



# Regulatory outcome evaluation of rescue and fire fighting deregulation for small airports

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Mastère Spécialisé Air Navigation Management 2018

**Alexandre Romano MASSIGNAN BEREJUK**

MS ANM18

# End of Studies Project Memoir

April 2, 2021

Regulatory outcome evaluation of rescue and fire fighting deregulation  
for small airports

**2021**

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# Flyleaf

# **ABSTRACT**

Aircraft Rescue and Fire Fighting (ARFF) is an important component of an airport safety system. It is also costly, especially for small airports that process less than 200 thousand passengers per year.

In December 2017 ANAC, the Brazilian Civil Aviation Authority, enacted a new rule that disengaged Rescue and Fire Fighting as a requirement for small airports that intend to have scheduled flight operations. As in any safety rule, there are rationales that led to such regulatory effort and targets to be reached by these means.

The aim of this paper is to assess whether the objectives of such deregulation have been achieved as of December 2020.

## **Keywords**

Aircraft Rescue and Fire Fighting; Deregulation; Regulatory Outcome Evaluation

# ACKNOWLEDGEMENTS

It is not possible to write about the year 2020 without considering the impacts of the Covid-19 pandemic on the way mankind relates itself with work, people and the planet. Although being far from over and its outcomes not being definitely measurable, this event may be considered as the beginning of a new era.

I thank everyone at SAC, ANAC and ENAC that made this course a reality.

The author could not have accomplished this report without the collaboration and patience of workmates at ANAC, and of course, of all colleagues of the course. We make a good team.

Last, but definitely not least, many thanks to Olivia, Meire and Luciana who were our link with ENAC and patiently helped us reaching the end of the course.

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# **CHAPTER 1**

## **INTRODUCTION**

### **Background**

One of the components of an airport that people hardly ever see at work are the firefighters. Although not always visible, they are generally considered a critical part of airport safety system (in the sense that it cannot fail) and one of the last barriers in case of an accident.

In December 2017, ANAC, the Brazilian Civil Aviation Authority, issued a new rule on Aircraft Rescue and Fire Fighting (ARFF), setting the bar for the compulsory need of ARFF only for airports that process over 200 thousand passengers per year, including arrivals and departures. Three years since its implementation, such rule demands an assessment on its effectiveness and the direct or indirect benefits it may have brought.

There are, as of today, 214 public aerodromes in Brazil. These are the ones that can have scheduled flights (as opposed to private aerodromes, that can be roughly described as those that can be used only by their owner). Of these 214 aerodromes, 123 have regular, or scheduled, flights. This group of airports with regular operations is the object of this study.

There are different types of airports, according to size or operation profile. Such diversity demands different requirements. Airports in Brazil are ranked by ANAC, for safety regulation purposes, in four categories. They all relate to the number of passengers processed yearly:

Class I (up to 200 thousand); Class II (more than 200 thousand up to 1 million); Class III (between 1 and 5 million) and finally Class IV (more than 5 million passengers per year).

Rescue and Fire Fighting (RFF) used to be a requirement for all airports, no matter the size or type of aircraft to be operated, as long as there were scheduled, commercial, (regular) flights. With this new rule, since December 2017 RFF is no longer a requirement for the smaller airports (Class I).

The rule was issued after thorough study and research, including a deep Regulatory Impact Analysis that lead to two master's theses developed by ANAC personnel while attending their own postgraduation studies in Transportation.

As this report is written, 36 months have passed since the enactment of the new rule, whereby an assessment of its regulatory effectiveness is necessary.

### **1.1.Scope**

The scope of the present study is to evaluate the small airports scenario in Brazil, three years after the deregulation, often called flexibilization, of RFF requirements. It means to observe changes related to RFF and if the outcomes expected by the new rules were reached.

### **1.2.Objective**

The objective of this study is to evaluate the regulatory outcome of Brazilian RFF rules for small airports, since a major change in regulation allowed small airports to not implement RFF.

When this flexibilization was issued there were some intended benefits to be reached. and this study aims to check their occurrence. The first and most obvious is the increase in the number of airports with scheduled operations. The second is the increase in the number of passengers. This could be understood as an incentive towards the democratization of air transport.

## **CHAPTER 2**

# **PRESENTATION OF THE WORK ENVIRONMENT**

### **2.1. Student Introduction**

I have a Bachelor's degree in business and a post-graduation in public management. A civil servant since 2007, I had the opportunity to work for some companies in different industries before joining ANAC. My previous work experience includes logistics (DHL), auto parts (Robert Bosch) and consumer goods (Philip Morris), to name a few.

At ANAC my experience for the past five years has been working on airport safety regulation, mostly involving airport certification. This means to assess aerodrome operations manuals and then to check, in on-site inspections, compliance to these rules. Briefly, I am an airport inspector specialized in Airport Emergency Response Systems, including Rescue and Fire Fighting (ARFF).

I also am involved in the airport privatization process since its beginning, in 2010 - and in different stages, as part of the working group that developed contracts technical documents, such as contract, building and project guidelines, and also initiated contract management of the first privatized airports (SBNT; SBGR; SBBR; SBKP). In this same process, I was a member of the auctioning staff for most of the auctions, including the 6<sup>th</sup> round of airport privatizations, scheduled for March 2021.

From 2011 to 2014, our team checked pre-building blueprints of privatized airports: compliance to safety and security requirements were our focus, as well as compliance to the contract design parameters. Once the designs were cleared there was the follow-up of investments: building and operating according to the approved project. We had the opportunity to follow the operations transfer from Infraero (state-owned airport company) to the private operators, including the ORAT of Natal Airport (operations transfer to a new site built at a 33 km distance) prior to the 2014 FIFA World Cup.

All these experiences have helped to develop a view of the aerodrome as an organic and complex system, which parts should work in synchronicity and towards a common goal. It is my understanding that such view is an asset for one performing its duties as an airport inspector for the CAA.

The main reason I applied for the Advanced Master in Air Navigation Management at ENAC is to learn, enlarge my horizons and have deeper knowledge of my field of work. It makes perfect sense if one has some years of work ahead, as is my case, and understands that what is done can always be improved.

I have performed my internship at ANAC, *Agência Nacional de Aviação Civil*. There are two sensible reasons for the internship being there: I am an ANAC employee since 2008, and this study is about a field that I am quite familiar with.

The second and most important reason goes by the name Sars-Covid-19, which has struck, causing great impact on the whole planet. Not being able to spend time abroad for the internship is a direct consequence of the pandemic. Therefore, we managed to work with what was possible at the time.

## **2.2. Introduction to the internship company**

ANAC, the Brazilian civil aviation authority, is a national agency established to regulate and inspect civil aviation activities as well as aeronautical and airport infrastructure. The agency was created in 2005, replacing the Department of Civil Aviation (then known as DAC).

The agency is responsible for the regulation, inspection and certification of aircrafts, companies, manufacturers, aircraft maintenance organizations, aerodromes, schools and civil aviation professionals. It works to ensure civil aviation safety and security standards and also to improve the quality of services, fostering a competitive market.

ANAC is linked to the Ministry of Infrastructure, but not hierarchically subordinate to the it. It is administratively independent, financially autonomous and its directors have a fixed mandate. There are seats for four directors and one director-president. Currently, north of 2.000 people work for ANAC.

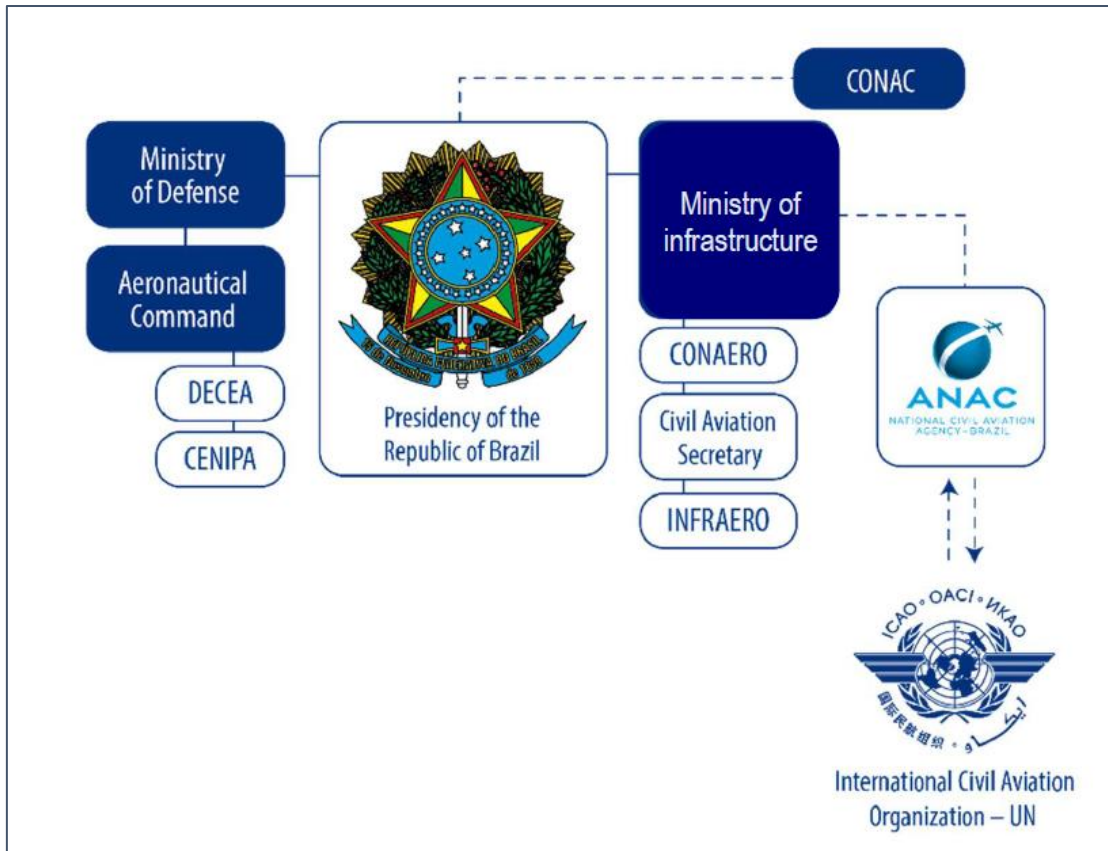


Figure 1 Brazilian civil aviation institution framework

ANAC develops rules and enforces compliance to promote safety and excellence in the Brazilian civil aviation market. ANAC also inspects and certifies aircrafts, aircraft operators, aircraft manufacturers, aircraft maintenance organizations, airports, training organizations and personnel to ensure compliance with established rules and regulations. One could say that safety is a major concern at the agency. Overall, ANAC's goals are to prevent accidents and to improve the quality of services provided by air companies, civil aviation personnel and airports.

ANAC certifies all the beings above mentioned (civil aircraft, airports etc.). The goal of the certification is to assess compliance with safety standards. Once assessed and found compliant a certificate is issued.

Certification is a systematic process involving evaluation and follow-up and for ensuring trust and compliance with requirements established by rules and regulations for all civil aviation regulated entities. Certification processes follow the Chicago Convention (1944) and its Annexes and are recognized by many countries with which Brazil has celebrated

aviation cooperation agreements, such as Australia, Canada, the United States of America and many countries of the European Union, South America and Asia.

ANAC develops and issues rules for the appropriate operation of Brazilian civil aviation, taking into consideration potential regulatory impacts. Additionally, it evaluates contributions sent by the Brazilian society through public consultations. Being a member of several international civil aviation organizations Brazil takes into account regulations issued by these institutions when developing its technical rules. As such, the rule which we are assessing in this paper was presented to our colleagues in the Rescue and Fire Fighting Working Group of the Aerodromes Panel (RFFWG) at ICAO.

The agency carries out inspections and surveillance activities. Continuous surveillance consists of a permanent follow-up for verifying performance patterns of products, companies, operations, processes or services and of professionals certified by ANAC in order to achieve acceptable levels of safety.

Considering an organization owner of a valid certificate, ANAC will check if the standards set by such certificate are being complied with, thus the surveillance activity.

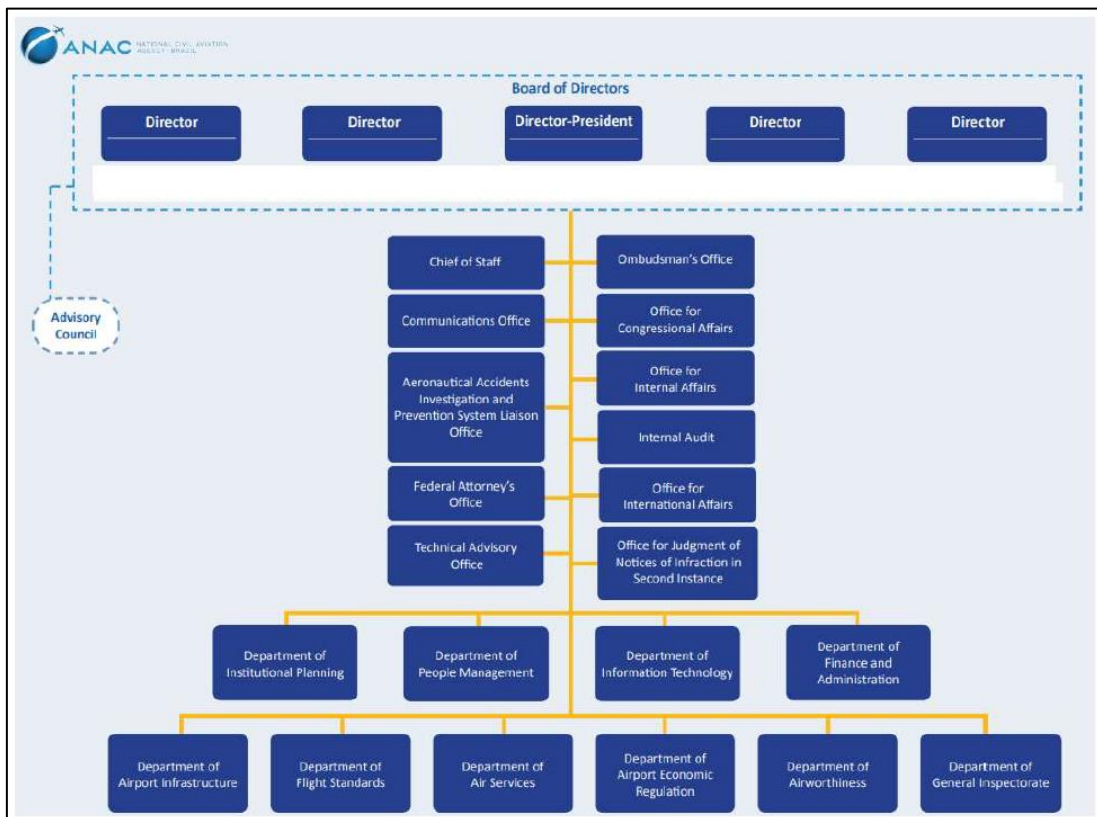


Figure 2 ANAC organizational chart.

### **2.3 Internship tutor and internship duties**

This end of the study project was performed under the supervision of Mr. Luciano Freire. Mr. Freire is an engineer with a master's degree in transportation and is currently (as of March 2021) taking another master's degree at Victoria University in Melbourne, Australia. Mr. Freire works has worked with ARFF regulation, certification and surveillance from 2008 until the end of 2020.

The research also had precise inputs from Mr. Tulio Guimarães. Mr. Guimarães is an engineer with a master's degree in mechanical engineering and works at ANAC since 2015 with ARFF regulation, certification and surveillance.

In addition, Mr. Freire and Mr. Guimaraes were part of the team that performed the research and assessment that lead to the RFF deregulation for small airports in Brazil.



## CHAPTER 3

# INTRODUCTION TO THE THEME

### 3.1 Brief introduction to ARFF



Figure 3 – Fire truck typically used in small airports with RFF.  
Picture taken by the author.

ARFF are all the resources at an airport that were planned and implemented to be activated in emergency situations. These resources are in the case of a small airport: a fire truck, fire extinguishing agents, firefighting and rescue equipment, a trained crew and protective gear.

ARFF exists for a simple mission: saving lives in the event of an accident at the airport or its immediate vicinities. ARFF equipment is used to help people escape from a damaged aircraft and keep out of harms' way.

Nevertheless, small airports are not required, since December 2017, to provide such resources.

Airport RFF category (CAT) is the level of protection to be provided in an airport. It is based on the dimensions of the aircrafts that normally use the airport.

The quantity of fire extinguishing agents, fire trucks and size of the crew are established according to the RFF category of an aerodrome. And this category (CAT) is related to the aircraft: larger aircrafts demand more resources. The table below summarizes the requirements Brazilian airports must follow. The figures are the same as in ICAO documents, as the aircrafts are the same. Even though Foam level “C” is in the requirement list as an optional resource, it is not being considered for the present example, without any lack of understanding. Another reason for not mentioning performance Level “C” foam is that this study focuses on small airports, which are CAT 5 or below. Foam of a higher performance level are, so far, not as cost-effective as level B, used worldwide. Actually, it is not to our knowledge that any airport in Brazil uses level “C” foam.

| CAT | Principal Extinguishing Agent<br>Foam Level “B” |                            | Complementary Extinguishing Agent<br>Chemical Drypowder |                       | Number of Fire Trucks | Number of Firefighters |
|-----|---|----------------------------|---|-----------------------|-----------------------|------------------------|
|     | Water (litres)                                  | Discharge rate (litre/min) | Dry powder (kg)   | Discharge rate (kg/s) |                       |                        |
| 1   | 230   | 230                        | 45  | 2,25                  | 1                     | 3                      |
| 2   | 670   | 550                        | 90  | 2,25                  | 1                     | 3                      |
| 3   | 1200  | 900                        | 135   | 2,25                  | 1                     | 3                      |
| 4   | 2400  | 1800                       | 135   | 2,25                  | 1                     | 3                      |
| 5   | 5400  | 3000                       | 180   | 2,25                  | 1                     | 3                      |
| 6   | 7900  | 4000                       | 225   | 2,25                  | 2                     | 6                      |
| 7   | 12100   | 5300                       | 225   | 2,25                  | 2                     | 6                      |
| 8   | 18200   | 7200                       | 450   | 4,50                  | 3                     | 9                      |
| 9   | 24300   | 9000                       | 450   | 4,50                  | 3                     | 9                      |
| 10  | 32300   | 11200                      | 450   | 4,50                  | 3                     | 9                      |

Table 1 – RFF requirements

Source: RBAC 153, adapted by the author

Aircraft companies provide these category numbers based on overall length and maximum fuselage width. A CAT 5 aerodrome can have the operations of an ATR-72 (AT72). Other aircrafts largely used in Brazil are CAT 6: Boeing 737-700 (B737) and the Airbus family A319 and A320. Another equipment of the same CAT is the Embraer family of E-jets: E-190 and E-195. These are the aircrafts used in small airports in Brazil for scheduled flights.

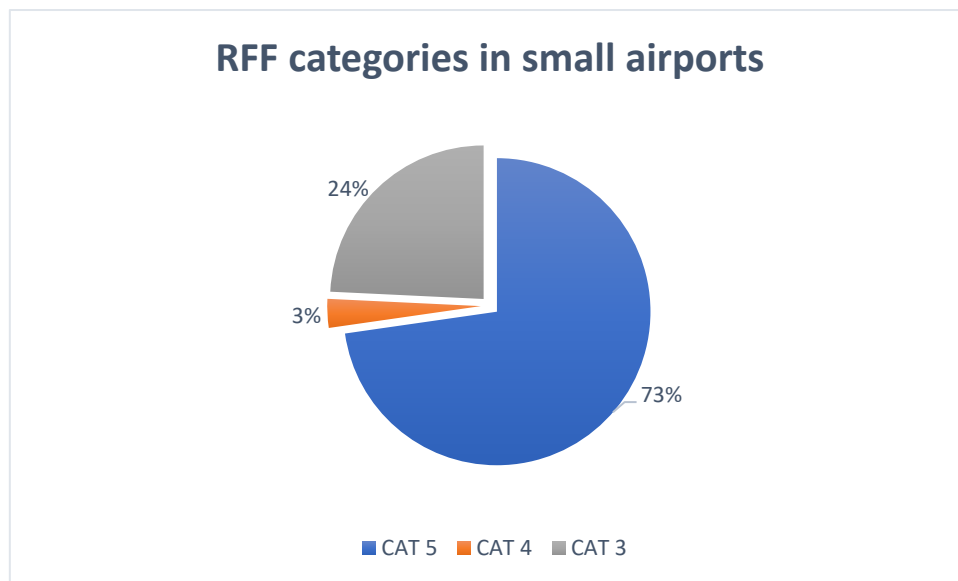


Figure 4 – RFF categories in small airports, percentual

Another issue is the cost of training: there are constant costs of personnel and equipment maintenance. In major airports there are alert situations in almost daily basis, which does not occur in smaller aerodromes. Therefore, these aerodrome firefighters seldom have to respond to an emergency – but if there is an emergency the response time must be very short and all equipment must work as planned.

The only way to achieve such result is methodically training, testing equipment and following the maintenance schedule. The crew has to be constantly performing exercises and drills, checking its protective gear, testing the extinguishing equipment and, during certain intervals of time, doing live fire drills.

Even if there is ARFF, small airports are not required to perform simulated emergency exercises. Nonetheless ANAC inspectors recommend that simulated exercises should

be done whenever feasible, and if there is the possibility of doing so and de decision to do, best practices should be observed in order to maximise the effects and benefits of the drill.



Picture 5: Firefighters performing a training drill during ANAC inspection.  
Picture taken by the author.

### 3.2 Brief introduction to ARFF regulation

Before ANAC, Aviation in Brazil was regulated by *Departamento de Aviação Civil* (DAC), a state organization linked to the Air Force. By the time ANAC was created and took over the duties previously held by DAC, rules that applied for ARFF were the “*Instrução do Comando da Aeronáutica – ICA 92-1*”, a military-rooted regulatory piece with requirements that, even though convergent to ICAO’s directives, had little connection to civil aviation (a fast-paced industry which has to be prepared for quick changes). After ANAC took over Brazilian aviation, many studies and reviews were performed with the target of adjusting the rules to the fast-changing reality of Brazilian aerodromes.

The first review was published in 2009. Even though it was the first ARFF set of rules made by a fully civilian institution, much of the previous rule was maintained.

The necessity of better rules was driven by a necessity of enforcement and compliance, along with rules that we clearly understood. Aerodromes would not be able to comply and sometimes the crews at the aerodromes would not understand the requirements.

The second attempt to improve the ARFF regulation came with a new set of rules in 2013. It was considered an evolution of the current rule, without much innovation.

It was understood by the team that it was lacking, but it was what was possible at that time. Many changes were considered but ANAC understood that more research and discussion should take place before implementation.

Finally, in December 2017, after a two-year project, the new rule was published. This 2 year time lapse was necessary were the regulation impact assessment and the search for a rule that could work along state policy targeting the development of small, regional airports. The reduction of regulatory barriers was an expected outcome of the new rule, and perhaps the most prominent one.

There were two master’s theses on the subject. Both were used as foundation to the research and discussion that led to the new rule. One of the studies aimed to understand the level of risk of Brazilian airports, the real benefit brought by ARFF and how much airports spend to meet the regulation<sup>1</sup>.

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<sup>1</sup> CUNHA, Daniel (2016)

Cunha studied 9.6 million aircraft take-offs, 1,868 operational safety events in the 100 busiest airports in Brazil with ARFF, from 2006 to 2015. For the author it was clear that ARFF costs far outweighed the benefits of the service and could be rebalanced through setting new standards to ensure greater levels of regulatory quality. This was proposed considering the impact of regulatory changes in elements such as the risk covered by the service, service costs, among others. Cunha also produced a fair estimative of the cost of ARFF service and its weight in a small airport budget. Such cost estimative was used in the rulemaking discussions.

The other thesis focused on demonstrating that there was an opportunity to deregulate and assessing the risks involved.

In his study, Freire<sup>2</sup> performed a survey with Brazilian airlines, asking them whether they wanted or not to fly to locations not served by commercial flights, and what were the obstacles to making flights viable. The most cited obstacle was ARFF, which confirmed the authors' supposition of ARFF requirements being a barrier for operation in smaller aerodromes. Airport operators were asked what stopped them from having commercial flights, and according to them most problems were due to infrastructure deficiencies (including ARFF). Fire departments in the target locations were also questioned about their capacity to attend to commercial flights, if ARFF was not required in aerodromes with up to one daily flight, but in their opinion, they did not have enough personnel to do so.

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<sup>2</sup> FREIRE. Luciano (2016)

# **CHAPTER 4**

## **STATE OF ART**

### **4.1 International Standards**

ICAO Annex 14

Any study on aeronautical rules should necessarily revisit ICAO foundations. The Convention on International Civil Aviation, drafted in 1944 by 54 nations, was established to promote cooperation and “create and preserve friendship and understanding among the nations and peoples of the world.”

The ‘Chicago Convention’, as it is currently known, is the landmark agreement that established the core principles permitting international transport by air and led to the creation of the specialized agency which has overseen it ever since – the International Civil Aviation Organization (ICAO).

The convention has its prime objective declared as the development of international civil aviation “...in a safe and orderly manner”, and that air transport services would be established “on the basis of equality of opportunity and operated soundly and economically.” ICAO’s core mandate, then as today, was to help States to achieve the highest possible degree of uniformity in civil aviation regulations, standards, procedures, and organization.

One should pay attention to the words “highest possible degree of uniformity”. They are one of the keys to understand why Brazilian Civil Aviation Authority had invested so much effort to improve its ARFF rule. The current standard is feasible for all airports (at a certain cost, yes, but definitely achievable).

The Chicago Convention establishes that States Should seek the uniformity of organizations, rules, standards and practices in benefit of air navigation. ICAO standards and recommended practices are divided in Annexes. Such annexes should be followed by contracting States.

In Brazil, ANAC as the Civil Aviation Authority is the agency in charge of implementing ICAO standards as well as watch and regulate aeronautical and airport infrastructure and set flight standards for air services, aeronautical services and airport services.

Within ANAC, airport standards and safety rules are a duty carried by the department acronymed SIA (*Superintendência de Infraestrutura Aeroportuária*), which is precisely the department where the author of this study works as an airport inspector.

## 4.2 State of the Art

### ICAO Annex 14

International standards and recommended practices (SARPS) can be found primarily at the Annex 14 (Aerodromes) to the Chicago Convention. The Volume I of the Annex is on Aerodrome design and operations. Chapter 9 of such volume is on operations, and chapter 9.2 is specifically on Rescue and Firefighting. According to the Annex 14, Volume I:

*9.2.1 Rescue and firefighting equipment and services shall be provided at an aerodrome.*

It also states that the information on the level of protection must be broadcast.

*2.11.1 Information concerning the level of protection provide at an aerodrome for aircraft rescue and firefighting purposes shall be made available.*

ICAO also set a method to indicate the level of protection available at the airport, in a range from 1 to 10 according to the length of the largest aircrafts that normally use the airport. Secondly the width of the aircraft is used as a metric but usually length is what defines the category.

According to the item 9.2.3, the level of protection provided at an aerodrome for rescue and firefighting shall be appropriate to the aerodrome category determined using the principles in 9.2.5 and 9.2.6 except that, where the number of movements of the aeroplanes in the highest category normally using the aerodrome is less than 700 (seven hundred) in the busiest consecutive three months, the level of protection provided shall be not less than the one category below the determined category.



Aerodrome category determines the minimum quantity of water for foam production, as well as dry chemical powders, to be available for immediate use in the fire engine. Foam is the principal extinguishing agent as per item 9.2.9 of Annex 14 while dry chemical powders are considered complimentary extinguishing agents by the same standard. Discharge rate is also a requirement, expressed in litres per minute (in case of dry powders, kg per second). So, by ICAO standards, rescue and firefighting category at an aerodrome is function of the extinguishing resources available and the expeditiousness with which resources can be used. There are also some recommendations in Annex 14, as well as mentions to Doc 9137.

#### DOC 9137

ICAO Documents are technical papers that cover a wide range of matters, from regulation to guidance. Doc 9137 is the Airport Services Manual. It is divided in 11 parts (as of the 4th Edition), and its Part 1 covers Rescue and Fire Fighting. It can be taken as guiding material for the States to implement the provisions and specifications of Annex 14 and for all aviation community for a better understanding of Annex 14 requirements.

### **4.3 Experience of other States**

Recalling the Annex 14, all aerodromes shall provide the service of rescue and firefighting, as well as inform publicly its level of protection and make such information available. States shall follow suit or declare differences. Indeed, declaration of differences is not unheard of.

Other differences do occur. For instance, the cap above which ARFF is mandatory may change from one State to another. The methodology used to exempt aerodromes of the RFF service in Chile, Costa Rica and South Africa is based on the number of seats of the aircraft (therefore, number of passengers in a given aircraft configuration). Other states, as Australia and Canada make the cut on a percentage of passengers, in an annual base.

In fact, Australia and Canada are the benchmarks for the current Brazilian rule. The reason is that both countries have a large area with few people (low populational density)

and the same happens in Brazil - in the Amazon rainforest region but not only there; and both countries show an acceptable safety record.

The United Kingdom, on the other hand, applies a different view for the issue. No flexibilization is allowed on the level of protection to be provided, even if mentioned in the Annex 14. Recalling 9.2.3: the level of protection shall be appropriate to the aerodrome category except that, where the number of movements of aeroplanes in the highest category normally using the aerodrome is less than 700 in the busiest consecutive three months, the level of protection provided shall be not less than one category below the determined category. And yet, no aerodrome in the UK benefits from that flexibilization possibility.

In the United States of America, operators of Part 139 airports (holders of a Certificate) must provide aircraft rescue and firefighting (ARFF) services during air carrier operations that require a Part 139 certificate.

#### **4.4 State of the art in Regulatory assessment**

Regulatory assessment is often written as Regulatory Outcome Evaluation, ROE, and can be described as an assessment process to determine whether the objectives have been achieved.

# **CHAPTER 5**

## **PROJECT PLAN**

This chapter presents the project plan of this study based on the objective detailed in paragraph 1.3. The main objective of this project was to check whether the possible benefits expected when deregulating RFF for small airports were accomplished.

### **Value Proposition**

To determine if deregulating ARFF for small airports has achieved its objectives.

### **Milestones**

The initial milestones were: to have data on airports, passengers and CAT; to have it processed and gather information that could be used to demonstrate if the objective of the deregulation was achieved.

These milestones had to be reassessed and the project had to be rerouted due to the pandemic and its effect on aviation: we could not reach people and have data for a full analysis as intended prior to the outburst of Covid-19.

It is our understanding ANAC could benefit from a study on the same subject performed in a few years' time, after the pandemic has been controlled and its effects on demographics are no longer a threat.

### **Delays and reschedules.**

By the end of February of 2020 we had decided the theme of the study and what we figured would be the road ahead. Then came the month of March and the big hit of Covid-19, forcing us all to be indoors for what then seemed a reasonable time – around 40 days. We could not be more incorrect in our estimation of time away from the office. Actually, as this chapter is been written (March 2021), it has been a year that we are working from home and there is no sign of change in the near future.

## Time Chart

| INTERNSHIP<br>ACTIVITIES AND<br>DATES | fev/20 | mar/20 | abr/20 | mai/20 | jun/20 | jul/20 | ago/20 | set/20 | out/20 | nov/20 | dez/20 | jan/21 | fev/21 | mar/21 |
|---------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Define tutor                          |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Develop roadmap                       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Define theme                          |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Interview with tutor                  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Gather data                           |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Work on data                          |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Assessment with tutor                 |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Present first Draft                   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Have feedback                         |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Present final thesis                  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| HOLD PERIOD                           |        |        |        |        |        |        |        |        |        |        |        |        |        |        |

Table 2 – Project ActualTime table

# CHAPTER 6

## REGULATORY OUTCOME EVALUATION

### 6.1 Theoretical foundation and reasoning for Deregulation

We revisited the reasoning that had laid foundation for the deregulation. It is extensively described and explained in the Technical Document used by the expert team to deliver its proposal. The documents also contained the expected benefits to be achieved with the new rule.

One should remember the main question driving this study (the problem we intend to solve): were those benefits achieved? Or, in other words, did the original plan work?

Measuring the regulatory outcome means a metric is needed. Good regulatory performance may include developing and/or adopting innovative regulatory approaches, making efforts to reduce the regulatory burden and effective use of risk-based regulation whenever feasible.

The period of time between the enactment of the regulation and the conclusion of a ROE (regulatory outcome evaluation) should be long enough to gather data that can lead to a solid conclusion. In our case, there is a maturation time for an airport to be certified and to resume aeronautical operations and scheduled flights. Sometimes infrastructure adjustments are needed either to receive large aircrafts or to have scheduled flights and that takes time – time to design, project, build.

Creating an indicator could be of great value for the assessment. Even though delivering indicators is not part of the scope of this report, our research has led us to know some techniques used by other regulators for performance measurement, such as Australian Health Administration<sup>3</sup>. The Australians have developed a framework comprising six outcome-based key performance indicators (KPIs). Such framework is said to aim encouraging regulators to deliver their duties with the minimum necessary impact to

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<sup>3</sup> Australian Government, Department of Health, Therapeutic Goods Administration: TGA key performance indicators and reporting measures. Version 1.0, May 2015.

achieve regulatory objectives and to effect positive ongoing and lasting change within regulators.

ANAC actually has a strategic directive to follow. Since 2012, the Agency's main guidelines have been the search for continuous improvement of organizational processes; the reinforcement of Strategic Management by improving management methodologies; the strengthening of the corporate sector; the integration of initiatives from technical areas; the increase in the quality of services by using Information Technology; and the recognition of human resource.

According to its strategic planning, for the years 2020 to 2026 there are five perspectives to be observed: society, regulated bodies, internal processes, learning and development and finally resources.

## **6.2 Expected benefits from deregulation**

The following expected benefits were part of the proposal for deregulation. It can be found within the files that contain the memoirs that led to the new RFF rule. All this information is public and available for all. There are many pages about the reasons for deregulate but after reading it several times we understand all the expected benefits can be reduced to two, that can be seen as inter-related (one being consequence of the other) cost reduction and increase of the number of airports with scheduled flights.

### **6.2.1 Cost reduction**

At the time ANAC proposed deregulation, research found that the annual average cost for RFF in small airports was around 1,8 Million BRL (Brazilian Real). This figure is part of the report that led to the enactment of the new rule, and was obtained via one of the master's thesis that were used to sustain its reasoning and argumentation.

Bringing it to present value, we have around 2 million BRL, as shown in table 1. The inflation index used was IPCA<sup>4</sup> (*Índice de Preços ao Consumidor Amplo*) or in English

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<sup>4</sup> IPCA is an official inflation index, issued monthly by IBGE – *Instituto Brasileiro de Geografia e Estatística*. The Brazilian Institute of Geography and Statistics - IBGE is the main provider of data and information about the Country. Such information meets the demands of several types of segments of civil society, as well as the bodies at the federal, state and municipal level.

Extended National Consumer Price Index, found in Banco Central's website. This particular index was chosen among others because it has as collection units commercial and service-offering establishments, public service and Internet concessionaries, meaning it is the price rate used for public services.

|                         |              |
|-------------------------|--------------|
| Value in December 20017 | 1.800.000,00 |
| Inflation rate          | 13,88%       |
| Value in January 2021   | 2.049.890,22 |

Table 3 – RFF annual average cost, present value

That figure is for one airport only. At the time there were 44 airports that could benefit from the deregulation. 44 times 1,8 million would give us back in December 2017 a value or more than 79 million BRL. Bringing it to present value at the same rate used in table 1 above gives us roughly 90,2 million.

Cost cutting *per se* is not an answer for any problem. What one would do with resources unspes what matters. In our case it is fundamental to observe that most of these small airports are state-owned and funded. That usually means a low budget, partly funded by the city and sometimes linked to the Ministry of Infrastructure. Also net income is low, since small airports alone are not economically viable: they are an important link in a logistics chain and a powerful regional development inductor<sup>5</sup>. According to Button, measuring economic impact assessment of an airport is not an easy task since there are opportunity costs that are difficult to evaluate with precision.

Even considering the old saying “build it and they will come”, building means investment and in a world of scarcity any spending is measured twice or even three times before done.

Economic resources could be used for recycling and repurposing existing airfields, to be used to operate larger aircrafts. Economic resources can also be used for developing better infrastructure, such as implementing Runway End Safety Areas (RESA), Precision Approach Path Indicator (PAPI) only to give examples of aeronautical technology. In some cases solutions could be as simple as fencing the airfield. All these investments contribute for a higher level of safety.

That will lead us to Certification, to be explored in chapter 6.

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<sup>5</sup> BUTTON, Ken (2010)

### 6.2.2 New Flights

The deregulation of RFF in small airports was seen as an opportunity for air carriers to test new markets and start new routes. Consider an airliner that intends to start flying to a small airport without RFF. By the old rules it would not be possible. Airports needed to have it fully operational. And as we mentioned before, there is a cost involved in it.

With deregulation a company can start flying to a place that so far did not have air services, as a market test. There is no need to have RFF on site. Translating it into economics, there is no barrier to entry. A barrier to entry is a cost one must incur to access a new market. And in this case the cost would be to the airport manager to incur in order to have an airline starting operations. And most of the time the airport manager has little or no budget for it.

Suppose after some months of market testing the airline doesn't have the expected revenue from that operation. There is the possibility to simply close the operation and leave.

Still about barriers, a survey<sup>6</sup> with airlines found out that, considering a hypothetical scenario of 40 small airports to start operations, 23 of these would be considered for a market test if there was no restriction such as ARFF. Nonetheless 91% of these flights could not be possible in real life due to the lack of ARFF. the same research found that ARFF was the main barrier to entry for starting a new route. Deregulation could make market tests viable without the need to investment implementing ARFF.

As a result for the community the regulator expected an increase in the number of available flights and competition among airlines, hopefully bringing along a reduction in fares.

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<sup>6</sup> FREIRE, Luciano (2016)



## CHAPTER 7

### FINDINGS

#### 7.1 Findings related to the initial objectives of deregulation

At the time of the deregulation there were 44 small airports, all of them with mandatory RFF. Three years later, even with pandemics that froze most of 2020 and challenged the industry, there is an increase in the number of small airports. As of December 2020 there are 71 small airports that can have scheduled flights. Almost half of these (46%, or 33 airports) have RFF implemented and were the origin or destination for over three-thirds of the passengers have flown in that year

|  |           |      |
|--|-----------|------|
| Total Passengers in small airports, 2020 | 1.661.004 | 100% |
| Airports with RFF                        | 1.264.684 | 76%  |
| Airports without RFF                     | 396.320   | 24%  |

Table 4 – Passengers in small airports, 2020.

Considering all passengers that flew in 2020, in all sizes of airports throughout the country, only 0,41% have been in an airplane that departed from an airport without ARFF.

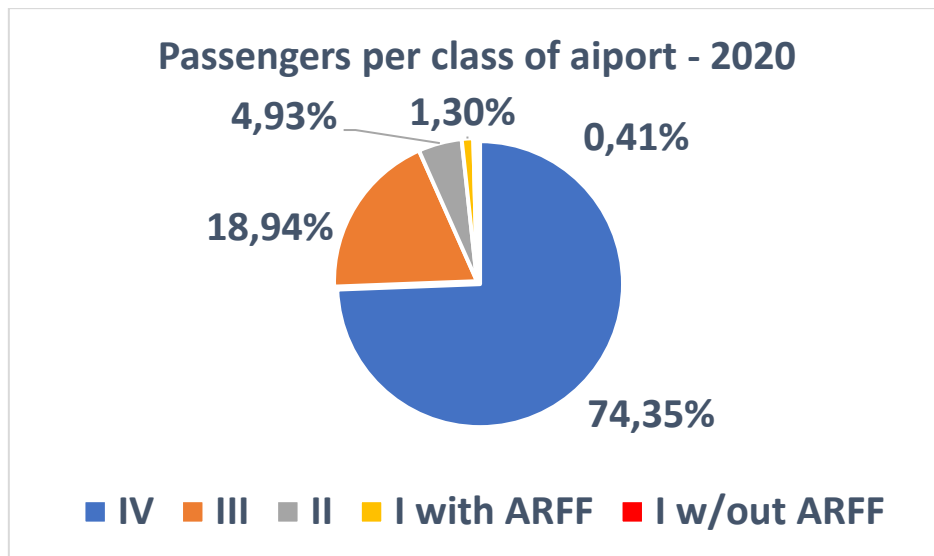


Figure 6 – Percentage of passengers in airports with ARFF

There are two important aspects to be outlined. One of them is that some of the existing RFF in the past have been deactivated. It was an expected outcome but there was not a precise forecast on what extent it would happen. The worst scenario was that all ARFF would be deactivated. Three years later we can see it was not the case.

An ARFF service deactivation becomes effective when the information is taken off from the official aeronautical information publications (AIP). If a small airport management decides to deactivate its ARFF service there are two simple steps to follow. The first is to warn all parties that use the airport (airlines, ground handling companies etc.) and ANAC of the date it will be deactivated. The second and last step is to inform such intention to the organization that publishes AIP. Once deactivated, ANAC no longer checks the airport for compliance of rules related to ARFF. Actually, only four airports completely deactivated and decommissioned its ARFF. All the others still have, to some extent, fire fighting resources. The capability of the remaining fire fighting resources is up for the airport management to decide according to its safety management system. Bottomline, some of the airports that deactivated its ARFF still have it but not officially: to be on aeronautical information it must be checked by ANAC be fully compliant.

Another aspect is that there are more small airports. Indeed one of the objectives was to create conditions as incentives for more airports to have scheduled flights and give air connectivity for more people.

Most of these already existed, with the exception of SBVC (Vitoria da Conquista, in the southern part of the southeast region) which is a greenfield, built from the ground up and had its operations starting in the beginning of 2019. SNCP (Correia Pinto, in the countryside of the southern region) is a new site as well. All the others had adjustments made in its infrastructure and management in order to have compliance to safety requirements and to eventually reach its goal: having scheduled flights.

## **7.2 other outcomes: Certification**

We described in the item 7.1 above that there are more small airports operating in 2020 than in 2017 and some of them have no RFF and so far all is well. Even though there has been an unexpected global pandemic and 2020 flights were dramatically reduced, thus reducing not only risks also the pace the industry was beginning to show after some

years of low figures. But there is another finding, one that was not wholly foreseen when the new rule was enacted. Small airports now are certified.

Airport certification is a process in which ANAC will assess if the airport is compliant with design (infrastructure) and operations requirements. The airport shows evidence that all the operation follows its procedures. And all the procedures are in the airport operations manual (MOPS). Staff must know and follow the procedures. By the end of the certification process ANAC issues a Certificate, that states that the airport is safe for certain types of aircrafts and in certain conditions.

According to Brazilian rules, if any airport intends to have scheduled flights it necessarily has to be certified. That is a barrier for new routes since airlines can only fly to and from certified airports.

In March 2021 there are 55 certified airports, divided as follows.

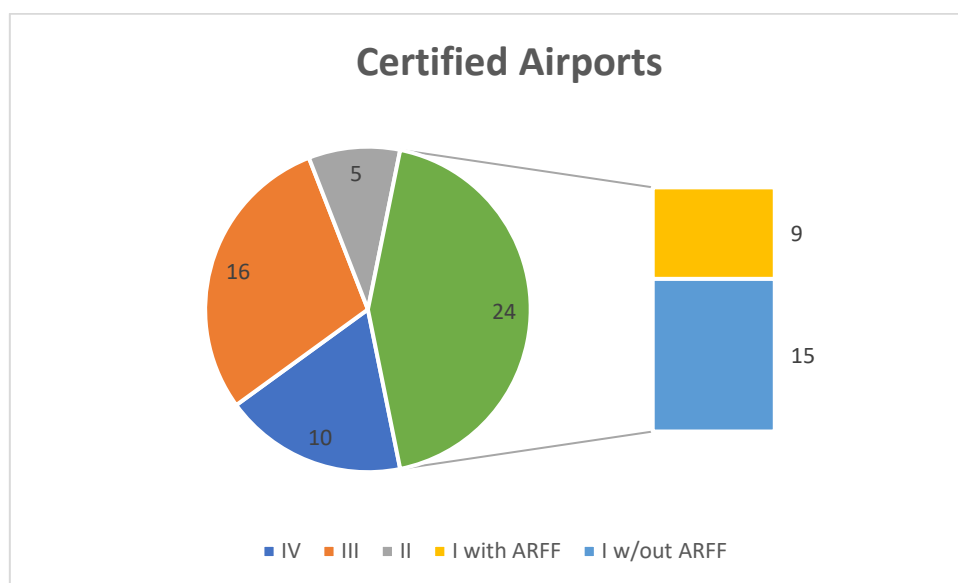


Figure 7 – Certified airports divided by its Class

The certification standard, RBAC 139, is relatively recent and is holds a transition rule within: airports without a certificate (that already existed and were fully operational) have an upper limit of flights. This limit is declared by ANAC and only ceases when the certificate is issued. This is the reason why some airports are not certified and have scheduled flights. The number of airports with scheduled flights and without a certificate

is yearly decreasing as airports are earning its certificate. The main reason is that the limitation to have more flights is an effective incentive for airports to pursue its certificate.

#### 7.2.2 Brief facts about the Certification Process

The Airport Operations Manual (MOPS) is the document that contains standards and description of the procedures performed by the aerodrome operator to guarantee a minimum level of safety. MOPS must have ANAC's approval and contain enough information for the proper understanding and performance of the operator's processes, taking into account the particularities applicable to the aerodrome.

Targeting small airports, the Agency has developed a model MOPS for those airport managers to better understand, create and register the processes required by applicable regulations, in particular RBAC 153.

Once the MOPS is approved ANAC performs a certification inspection. Its aim is to check if the rules, standards and practices adopted at the airport correspond to those contained in the MOPS and includes all the aspects related to airport safety:

|                                    |
|------------------------------------|
| 1. Aerodrome operator organization |
| 2. Safety Management System (SMS)  |
| 3. Wildlife Hazard Management      |
| 4. Airport Infrastructure          |
| 5. Airport Operations              |
| 6. Airport Maintenance             |
| 7. Rescue and Fire Fighting        |

This last part, Rescue and Fire Fighting, is the one that was waived and is object of this report. The absence of ARFF requirements for small airports can be understood as an incentive for the certification. Bottom line airports are more aware of the importance of safety procedures and following the operations manual. One other aspect that, unfortunately, this study could not lay eyes on, is that without ARFF requirements the airport's budget could be invested in better infrastructure. For future studies this could be an interesting line of research.

Airport certification process at ANAC can also address exemptions and the declaration of Equivalent Level of Safety. Even though these measures are taken one by one, since

it is not a “one size fits all” solution, we will mention it in this study but avoiding detailing it for the reason that it is not part of our scope.

When a non-compliance could not be resolved immediately or even in the medium/long term, the aerodrome operator may request ANAC a temporary or permanent exemption. An exemption can be defined as a release, temporary or permanent, of compliance with the rule established by ANAC in RBAC or Resolution, when it is proven that the non-compliance does not affect the safety of operations or that the interested party is taking actions to guarantee the service to the public interest with a level of safety acceptable to ANAC.

In the certification process, it is possible that the type of operation desired in the operative specifications (EO) finds difficulties to reconcile with the existing infrastructure and its adequacy cannot be performed immediately. Therefore, the operator may request exemption from compliance with the infrastructure requirement, based on a robust risk analysis which demonstrates that the non-compliance does not significantly affect the operational safety. The request for Exemption must be substantiated by an Operational Safety Analysis (AISO), an Aeronautical Study (EA) or a Compatibility Study (EC), as appropriate.

An equivalent level of safety (ELOS, or in Portuguese NESO) means the condition in which there is no exact fulfilment of the requirement established by ANAC, but compensatory factors that reach the purpose of the requirement are adopted, thus guaranteeing an equivalent level of safety.

In the certification process, the type of operation planned in the Operative Specifications (EO) of the airport may find difficulties for an accurate compliance with the existing infrastructure, but it is possible to reach an equivalent level through operational restrictions and procedures. Therefore, RBAC 139 grants the possibility for the aerodrome operator to request an ELOS. The ELOS request must be substantiated by an Operational Safety Impact Analysis (AISO), an Aeronautical Study (EA) or a Compatibility Study (CE), as appropriate.

# **CHAPTER 8 CONCLUSION**

## **8.1. Technical Conclusion**

After three years of deregulation on RFF requirements for small airports, the number of airports with scheduled flights has improved by 61%, increasing from 44 in December 2017 to 71 in December 2020. As a direct result, more cities were connected to the air service network. For a country with huge distances to be travelled and poor or non-existing roads this figure speaks for itself. Nevertheless, safety is maintained in an accepted level, due to the small airports' certification program.

## **8.2. Personal Conclusion**

It was not scope of this report to perform a risk assessment based on the number of flights per airport. Due to the huge variation of numbers in 2020 as a consequence of the pandemic fewer people flew and any tentative to assess risk would result in something not comparable to the previous scenario.

This report was a small step towards regulatory outcome evaluation. We understand many rules, if not all, issued by the Agency could be evaluated. The decision of whether evaluate or not, and which ones, and what techniques to use, are all reason for us to expect regulatory evaluation to grow and to become more important within ANAC. The pressures for effective evaluation should also lead us for improvements. Above everything, data shall be publicly available for all. The author understands transparency is an effective shield for the public agent such as ANAC's team. The more people know what the Agency does and the reason for doing so, and provided its effectiveness, the more can be done for better regulation laying foundations for a better future.

## **8.3. Recommendation**

Considering the effects of the Sars-Covid-19 pandemic in the industry as a whole, we understand running another survey is mandatory. This second study should be better

done when aviation reaches the same figures it has in 2019, the year before the pandemic outbreak.

Due to the pandemic there had to be a rerouting in the initial planning, and the following are not answered by the present study. We understand it could be of great value to develop further studies on:

- Number of new routes (to/from airports without ARFF) after the rule; and
- Number of passengers in these new routes (that did not have the air transportation option before the rule).

We are aware that many authors<sup>7</sup> do recommend the construction and use of indicators of regulatory quality. Our research found relevant data organised by OECD (Organisation for Economic Co-operation and Development). Creating an indicator could be helpful to measure the effectiveness of the regulatory activity. Nevertheless, it was not in our scope therefore we did not work on it. We understand indicators could create a means of comparison between different regulations, effective-wise.

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<sup>7</sup> BJORKLUND, Mona. "The European Commission's Work on Indicators on Regulatory Policy", in *Regulatory Performance: Ex Post Evaluation of Regulatory Policies*. Paris, OECD, 2003.

# GLOSSARY

|      |   |
|------|---|
| AIP  | Aeronautical Information Publication  |
| ANAC | Agência Nacional de Aviação Civil (Brazilian Civil Aviation Authority)      |
| ARFF | Aircraft Rescue and Fire Fighting   |
| CAT  | Airport Category (level of protection to be provided by ARFF)               |
| ELOS | Equivalent Level of Safety  |
| FAA  | Federal Aviation Administration   |
| ICAO | International Civil Aviation Organization                                   |
| MOPS | Airport Operations Manual   |
| RBAC | Regulamento Brasileiro de Aviação Civil (Brazilian Rules of Civil Aviation) |



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