Findings," which need to be answered by the affected department with an "Action Plan." This action plan is then submitted to the SMS manager. This manager is accountable for approving or requesting

enhancements to the proposed action plan. This system is credited to the SMS framework's third pillar, Safety Risk Management (ICAO DOC 9859, 2018).

Without safety reports, there is no way to develop action plans. Even worse, the Brazilian CAA cannot process the above-cited chain because there is no provision of an ASR program designed by ANAC.

According to ICAO DOC 9859, safety culture is a natural consequence of human factors in complex environments such as aviation. As mentioned earlier, this document defines safety culture as "how people behave in relation to safety and risk when no one is watching." (ICAO DOC 9859).

Just Culture and Human Factors

According to Dekker (2007), culture is like a definition between the acceptable and the unacceptable. A safety culture based on a just culture can be the key in exonerating responsibility, however, giving different approaches, considering the individual as a human being subject to error. "Saying that others' behavior is erroneous or risky or reckless is our judgment of what other people do, not a description of the essence of their behavior. In other words, if we categorize behavior, we do nothing more than categorizing our own judgments".

According to Dekker (2007), when we talk about voluntary reporting and just culture, what pilots see as necessary to report may go beyond what is mandatory by the company. "The language in the Eurocontrol rules suggests that reporting should be compulsory. All safety occurrences need to be reported. A lot of organizations have taken it to mean just that and have told their employees that they are obligated to report safety occurrences. But this might make little sense. Why does research show that a voluntary system is better, leaving it to people's own

judgment to report or not? Mandatory reporting implies that everybody has the same definition of what is risky, what is worthy of reporting. This, of course, is seldom the case. The airline captain who maintained omertà on his own flight deck could— in principle— be compelled to report all incidents and safety occurrences, as Eurocontrol would suggest. But the captain probably has different ideas about what is risky and worth reporting than his organization”.

People as human beings make mistakes. However, taking the blame knowing the possibility of being punished, may not be attractive to voluntary reporting. Finding a culprit and putting the whole situation on top of that, ends up missing the bigger problems, such as organizational problems. If this happens, the reports may not be faithful to the situations nor a preventive idea regarding the application of flight safety. This could result in these "unrealistic" reports are not useful (Dekker, 2005).

People are judged on their behavior. For this reason, pilots may fail to report something they did or saw. Dekker explains that our actions are explained in terms of what we were seeing at that time and with the tools available at that time as well. That's local rationality. People make mistakes and they can report it or not. “People’s errors and mistakes (such as there are in any objective sense) are systematically coupled to their circumstances and tools and tasks. Indeed, a most important empirical regularity of human factor research since the mid-1940s is the local rationality principle. What people do makes sense to them at the time—it must, otherwise they would not do it. People do not come to work to do a bad job; they are not out to crash into cars or airplanes or ground ships. The local rationality principle, originating in Simon (1969), says that people do things that are reasonable, or rational, based on their limited knowledge, goals, and understanding of the situation and their limited resources at the time” (Woods et al., 1994). Therefore, what is reasonable for an organization may or may not be for an individual.

When we talk about reports, there is the possibility that this report is about an error made in a certain situation. Another important thing for the treatment of a given report is to be able to understand what the individual's situation was at the time the facts happened and if what was reported and referenced made sense to him. (Dekker, 2007). Therefore, this individual will not necessarily be making an isolated error, but it may be an error linked to the organization or other external factors that went unnoticed. This can directly impact non-punitive reporting, as people may be afraid or insecure in reporting, especially when dealing with organizational situations. In an organization, there is a chance that this individual will not be heard for a reported situation or error. The individual's point of view may not be considered when dealing with an organizational problem that impacted the work environment and may have led him to act as he did. (Dekker, 2002).

Aviation is considered a complex system. The concept of the human factor is already accepted as an existing factor in this environment. Also, bearing in mind that there is a gap between theory and practice (O'Hare, 2000).

The Risk Management Cycle of Voluntary Report and the Importance of Confidentiality

Among others, a document that supports ASAP is the FAA Advisory Circular (FAA, AC120-66C). It states on its introduction that *“Under an ASAP, safety issues are resolved through corrective action rather than through punishment or discipline.”*

In the same vein, it is worth mentioning that the RCSV also seeks a similar corrective action production as the result of a safety report. Nonetheless, CENIPA (which is the investigating authority, but not the regulatory authority in Brazil) has not the same enforcement power as the National CAA (ANAC). Under a custom-designed SMS framework, ANAC could

directly request corrective action plans from flight service providers (organizations) under its jurisdiction, when a program like ASAP identifies a hazard in the operations field. In a simple way of saying, this is an example of a risk management cycle.

As nowadays CENIPA is responsible for receiving safety reports (RCSV program), an interaction formal process with ANAC is necessary to make it happen. As a parallel, it would be as if the NTSB received voluntary reports (like ASAP, for instance), instead the FAA. But the FAA would process it only after the report deidentification being made by the NTSB, in the effort to protect the reporter id. A potential problem in this process is the impossibility of proper treatment of reports.

This is explained by the fact that, after reaching CENIPA's care, the reports are filtered before being sent to ANAC for risk management activities request process. In order to avoid the possibility of inadvertently identifying the author of the report, essential information is often removed (filtered) from the report. In the end, the appropriate sector of the affected organization is prejudiced to present an effective corrective action plan, by lack of pivotal information.

If an Action Plan cannot be produced to mitigate a risk derived from the identified hazard, the risk management cycle is not complete. An Action Plan is the tangible product of the voluntary reports process, as the result is prevention of recurrences from those reported hazards.

Researching the Brazilian aviation authority's risk management cycle on voluntary reporting, the researchers analyzed the ANAC's "Procedure Manual for Aeronautical Occurrences Management" (MPR), issued in 2016 by ANAC's Safety Advisory Department (ASIPAER – Assessoria do Sistema de Prevenção de Acidentes Aeronáuticos). It described the RCSV processing interaction among the Brazilian CAA with the CENIPA.

The picture below describes the flow until the designated aeronautical organization's department receives the document requiring the safety occurrence or identified hazard (object of the RCSV) for analysis and action submission.

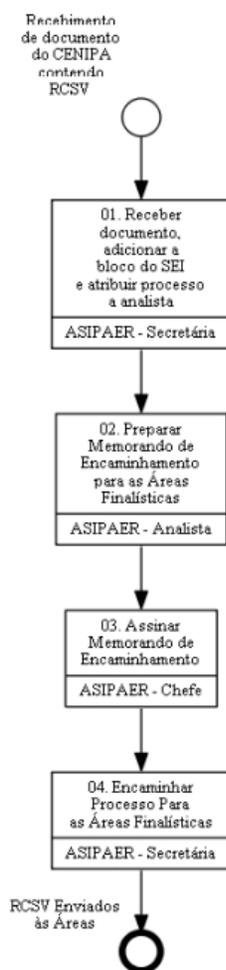


Figure 11: RCSV Process. Source: ANAC

Still in the Safety Report management context, three months before this study completion, the Brazilian aviation authorities published a normative, “*Portaria Conjunta N° 5.754* (from August 23rd, 2021) which approves the “Reporting System for Brazilian Civil

Aviation.” It is a joined regulation, from two of the Brazilian Aviation Authorities - COMAER (Brazilian Air Force Command) and ANAC (Brazilian CAA). The initiative seeks to “improve the mandatory and voluntary reporting mechanism of occurrences, which is handled by the COMAER and ANAC, as an integral part of the Brazilian Program for the Operational Safety of Civil Aviation (PSO-BR).”

Considering the requirements of Annex 19, item 5.1.3 regarding the “establishment of a voluntary safety reporting system to collect safety data and safety information not captured by mandatory safety reporting systems,” the RCSV-CENIPA program does fulfill this requirement. Although, its processes require extensive collaborative information exchange and coordination among two different Brazilian aviation authorities. In this context, Howell (2019) mentions that “difficult reporting processes” is one of the biggest challenges to obtain safety reports from frontline personnel. If the report perceives long time to receive feedback about the report issued, the person tends to feel discouraged to do so. Howell also cites that “overly complicated reporting processes increase the chances of system failure, and overly complicated systems are seldom long-lasting and not sustainable.”

Nonetheless, it’s worth mentioning the ICAO recommends that “State authorities with responsibilities for the implementation of the SSP should have access to the SDCPS to support their safety responsibilities.” (ICAO Doc 9859, item 5.1.5, 2018).

Considering “ASAP requires analysis and corrective action” (FAA AC 120-92B, Chapter 3-5 c. (7) (f) 3), it is worth mentioning that the ASAP program is just one among others voluntary safety report programs made available by the FAA to fulfill the requirements of the

ICAO legislation regarding the hazard identification and risk management program from Annex 19.

The ASAP attends the FAA SMS legislation (AC 120-92B), and the ICAO SMS legislation is Annex 19 Chapter 5.1.3 (“*States shall establish a voluntary safety reporting system to collect safety data and safety information not captured by mandatory safety reporting systems.*”)

According to Steckel (2014), the ASAP and Voluntary Disclosure Reporting Program (VDRP) – another FAA voluntary ASR – did not address the perception of frontline personnel about their organization's safety culture before its implementation. The point to be considered is how this perception can affect the success or failure of the program.

For this reason, the conducting of research among pilots of the affected organization or communities is relevant. This point will be addressed by this study in the next chapter, Methodology.

Federal Aviation Authority - Aviation Safety Action Program

In the context of ASR programs, one consolidated example comes from the FAA. As mentioned on its website, ASAP encourages voluntary reporting of safety issues identified by employees (FAA, 2021). Its goal is to enhance aviation safety through the prevention of accidents and incidents. Due to inherent limitations, the scope of this study is restricted to pilots, but in fact, all personnel involved with aeronautical operations should be encompassed by any ASR program.

There are numerous safety data gathering programs across the global aviation system. In addition, a massive effort has been made to convince pilots about the benefits of the voluntary report (Steckel, 2014). Counting on pilots to voluntarily report hazards, risks, their lapses, mistakes, and errors have proven to be a challenge. Among other factors, this is a result of the lack of trust in its non-punitive nature (The Mobility Forum, 2016).

Aware of this fact, ASAP regulation has strong support “to encourage an employee to voluntarily report safety issues even though they may involve an alleged violation, enforcement-related incentives have been designed into the program” (FAA, 2021). Besides it, the ASAP is customized to each organization (not restricted to airlines). It is constituted on a formal agreement embracing the company, the National CAA, and a representative of the employee’s labor organization.

The strategy is to achieve a substantial compromise among the aeronautical community. From a simplistic point of view, ASR contains nothing more than precious specific information. This type of information is sensitive and maybe would never be gathered – and worked on - without the aviation personnel contribution. This contribution only occurs based on confidence. The safety culture has a crucial role in this chain, as this study will approach further.

FAA Voluntary Report Gathering Strategy and ASAP Regulatory Support

Apart from ASAP, FAA has developed a “network” of nine other voluntary reporting programs. Each of them processes confidential information to foster safety concerns without fear of retaliation due to its non-punitive protection.

These programs embrace personnel from specific aviation sectors, as aircraft certification process, airports, air traffic control, FAA employees (as engineers and architects), and finally to all participants in the NAS (USA National Airspace System) who wish to voluntarily report safety incidents and situations.

This approach used by the FAA, on collecting and processing thousands of aviation personnel reports is an example of the proactive strategy to manage risks. The aviation community has moved away from the “forensic” approach of making safety improvements based solely on accident investigations to a proactive strategy that incorporates a mix of actual flight data, data from other government agencies, and voluntarily submitted information from airline employees (FAA, 2021).

Other important pillar for the ASAP program concerns safety data and safety information protection. The ICAO Annex 19 (2016) states:

5.3.1 States shall accord protection to safety data captured by, and safety information derived from, voluntary safety reporting systems and related sources (...)

The first document which brings support to the ASAP program is the FAA Order 8000.82, concerning “Information as Protected from Public Disclosure under 14 CFR Part 193” (FAA, 2021). This is crucial to guarantee the reporter and the information brought from disclosure. This seeks to ensure the protection of people who report situations of risk so that they are not victims of persecution or revenge by managers not yet familiarized with the concept of Just Culture.

Analyzing the RBAC list, there is no equivalent Brazilian document to the 14 CFR Part 193. In the Brazilian state jurisdiction, voluntary confidential reports are protected under three types of regulation:

- The “Normas do Comando da Aeronáutica 3-3” (NSCA 3-3), which rules the flight safety management in Brazilian aviation. It states each RCSV processing is based on the concept of “voluntariness” and “non-punishment,” and that the program's success is intrinsically linked to the guarantee of confidentiality of the source of information. (Ministry of Defense, 2013)
- the “Instruções do Comando da Aeronáutica 3-7” (ICA 3-7), a Brazilian publication designed to disseminate rules and facilitate the application of laws and regulations. It states that concerning the guarantee of confidentiality, CENIPA guarantees the reporter's anonymity in all cases in which reported events refer to the prevention of aeronautical occurrences (ANAC, 2021).
- The Brazilian Federal Law 12.970 (2014), which states that data from the voluntary notification systems of occurrences *“will not be used for evidential purposes in legal proceedings and administrative procedures and will only be provided upon judicial request.”*

Despite the mentioned protections to the identity of the volunteer reporter, there is a major problem to be resolved so that non-punishment is really guaranteed. Due to the complete record of each activity carried out by any airline (technology and audits facilitate and require it), there is comprehensive data that documents the participation of each machine, location, individual (or team) in all flight operations and support activities. This allows any accountable manager (responsible for implementing an action plan - in response to an identified hazard) to identify the reporter (or the most likely individuals). Thus, if the manager is not solidly aware of the positive influence of just culture on the efficiency of his department (and, therefore, his

organization), reporters are subject to punishment (often veiled) by their superiors or even of their peers.

Other Authorities Non-Punitive Safety Reporting Programs

EASA Confidential Safety Reporting

In accordance with the ICAO Safety State Program and in line with the industry best practices, the European Union Aviation Safety Agency - EASA has in its documents a set of regulations to enable individuals to report malpractices and irregularities, without worrying about any adverse consequences to the reporter.

The EASA Confidential Safety Reporting requires from each of the Member States and Agencies to establish a voluntary reporting system, used to collect safety related information not captured by other safety programs. The EASA Confidential Safety Reporting sole objective is the prevention of accidents and incidents. It should not be used to attribute blame or liability (European Union Aviation Safety Agency, 2014).

Even though the EASA regulation states that the sole objective of its safety reporting program is prevention of accidents. The regulation uses the Just Culture concept, which is defined by EASA as a system to “encourage individuals to report safety-related information. It should not, however, absolve individuals of their normal responsibilities. In this context, employees and contracted personnel should not be subject to any prejudice on the basis of information provided pursuant to this Regulation, except in cases of willful misconduct or where there has been manifest, severe and serious disregard with respect to an obvious risk and profound failure of professional responsibility to take such care as is evidently required in the

circumstances, causing foreseeable damage to a person or to property, or seriously compromising the level of aviation safety” (European Union Aviation Safety Agency, 2014).

The just culture concept is important for any safety reporting program, especially because it can create a good safety culture, and because it provides a clear definition of the acceptable and unacceptable behaviors.

Another important aspect addressed in the EASA regulation is the fact that any unpremeditated or inadvertent infringements of the local laws that are only reported through the Confidential Safety Reporting program “should not be the subject of disciplinary, administrative or legal proceedings, unless where otherwise provided by applicable national criminal law” (European Union Aviation Safety Agency, 2014).

Australian Transport Safety Bureau (ATSB) – Aviation Self Reporting Scheme

The Australian Safety Bureau has its own non-punitive safety reporting program. It is called Aviation Self Reporting Scheme (ASRS). The name of the program already denotes the purpose of such a program. Under the ASRS program, any individual can report any contravention of the rules or requirements established by the Australian Civil Aviation Authority (CASA).

For the Australian Civil Aviation Authority, as per Act 63 from 1988, a contravention is defined as:

“Reportable contravention means a contravention of the regulations, other than the following:

- (a) a contravention that is deliberate.
- (b) a contravention that is fraudulent.

(c) a contravention that causes or contributes to an accident or to a serious incident (whether before or after the contravention is reported);

(d) a contravention of a regulation that is prescribed for the purposes of this paragraph.

From the contravention definitions it is clear that the non-punitive protection given by the ASRS program is for mistakes and errors made by the aviation personal while performing their duties.

Another important aspect from the Australian regulation is the fact that the administrative protection can be claimed once every 5 years (30DO of the Civil Aviation Act, 1988).

To be considered for as an ASRS and take the protection against any administrative action, the reporter should also report the issue within 10 days of the event and before receiving the show cause notice for the proposed decision. Those restrictions make clear the purpose of the Australian non-punitive safety reporting program, which is to give protection of any administrative action in exchange for safety related information.

International Federation of Air Line Pilots Associations Perspective on Non-Punitive Safety Reporting Programs

The Pilots are an important stakeholder for the implementation of a non-punitive safety reporting program by the ANAC, specially because they must feel comfortable on how the program is structured and how the safety information will be handled. The International Federation of Air Line Pilots Associations (IFALPA) represents over 100,000 pilots in nearly 100 countries world-wide and can be used as a representation of the Pilots' stance about the non-punitive reporting programs.

According to IFALPA (2012), “It is widely recognized that a focus on the human factors associated with aircraft accidents and incidents is needed to further improve air safety, and a voluntary confidential reporting scheme can be an important part of that approach.

The Pilots actions and performance are in most times affected by conditions that are not under their control. In this scenario, the errors are more consequences and not root causes (IFALPA, 2008). In such a situation of unintended errors or deviations from the regulations, “only in exceptional circumstances involving criminal action, intentional or gross negligence, should blame be apportioned” (IFALPA, 2008).

The non-punitive environment or culture does not give immunity from consequences but gives fair treatment for pilots who proactively reports their mistakes, even if it includes the unintentional non-compliance of any regulation.

For the IFALPA (2008), “States must ensure that legislation is passed that enforces the non-punitive philosophy. Aviation safety can be enhanced by the establishment of a non-punitive culture, the focus of which is safety rather than the apportionment of blame”.

Brazilian Authorities current types of Air Safety Reports

Currently, ANAC makes available to the Brazilian aeronautical community five types of operational safety reports, reproduced below:

- Denúncia sobre Segurança Operacional (Denunciation affecting Operational Safety):
To denounce violations and crimes directly to ANAC. The Just Culture is not embraced in this report. In other words, there is no focus on safety management in this report.

- Reporte de Infrações de Tráfego Aéreo (Air Traffic Infraction Report): devoted to report air traffic infractions.
- Reporte de Dificuldade em Serviço (Difficulty in Service Report): to report an aircraft mechanic malfunction as per RBACs 21.3, 121.703, 135.415 e 145.221.
- Comunicação de Evento de Segurança Operacional (Operational Safety Event Communication): devoted to informing unwanted events occurred on an airport site.
- Relatório de Prevenção – RELPREV (Prevention Report): a form devoted to bringing information regarding safety direct to the organization where a threat or risk was identified. There is no interaction with the CAA.
- Relatório ao CENIPA para a Segurança de Voo - RCSV (Flight Safety Report to CENIPA): other CENIPA form, to report, situations which may affect aviation safety directly to the Brazilian NTSB. For instance, when a previous RELPREV was not sufficient to generate adequate action plans to mitigate a risk. It can protect the reporter id.

It would be simpler if they all shared a single platform for submission. The impeding reason is that the subject's content varies from one to another, and the desired treatment for the report vary for each case. Besides it, each type of report is correctly directed to the sector responsible for the solutions or adopting measures to be implemented (ANAC, 2016).

The above cited reports are not required to have a flow like that of ASRs processed internally by airlines (see Figure 6- Typical Aviation Safety Report Process), as they were not conceived under the SMS framework, which arose in 2009 (ICAO, 2018).

The Potential of the ASO and "Flight Alerts"

One of the potential outcomes of an ASR (Air Safety Report) Program by the Brazilian CAA is supporting the increase in the quantity of Operational Safety Alerts (ASO, in Portuguese) issued by ANAC. An ASO is an informative short paper widely disseminated to the Brazilian aeronautical community by ANAC. It is a tool to alert civil aviation operators about identified Hazards and unwanted situations likely to occur during operations. An ASO may contain recommendations for actions to be taken by aeronautical organizations. As a result, it contributes to avoiding or mitigating Hazards that could lead to incidents or accidents (ANAC, 2021).

	ASO	ALERTA DE SEGURANÇA OPERACIONAL	
Publicação:	26/07/2021		
Id do ASO:	0001-0/2021		
Atualização:	Versão original		
	O ASO contém informações importantes sobre segurança operacional e pode conter recomendações de ações a serem tomadas pelos operadores. Contudo, mesmo que uma recomendação seja publicada em um ASO, uma ação alternativa pode ser tão ou mais eficiente para o caso específico de cada operador e suas particularidades. O conteúdo deste documento não tem força e efeito legal e não se destina a vincular o público.		
Utilização de Condicionadores de Metais em peças e motores de aeronaves na aviação civil			
Recentemente, foi observada a utilização de produtos classificados como condicionadores de metais em peças e motores de aeronaves na aviação civil no Brasil. Salienta-se que todo e qualquer produto a ser utilizado como lubrificante, aditivo ou afins em motores aeronáuticos certificados, que estão incorporados nas especificações e aprovados pela ASTM e SAE, não requerem testes e aprovações adicionais pela ANAC. Por outro lado, caso o produto não esteja aprovado ou incorporado nos padrões da ASTM ou SAE será necessário demonstrar cumprimento com os requisitos de certificação de acordo com o RBAC 33 e Advisory Circular número 20-240. Para isso, é importante salientar que para a aprovação do produto:			
<ul style="list-style-type: none"> a) Deve ser demonstrado que o produto não tem efeitos adversos sobre o funcionamento, desempenho, durabilidade ou materiais dos produtos destinados ao uso. b) Deve ser demonstrado que o produto não tem nenhum efeito adverso no desempenho do combustível ou óleo com o qual se destina. c) Deve ser demonstrado que o produto é compatível com todos os outros aditivos, ou combinação de todos os outros aditivos, permitidos para uso no combustível ou óleo com o qual o produto se destina. 			
Recomendações feitas pela ANAC			
A ANAC não recomenda o uso de produtos classificados como condicionadores de metais não aprovados ou que não tenham evidência de aprovação por outra instituição congênere ou que não estejam de acordo com os padrões da ASTM ou SAE.			
Aos operadores aéreos, a ANAC recomenda que, caso exista histórico ou evidências de utilização de produtos não certificados, busquem imediatamente uma oficina de manutenção aeronáutica credenciada para uma avaliação mais detalhada. Ao identificar esse tipo de caso, os relatos poderão ser enviados para o endereço de e-mail: assop@anac.gov.br			
Aos fabricantes desse tipo de produto, caso desejem comercializar o produto para uso aeronáuticos, informa-se que deverá ser solicitado a aprovação junto ao fabricante de motores ou à ANAC, seguindo os regulamentos de certificação estabelecidos.			
Data desta versão	Publicado e distribuído pela		Versão
26/07/2021	ANAC – Agência Nacional de Aviação Civil		ASO-0001-0/2021
	https://www.gov.br/anac/pt-br/assuntos/seguranca-operacional/informacoes-de-seguranca-operacional/aso/alerta-de-seguranca-operacional		

Figure 12: Reproduction of an ANAC ASO Document. Source: ANAC

In addition to the ASOs, ANAC also issues documents entitled "Flight Alerts" (Alerta de voo, ANAC 2021). They consist of publications from aeronautical accidents investigations (reactive safety management approach) or situations in which the CAA identifies potential risks to air operations - predictive or proactive approach (Hsu, 2007).

ASR processed by ANAC would bring more information to support the increase of ASO's and Flight Alerts quantity. This is important if we consider that successful action plans placed by one company do not carry the chance to be implemented by its peers – if they identify it as pertinent, of course.

As per the ICAO Doc 9859, each organization has its own culture and particularities. Therefore, a successful action plan implemented by one organization does not mean that it will have the same effect on other companies, even if they operate in the same market (ICAO, 2018).

It is appropriate that each one decide on their own if they should implement the same action plan, adapt it, or do not take it by any means. To guarantee the chance to evaluate it is something possible to be built if ANAC implements its own ASR program.

One of Flight Safety slogans by CENIPA is: "In accident prevention, there are no secrets, nor flags." (Filosofia SIPAER). That being so, there is a culture of exchanging sensitive information and safety action plans within the aeronautical community, "on-demand." It is facilitated by a positive Safety Culture and Just Culture. Still, these sensitive information and safety action plans adopted by each organization are restricted to its sole database and operational security management platform.

The Brazilian regular air transport carriers are governed by RBAC 121. On its subpart BB, RBAC 121 requires air operators to conduct a formal process to identify hazards and their consequences, so that each risk is then classified as intolerable or tolerable with mitigation. An action plan must be implemented for each identified hazard (ANAC, 2021).

Each Brazilian regular air transport carrier must have robust Safety Departments to seek and manage the risks of their identified threats. They issue their own safety alerts, but it is a process which is intrinsically restricted to internal use.

The strength of an ASO issued by ANAC can help prevent unwanted occurrences within all the air operators. They are within easy reach of the entire aeronautical community.

Summary

This literature review is only a small part of all the available literature available about the non-punitive reporting programs. According to the other countries CAA regulations, articles, books and manuals, the non-punitive safety reporting programs are a relevant subject for the airline industry safety and need to be approached worldwide, with focus on creating and maintaining a favorable ambient to a strong voluntary reporting system based on non-punishment policy supported by the application of the Just Culture concept.

Chapter III

Methodology

This research project focused on exploring potential benefits of implementing a non-punitive voluntary safety report by the Brazilian Civil Aviation Authority. This chapter presents the methodology that was used to understand the cultural aspects of Safety Reporting. In addition, the Chapter focused on understanding how airline pilots and safety managers perceive the non-punitive reporting programs in the aviation industry.

Unlike other careers in the air transport industry, airline pilots receive training aimed at operational safety and the culture of voluntary and mandatory reporting from the earliest stages of their careers. In addition to scope limitation issues, this study was designed to survey cultural aspects of safety reporting only among licensed airline transport pilots working for a company operating under the requirements of RBAC 121.

Nevertheless, to be effective, a voluntary reporting program must allow all employees from any area of an airline to participate by issuing reports and receiving feedback on the results of their contributions. According to the FAA, “ASAPs can be used as part of the employee reporting system for the employee groups covered by the ASAPs. However, the confidential

employee reporting system required by part 5 must include all employees in the company” (FAA AC 120-92B, 5-2. (2) (b)).

A questionnaire with nine questions was distributed to collect the Airline Pilots' perspective about implementing a non-punitive voluntary safety report program by the Brazilian Civil Aviation Authority. The results of the questionnaires were tabulated.

Besides the form, a structured interview was prepared for Safety Managers of Brazilian airlines, ANAC, and the Pilot's Association. In addition to the questionnaire, this interview brought the perspective of the different stakeholders involved in the Safety Reporting Program.

Although CENIPA is currently the institution responsible for receiving ASRs within the Brazilian state (see chapter 2 - The Brazilian Civil Aviation Safety Oversight), the researchers chose not to interview the managers in charge of the RCSV program, as the focus of this study is on the benefits of an ASR program managed within the scope of the Brazilian CAA.

The results of the questionnaire and interviews are described in Chapter IV.

Experimental Design

The researchers designed two types of experiments to be applied:

- A questionnaire to be answered by Airline Pilots, to assess the Brazilian airline pilots population perception (through a sample) about the implementation of a non-punitive safety reporting program by the Brazilian Civil Aviation Authority.
- An interview with five questions was conducted with Airline Safety Managers, Pilots Association representatives, and ANAC managers.

Data Collection and Analysis

This research methodology used primary sources, such as the questionnaire and interview forms, and secondary sources, such as ANAC data available regarding the number of airline pilots with currently issued licenses.

Questionnaire - Data Collection

The Implementation of a Non-Punitive Operational Safety Reporting Program questionnaire was designed with the focus on airline pilots. It was distributed by social media and the Airline Pilots Association. The questionnaire was a set of 9 multiple choice questions and one open question for additional comments. The questions are listed below:

1. Gender

- Female
- Male
- N/A

2. Age

- 20 or less
- 21 to 30
- 31 to 40
- 41 to 50
- 51 to 60
- 61 or more

3. Professional Position

- Captain

- First Officer
4. Operation type
- Regular Airline (RBAC 121)
 - Air Taxi (RBAC 135)
 - Private (RBAC 91)
5. Flight Experience (flight hours)
- 150 - 500
 - 500 - 1000
 - 1000 - 2500
 - 2500 - 5000
 - 5000 or more
6. Have you ever filled out a Safety Report for your company, reporting an error made by you?
- Yes / No
7. Have you ever filled out an RCSV (CENIPA) reporting an error you made?
- Yes / No
8. If ANAC implements a Safety Reporting program that protects you from any administrative sanction, would you report a mistake?
- Yes / No
9. In this case, where ANAC implements a Non-Punitive Safety Reporting program, you would report an error to: (Select one or more options)
- ANAC
 - Your Company's Reporting Program

- RCSV (CENIPA)
- Would not report

10. Additional Comments

The main objective of this questionnaire was to understand the credibility that a possible Non-Punitive Safety Reporting program from ANAC would have with the group of pilots. The most relevant question for this research project was Question Nine. It proposed a situation to the respondent, where pilots answer if they would choose the reporting program already known within the airline of employment, or the one made available by the Brazilian NTSB, or the use of a possible new program implemented by the Brazilian CAA – more than one option was accepted as a valid answer.

Therefore, this Question concentrated on how comfortable pilots would feel about the new program. This factor was relevant, as set out in the Chapter Two- heading "Punitive Safety Reporting Programs". As potential safety information producers, pilots are essential stakeholders in the implementation of this program.

The Questions numbered from One to Five aimed to better understand the sample demographic information. Thus, it allowed applying filters to better understand the pilots' expectations, according to a given group (pilots operating under RBAC 121).

Questions Six and Seven were targeted to identify the pilot's previous experience regarding safety reports.

Although slightly like question nine, question eight only provided information about whether the pilots would use the Brazilian CAA's Safety Reporting program. Thus, it did not confront the new program with the one already established in the pilot's routine. For this reason, it had a different focus than Question Nine.

Questionnaire – Demographic Analysis

A survey was implemented, and we received a total of 539 answers, (488 of them from Airlines pilots) which represents around 10% of the number of Airline Transport Pilots in the Brazilian Aviation Market.

The research collected 5 different information points that allowed for a better understanding of the relevance of the obtained sample. This information included the experience of the pilots, which can directly influence their perception of the systems currently adopted by the safety area of their respective airlines.

The first information point referred to the respondent's gender. See Figure 8. Although it was not directly related to the objective of this work, it was possible to identify the largest number of male pilots, which reflected the reality of the job market in this profession itself.

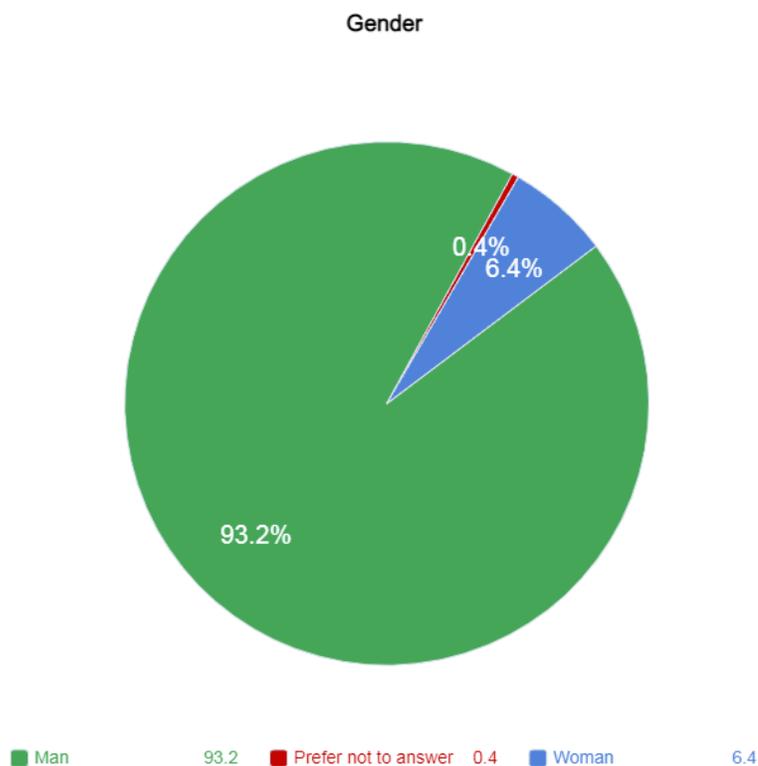


Figure 13: Gender

The pilot's age was relevant for a better understanding of his professional experience. The longer the time in the profession, the more the pilot was exposed to risky situations. In addition, the greater the chance that the pilot has made a report to the safety area of the pilot's company. The result would be that the pilot was aware of and/or familiar with the current system of reporting employed by the pilot's airline.

As it is possible to identify in the Figure 9 – Age, more than half of the pilots interviewed are over 30 years old, which indicates a very relevant experience in aviation.

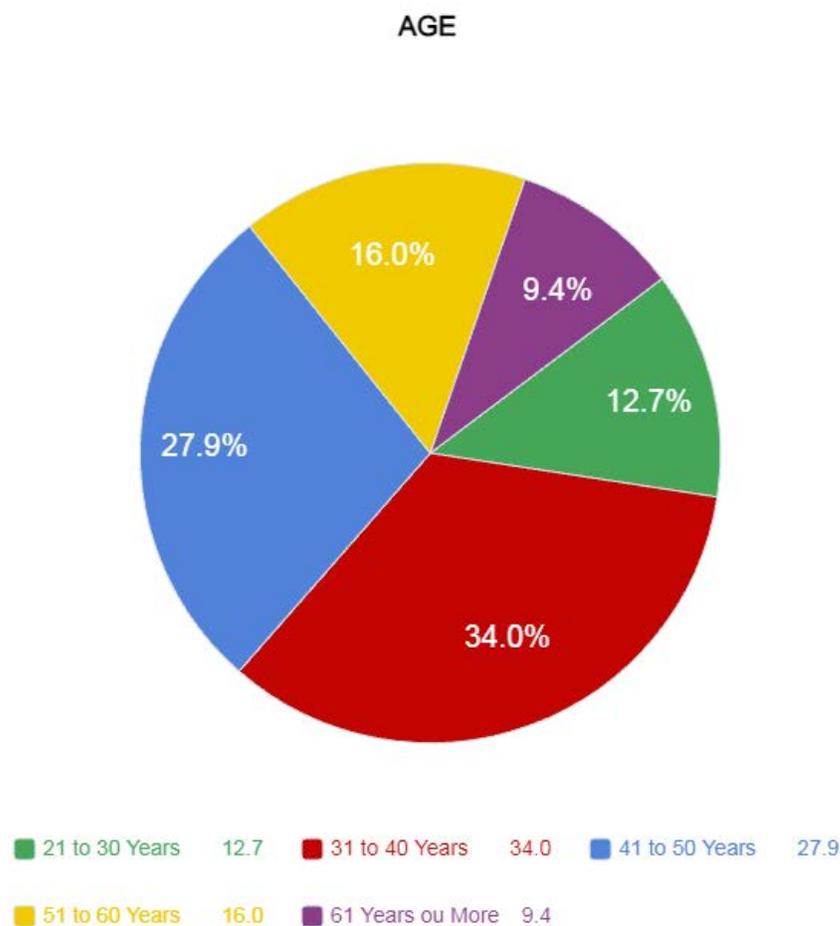


Figure 14 - Age

The professional position reflected what role the pilot has on board and can basically be divided into two groups: Captain and First Officer. As shown in “Figure 10 - Professional Position”, our survey counted several participating Captains, relatively higher than the number of First Officers.

Since the promotion to Captain only happens after years of experience, the fact that this indicates a greater number of Captains responding to the survey. The survey therefore meant that our sample has many pilots with considerable flying experience. Consequently, the survey had pilots who have already witnessed threat situations and have probably already made use of current reporting systems available in companies. This information was further confirmed by the results of the flight hours of the respondents.

Professional Position

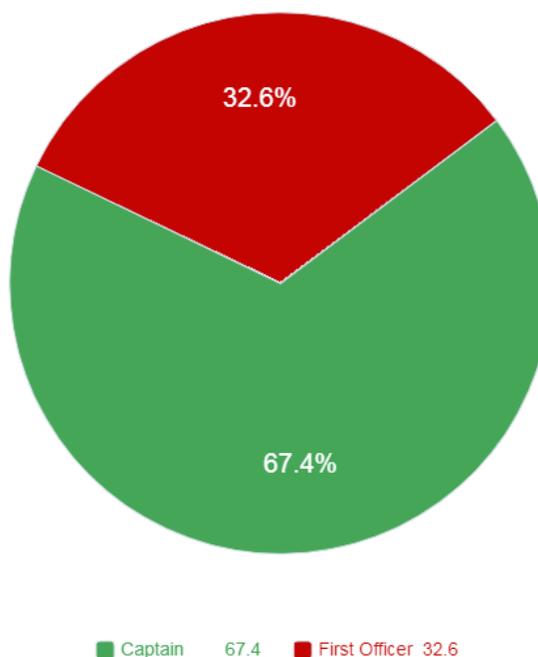


Figure 15: Professional Position

The type of air transport operation (RBAC 121, 135 or 91) was directly related to the objective of this work. The research was conducted with several types of pilots. The group this work was aimed at, and which was the largest possible sample desired was the group of pilots working for the airlines operating under the RBAC 121. The target group comprised of about 90% of the pilots surveyed. See Figure 11. This was because this type of operation was carried out by large airlines that usually already have self-report systems for their pilots.

The other two samples are small and not relevant for the purpose of this work. They consist of Charter Services and Private Pilots. Therefore, the researchers excluded their responses from the results before developing the conclusions and recommendations.

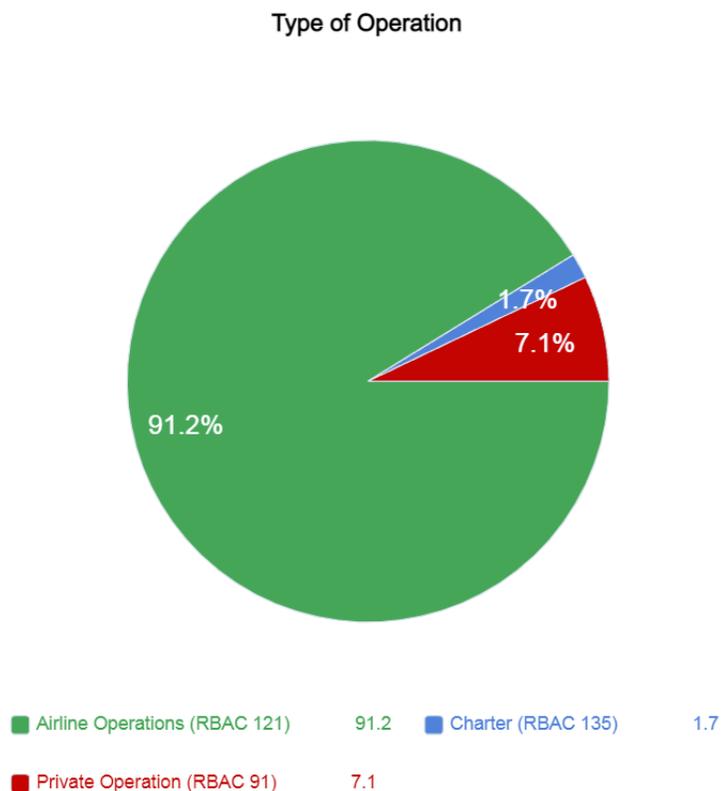


Figure 16: Type of Operation

As explained above, the flight experience was added to the age of the pilots and the ranking to better understand the pilot's experience in situations that put flight safety at risk.

As identified in the previous graphs, the interviewed pilots mostly have vast flying experience. It was possible to identify in “Figure 11 - Flight Experience” that more than 74% of the pilots have more than 5,000 hours of flight. This was the highest experience rating present in our research.

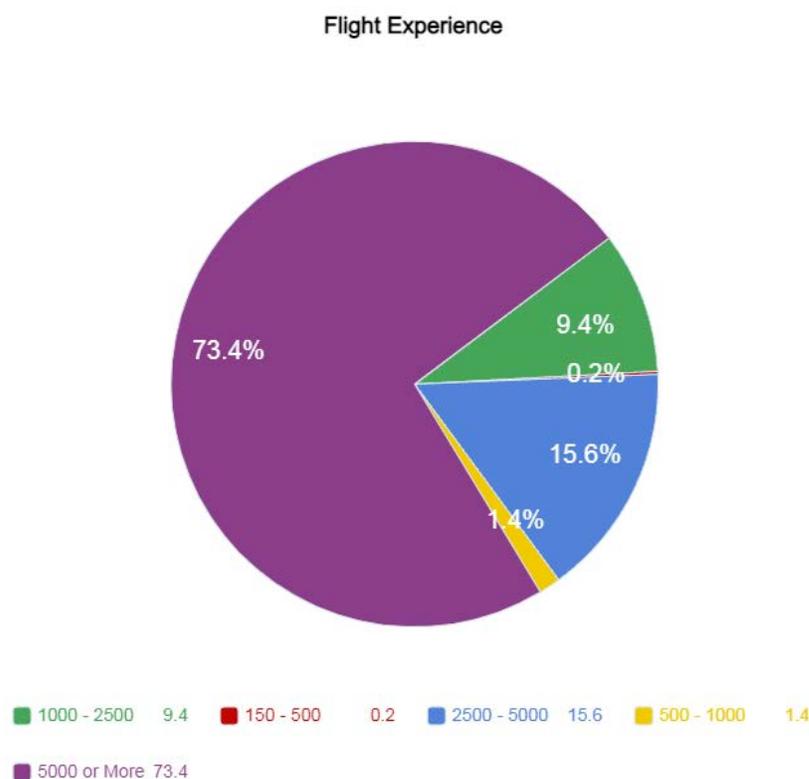


Figure 17: Flight experience

Interviews - Data Collection

The interview format was designed to collect the safety managers perspective from three stakeholder's (Airlines, pilots association and Brazilian CAA) over the possibility of a new ASR program within the scope of the Brazilian CAA. The interview questions are listed below:

For Airline Safety Managers:

1. Does your airline have a Just Culture program in place?
2. If any Pilot self-reports a mistake or error, how is this information managed internally?
3. Has your organization any policy to protect Pilots that self-report mistakes or errors against disciplinary actions?
4. Do you know about any non-punitive safety reporting program established by any civil aviation authority? If yes, which one?
5. If ANAC establishes a non-punitive safety reporting program, would the airline be willing to be a participant?

These were the questions asked of the ANAC representatives and Pilots' Union Safety Managers:

1. Based on the premise that "the more reports, the better is the risk management", in the view of your organization, what would be the main point of improvement pertinent to the current system of voluntary reports made available by the Brazilian aeronautical authority to encourage an increase in the number of reports?

2. In your opinion, what should be done to increase the efficiency of the ASR-RCSV process flow?
3. Beyond that point, what else would you change in the ASR-RCSV processing flow your institution manages?
4. The latest regulation issued by the Brazilian Aeronautical Authority on Safety Reports (Portaria N° 5.754/2021) meets what expectations of your organization? Does it bring significant process improvements (advantages or disadvantages, if any)?
5. Do you know about any non-punitive safety reporting program established by any civil aviation authority? If yes, which one?
6. If a non-punitive reporting program were created involving these 3 stakeholders (ANAC, Employee Representative Entity and Airline), would your organization be willing to participate?

These Questions had three main objectives. The first objective was presented in the structure of Questions One, Two, and Three. They were designed to assess the current level of Just Culture program in each of the leading Brazilian airlines today and how it was applied.

Question Four is related to the second objective, which was to assess the perspective that the Airline Safety Managers have about a non-punitive self-reporting program being established by the Brazilian Civil Aviation Authority.

Question Five met the third objective, which was to understand the level of involvement that each airline would be willing to have, together with ANAC and other companies, in the collaborative construction of the program that was the focal point of this research. This Question

was one of the most important in the survey. It involved the construction of the proposed program.

As the first three Questions were not applicable to the ANAC, ~~CENIPA~~ and Pilots' Union Safety Managers, they were replaced by other Questions that brought relevance to the study.

Question Six's objective was to compare the answers with the gaps identified in the methodology of this project.

Questions Seven and Eight were designed to identify whether there were any common points among stakeholders regarding suggestions for improving the ASR protocol and its process within the scope of the Brazilian state.

As established in Chapter Two of this work, "State Safety Program," the collaborative work between airlines and the State was essential for the program's success.

Interviews – Analysis

The pilots survey has already added to this project a clear perception of the Airline Pilots about the program., and a total of seven interviews were carried out. Each interview had at least two members of this research group. The interviews were performed by videoconference or in person. All the interviews were voluntary.

During the interviews, there was an opportunity for the interviewees not only to answer the suggested questions, but also to try to express the current challenges of their current programs. They brought insights for future related programs and whether if this project proposal would fit into their organization plans.

This work aimed to maintain the anonymity of the interviewees; thus, the names and positions will not be opened. The respondents were from the three major Brazilian airlines safety area, Union representatives and two representatives from ANAC.

The pilots survey and safety managers interview conclusions and recommendations will be approached on Chapters Four and Five.

Chapter IV

Conclusions

This chapter was structured in order to enable a clear and objective understanding of the results of this research. Thus, a division into 3 sub-chapters was adopted, treating each of the 3 main conclusions independently, and connecting them when appropriate.

First, the 3 conclusions will be presented very objectively, highlighting in bullet points only the essential aspects of this work. Later in this chapter, each conclusion is presented with greater detail, where the graphics and research that highlight the main conclusions are given due emphasis.

Conclusion 1 – Pilots safety reporting culture

- **Data Collection method**

The data for conclusion 1 was collected using questions 5, 7, 8 and 9 in the survey applied to Pilots, as per chapter 3 as well as the field available for respondents to write any additional ideas or comments.

- **Results**

The data collected shows the Pilots willingness to report error and mistakes to the National Civil Aviation Authority in exchange for protection against administrative sanctions.

The various survey respondents reported a lack of confidence in submitting self-reports to the ANAC. Indeed, they reported greater confidence in reporting directly to the companies; however, if ANAC implemented a new ASR program that protected the pilot from administrative sanctions, the pilots would be willing to participate.

If ANAC implemented a new ASR program that protected the pilot from administrative sanctions, the pilots would be willing to participate.

- **Conclusion**

The results and data collected validates the ICAO statement that whether individuals are willing to report their experiences and errors is mainly dependent on the perceived benefits and disadvantages associated with the act of reporting (International Civil Aviation Organization, 2018). We can conclude that respondents were confident in reporting as long as there is a very clear process with a guarantee of non-punitiveness and the three main stakeholders agree to participate in a collaborative ASR program. If the Brazilian Civil Aviation Authority desires to improve the safety data collection using the Safety Reporting program, a new non-punitive Safety Reporting Program should be implemented by Brazilian CAA taking similar strategies like other civil aviation authorities successfully implemented around the world (see Chapter II).

Conclusion 2 - ICAO Annex 19 fulfillment and the RCSV

- **Data collection method**

The data for conclusion 2 was collected using the question 6 and 7 in the survey applied to Pilots, as per chapter 3 as well as the field available for respondents to write any additional ideas or comments.

- **Results**

The data shows that users are willing to report their experiences; however, due to the lack of clarity in the process, they simply end up reporting exclusively to their companies.

The data collected shows a lapse in the use of the RCSV, as only 11% of the pilots that answered the survey informed that they have already reported their errors.

- **Conclusion**

The Brazilian Civil Aviation Authority considers the CENIPA RCSV as the method of compliance with the requirements of the ICAO Annex 19 for a voluntary safety reporting system, but the RCSV appear not to be the most effective tool to fulfill the requirement since approximately 88% of respondents have never filled out an RCSV reporting an error.

Although there is already an official channel for pilots reporting identified hazards - the RCSV - most of the airline pilots simply do not use it. Therefore, there is evidence that, despite the existence of an official channel available by a Brazilian aviation authority, there is room for improvement regarding the quantity of ASR collected by the Brazilian aviation authorities.

Conclusion 3 – Stakeholders Perspective

- **Data collection method**

The data for conclusion 3 was collected using the interviews aimed at stakeholders of the Brazilian Civil Aviation System.

○ **Results**

If the three main stakeholders agree to participate in a collaborative ASR program, we have a favorable scenario for the Brazilian reporting system to evolve. Either through a new system or by redesigning the current primary system (RCSV). According to the interviews with the Safety managers of the airlines, it was possible to see that a program of voluntary and non-punitive reporting is well regarded as long as the policies, processes, and procedures are very clear and defined among all those involved.

Currently, Just Culture is a topic already discussed at the highest levels of airlines. The idea passed on in the interviews showed use and interest in predictive processes, new pillars of safety culture, and a change in aviation culture in favor of better results, aiming at improving operational safety.

○ **Conclusion**

Furthermore, according to interviews with airline safety managers, they would also be willing to participate in such a program. In the same way, the association representing the pilots reinforced its commitment to the non-punishment policies regarding voluntary reporting programs. To complete the research on the willingness of the main stakeholders involved in a new voluntary reporting program, ANAC's Safety managers also responded positively about the possibility of an ASR program along the lines of the ASAP.

Description of Conclusions (Background)

Conclusion 1 - Pilots safety reporting culture

According to the survey, most pilots responded that they would report errors and mistakes to the Brazilian Civil Aviation Authority if a non-punitive reporting program is implemented by the Authority.

If ANAC implements a Safety Reporting program that protects you from any administrative sanction, would you report a mistake?

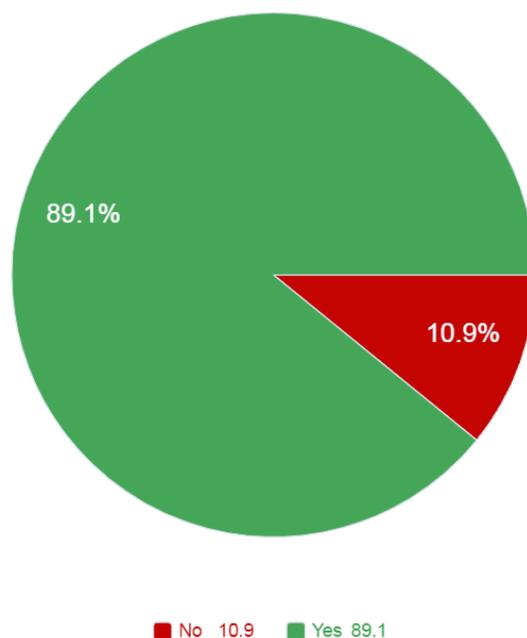


Figure 18: Pilots willingness to report under a non-punitive safety reporting program

About 89% of the Pilots informed that they would be willing to report error and mistakes if ANAC implements a Safety Reporting program that protects them from any administrative sanction.

The aviation industry is a complex system. Errors and mistakes will be made by pilots during their routine and no-routine operations. The fear of being punished by the Civil Aviation Authority may not be attractive to voluntary reporting. This fear by a mistake or error could inhibit the submission of safety reports by the pilots and, therefore, aviation authorities and air operators may lose the opportunity to identify systemic or organizational problems more relevant than the error itself.

According to Himmelstein (1999), the fear of consequences on the job and disciplinary actions appears as one of the top reasons for the under-reporting phenomena.

One of the current gateways to reporting that can help with the reporting of safety issues is the mandatory reporting program. In these reports, pilots must report any operational irregularities (IROPS), errors, violations, or any situation that may be required by the company. The only problem with this kind of reporting is the fact that there is no protection for the reporter against administrative sanctions.

In the USA, the aviation regulatory body (FAA) is the same which oversees the ASAP program. Nonetheless, in the same way that airlines managed to convey confidence to their employees by reporting identified hazards to them without fear of suffering internal retaliation, the Brazilian aviation authority can develop this trust among its regulated users. Again, this is a matter of a positive safety culture

It is important to note that question 8 does not establish many details of what the proposed reporting system would be, it only establishes the condition that it would be a non-punitive system. The positive response of a large majority of respondents to this question leads us to conclude that one of the most relevant characteristics for pilots adherence to a voluntary reporting system is its non-punitive characteristic.

In August of this year, a joint regulatory publicized by ANAC and COMAER was released, seeking to develop ways to improve the Reporting System for Brazilian Civil Aviation. The favorable scenario identified by conclusion five of this study shows that stakeholders are willing to work together to improve the voluntary reporting system within the Brazilian state aviation authority.

Conclusion 2 – ICAO Annex 19 fulfillment and the **RCSV**

According to the research carried out, it is clear that a high safety reporting culture level is present in the approached crew, as provided for in DOC 9859 “how people behave about safety and risk when no one is watching.” The collected data shows that 89% (figure 13) of the group of pilots would report mistakes if the ANAC implements a Safety Reporting program that protects them from any administrative sanction.

Another important aspect that validates the perception of the high levels of safety reporting culture among the Airline Transport Pilots is the fact that more than 70% of the pilots reported that they have already filled out a Safety Report for their company self-reporting an error.

Have you ever filled out a Safety Report for your company, reporting an error made by you?

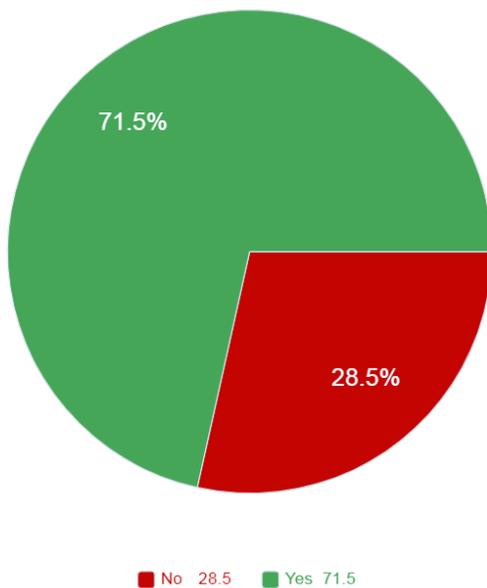


Figure 19: Pilots reporting safety culture

Have you ever filled out an RCSV (CENIPA) reporting an error you made?

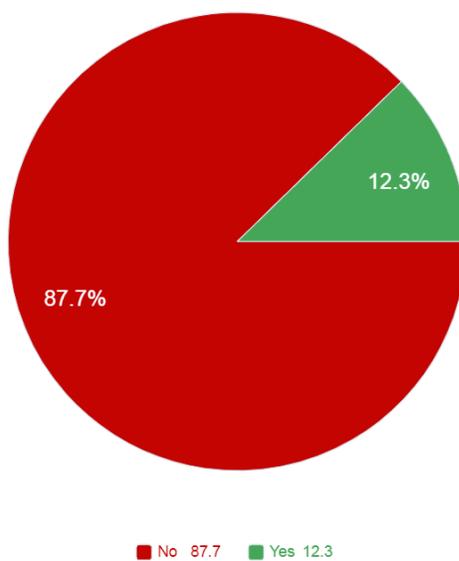


Figure 20: Pilots reporting error

Therefore, we can conclude that system users need greater clarity on where, how, and when they should make their voluntary self-reports.

Despite the Safety Culture of reporting being present in the Brazilian airline Pilots' group, this culture is only effective in reporting errors to airlines and not to the aviation authorities. The CENIPA RCSV is considered by the Brazilian Civil Aviation Authority the State Reporting Program, but the tool has not seemed to be used by the pilots to report error or mistakes when compared to the airlines own ASR tool. This is supported by the survey, which identified that only 11% of the pilots have filled a RCSV reporting a self-error (Question 7, Figure 14) while 71% of the pilots have already filled a Safety Report for its company program (Question 6, Figure 13).

It is interesting how respondent pilots are available to report as long as there is a guarantee of non-punitiveness. Among pilots, there is a culture of safety that is disseminated from the beginning of their careers and continues to be implemented when these pilots join an airline. As pilots, they know the importance of reporting but do not always feel comfortable reporting a situation, be it an occasional mistake or even a violation.

Therefore, it is possible to affirm that the pilots are willing to carry out voluntary reporting and that the RCSV, in its current form, as the Brazilian State Safety Reporting program, might not be the most effective tool to capture threats, errors and mistakes.

Conclusion 3-- Stakeholders Perspective

According to the identification with stakeholders, a concern with aviation safety was unanimous.

Safety is the priority for ICAO and its allied states. The interviews show the need to optimize the voluntary reporting system and that, mainly, Brazilian CAA creates and establishes the system, rules, and interaction between stakeholders.

It is interesting to note that the stakeholders are concerned with advancing the safety culture, always protected by a just culture, for all areas of aviation, which are not just pilots. Thinking about this vision in spreading, improving, and increasing aviation safety in the country, it is concluded that there is a willingness to take part in projects that include these themes.

An important point as well as the issue of establishing clear rules so that everyone involved is comfortable and trusting in the entire process.

Chapter V

Recommendations, **Future Research**, and **Lessons Learned**

Considering all the data collected and the analysis performed, the researchers found evidence to support a few recommendations. We believe that these recommendations will improve the safety in the Brazilian airline aviation industry. Each recommendation is related to at least one conclusion listed on Chapter 4 of this study.

- **Recommendation One:** ANAC should launch a new ASR program, with a different scope from RCSV
- **Recommendation Two:** ANAC should promote the Just Culture concept within the Brazilian Civil Aviation
- **Recommendation Three:** CENIPA needs to promote the Just Culture concept within the Brazilian Civil Aviation

- **Recommendation Four:** The Operational Safety Committee (PSO-BR) should review the suitability of RCSV program, and/or ANAC should have complete access over safety data available by the Brazilian official Safety Report program
- **Recommendation Five:** If a new voluntary self-report program is adopted, ANAC should involve all the stakeholders to collaborate on the program design

Description of recommendations (Background)

Recommendation One

The Brazilian National Civil Aviation Authority should evaluate the implementation of a non-punitive self-reporting program, as some other authorities around the world have already implemented. This non-punitive self-reporting program must have a clear process and requirements in order to facilitate the Pilots and Airlines Managers understanding about the benefits and consequences regarding their participation in such program. Moreover, the program must be supported by the Just Culture concept, which was not identified within the ANAC SMS literature review.

In this context, the ICAO Annex 19 declares that “States shall take necessary measures, including the promotion of a positive safety culture, to encourage safety reporting through the systems referred to in 5.1.2 and 5.1.3” (ICAO, Annex 19, 5.3.5). “States shall establish a mandatory safety reporting system that includes the reporting of incidents”. (ICAO, Annex 19, 5.1.2) and “States shall establish a voluntary safety reporting system to collect safety data and safety information not captured by mandatory safety reporting systems”. (ICAO, Annex 19, 5.1.3).

Besides it, according to Article 60 of the PSOE-ANAC, in order to operationalize the risk management process, the ANAC itself must establish means capable of recording, treating and monitoring data and information related to hazards and risks.

This Recommendation also complies with the provisions of Article 74 of the PSOE-ANAC, constituting a way for ANAC to establish a means for the collection, storage and use of operational safety data and information originating from its external environment.

Recommendation Two

As an opportunity to increase awareness and improvement of the operational safety culture (complying with PSO-BR Article 26), it is also recommended to the Brazilian National Civil Aviation Authority to promote educational and clarifying actions and policies that make the pilots willing to report their errors and violations as much as they already do to their airlines. Like the airline's internal ASR program, the Brazilian state's non-punitive self-reporting program needs a robust campaign to raise awareness among pilots (actually among all the aviation community) on the use of Just Culture by the Brazilian National Civil Aviation Authority in the management of voluntary reports. That the collected information will be used solely for operational safety purposes, even being processed by the regulatory authority.

Recommendation Three

The Brazilian Investigatory Aviation Authority should update the CENIPA NSCA 3-3 (Flight Safety Management in Brazilian Aviation) to include more aspects and concepts of just culture and non-punitiveness.

Recommendation Four

Although the CENIPA RCSV is considered by the Brazilian State to fulfill the requirements of the Annex 13, it is clear that airline pilots do not normally use this channel to report Hazards. So, it is recommended to the Brazilian Aviation Authorities to review the suitability of the CENIPA RCSV as the method of compliance for the purpose of the ICAO Annex 19.

As two aviation authorities in Brazil (ANAC and CENIPA) share the responsibility of managing the operational safety of civil air activities in Brazil, the collection and processing of voluntary reports is not favored. Nonetheless, it is difficult for one authority to adopt incentives or waivers of administrative sanctions without overriding the attributions of another authority.

In this context, due to the structure of the PSO-BR, the adoption of the same strategy used by the FAA ASAP is hampered. Nowadays it is necessary extreme coordination, cooperation, and collaboration among two authorities to promote an increase in the number of reports processed by the Brazilian state.

Furthermore, according to the Operational Safety Supervision Plan (PSSO-2019)— a Safety regulation document prepared in periodic cycles aiming to contribute to the continuous improvement of the operational safety of Brazilian civil aviation— ANAC““seeks to establish the necessary channels for collection , storage and use of operational safety data and information from its internal and external environment, as a subsidy for the improvement of its operational safety assurance processe”” (PSSO 2019 ANAC, pg 9).

This Recommendation also complies with the provisions of the 3rd paragraph of Chapter 1 of the PSSO-2019, which describes which initiatives arising from the collection and analysis of data and information serve to achieve the objective number Four of the PSSO, which is““Improve the implementation of the PSOE- ANAC”” The researchers believe that this Recommendation is in line with ANA’s stated objective of““implementing a risk-based surveillance mode””, as well as““improving the sharing and exchange of operational security information, including supporting the operationalization of the Safety Data Collection and Processing Sysytem (SDCPS) of the PSO-B”” (PSSO 2019 ANAC, pg 15).

Recommendation Five

If the Brazilian Civil Aviation Authority decides upon the implementation of a new non-punitive reporting system, the Pilots Associations and Airline management should be involved and participate in the development and implementation of the program. With a more robust system of confidentiality in the processing, Brazilian airlines could also be willing to share their safety data with the Brazilian CAA and improve the State Safety system.

This Recommendation complies with the provisions of Article 75 of the PSOE-ANAC (2019), by suggesting the development of initiatives for the sharing of operational safety data and information, in collaboration with the civil aviation industry.

Future Research

- The researchers believe further studies should be conducted to assess the benefits of a non-punitive safety reporting program to embrace other aviation professionals excepted from pilots. Mechanics, flight attendants, flight dispatchers, ground personnel, Airlines' Operational Control Center professionals, different segments other than just airline pilots, etc. There are many others involved that can also be part of a non-punitive reporting system, improving the overall safety performance of the Brazilian Aviation Industry.
- Besides it, to develop studies for the Brazilian CAA not to be exposed to accusations of interference as a supervisory body. For example, the Brazilian aviation authority needs to be legally supported not to be accused of misconduct if it does not punish a user who violated an ANAC regulation.

Lessons Learned

- The main learning point from this work is that there is a strong safety culture among Brazilian airline pilots. The active participation of the National CAA in a structured and robust non-punitive safety reporting program can favoring the operational safety performance of the entire Brazilian air transport industry.
- Regarding the pilots who participated in the survey, we noticed their commitment to flight safety and concern for a Just Culture. Therefore, any implementation must be based on knowledge and non-punitiveness.
- Another problem identified was the unavailability of published statistics on the number of action plans (the result of a processed report) in response to the Hazards identified by the voluntary reports received by the Brazilian State through the RCSV program. Researchers have identified a robust ASR system within Brazilian airlines.
- It is not the purpose of this study to propose the replacement of those programs. The researchers understand that there would be a setback in the risk management carried out by Brazilian Airlines if civil aviation professionals stopped using the airlines own ASR program and started using only a new self-report program. The researchers believe that such programs are complementary, not “competitors”. Likewise, the researchers emphasize that a “Brazilian ASAP” should not be seen as a competitor to the existing RCSV. This is based on the fact a self-report is not protected within RCSV protocols. In RCSV, only the reporter has their identity preserved, and the reported does not (NSCA 3-3, section 3.6.2.5; 2013). If both are the same person, there would be a discouraging conflict to fill out a self-report.

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Appendix A

Questionnaire

*EMBRY-RIDDLE*
AERONAUTICAL UNIVERSITY

Non-Punitive Safety SELF-Reporting Survey

The ICAO Annex 19 requires from the contracting states the implementation of a voluntary safety reporting system. The purpose of this system is to collect safety data and safety information that may not be captured by other processes. Whether Pilots are willing to report their experiences and errors is mainly dependent on the perceived benefits and disadvantages associated with the act of reporting. Many Civil Aviation Authorities around the world have implemented a voluntary self-reporting program. This program contains protections against any administrative sanctions.

This research project's goal is to identify the potential benefits of implementing a non-punitive voluntary safety report by the Brazilian Civil Aviation Authority. The results of the research project are expected to contribute to Brazilian aviation industry safety, by bringing value to the airline industry, managers, pilots, and other aviation professionals.

Feedback from you on this Survey will go a long way to helping us ascertain key aspects regarding the reporting of safety issues. Your contributions through this Survey will be appreciated.

We know that you have busy schedules but please try to complete the Survey on or before Sunday September 6th.

Thank you!

Gender

- Female
- Male
- Prefer not to say

Age

Your answer _____

Professional Position

- Captain
- First Officer

Operation Type

- Regular Airline (RBAC 121)
- Air Taxi (RBAC 135)
- Private (RBAC 91)

Flight Experience (Flight Hours)

- 150 - 500
- 500 - 1000
- 1000 - 2500
- 2500 - 5000
- 5000 or more

Have you ever filled out a Safety Report for your company, reporting an error made by you?

- Yes
- No

Have you ever filled out an RCSV (CENIPA) reporting an error you made?

- Yes
- No

If ANAC implements a Safety Reporting program that protects you from any administrative sanction, would you report a mistake?

- Yes
- No

In this case, where ANAC implements a Non-Punitive Safety Reporting program, you would report an error to: (Select one or more options)

- ANAC
- Your Airline ASR Program
- RCSV (CENIPA)

Additional Comments

Your answer _____