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A portrait of the quality of life of pilots in regular public air transport in Brazil

Situational awareness

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By **Fabiano Paes Gonçalves**

editor's note

Dear reader,

In this issue, we feature two important case studies that cover quality of life at work. Psychologist Karynne Bayer, who has a Master's degree in social psychology and is a registered element through CENIPA, has written about the Quality of Life at Work (QLW) of pilots who fly in Brazilian airlines. With the intent of encouraging the development of QLW politics, the researcher has pointed out that the downtime for crewmembers hasn't been enough for promoting a repairing rest. That reinforces the need for representative bodies, government and air companies to foster scientific studies for assessing the risks of fatigue for the safety of flights.

Another important point in this research is that it shows the points of view of pilots on the definition of QLW. The group believes that the adequate amount of rest, in addition to opportunities to dedicate some time to personal activities, good management of stops, recognition and valuation by management and quality nutrition are fundamental pillars for the quality of life at work.

A second study, conducted by ATL in partnership with Universidade de São Paulo, presents an analysis of the quality of nutrition for Brazilian crew members. Evidence has been found that the food served in flights offers few menu options, and presents high levels of cholesterol and a lack of key nutrients for human health.

There is also an article from federal judge Adriana de Zanetti, who points out the regulatory requirements for boarding and deboarding armed passengers.

In this issue, we bring great news to our readers. We now have two new partners. IFALPA - International Federation of Air Line Pilots' Associations and CENIPA (which stands for the Center for Aircraft Accidents Investigation and Prevention) will now have their own columns. "IFALPA Space" and " CENIPA Space" are the way the Association has found to bring those entities closer to Brazilian aeronauts.

We hope you appreciate the news that is boarded in this issue!

Enjoy your reading!

Captain **Mário Sérgio Amato Júnior**
President, ASAGOL

Erratum

In our last issue, we have attributed authorship of the article 'A participação da Gol na Segurança Operacional' (Participation of Gol in Operational Safety) to our colleague, Captain Augusto da Fonseca Viana. However, the article has been written by First Officer Pedro Gomes.

This issue's highlights

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A portrait of the quality of life of pilots in regular public air transport in Brazil

By Karynne Bayer*

Civil air transportation is a key social and economic activity in Brazil. In this country, which has continental dimensions, air transportation allows for the resizing of time and space, with unmatched speed to traditional land and water transportation methods.

Since 2015, however, air transportation has developed into an economic downturn setting in Brazil, and consequent fall of purchase power has reflected in demand for flights. In 2016, a decrease in the number of passengers has been seen, and a first decrease (5.7%) has been recorded after over ten years of growth[1]. In February 2014, the worst demand performance since 2013[2] was recorded. In the face of that, the strategy followed by most regular passenger companies has been readjusting their networks, reducing flight offers, fleet, and personnel. That is a fact that, we know, has transcended the economic dimension.

The reduction of the number of pilots has implied in reorganizing flight schedules, fostering a work intensifying framework through tighter schedules and the reduction of time for rest and downtime. Favored by organizational restructuring, new technologies and new market perspectives, those transformations have led to consequences for the well-being at work for the professional category and also for air service efficiency[3], putting at stake the safety and satisfaction of crew members and passengers, and showing that the well-being of pilots at work need to be focused when managing aviation risks.

In that scenario, some fundamental questions arise: how much has the context of work of regular air transportation pilots interfered in their well-being and discomfort experiences at work? How do those pilots evaluate their Quality of Life at Work (QLW)? In which sense those evaluations could have an impact on the efficiency and

effectiveness of the work and operational safety of all aerial modal users? In 2017, those inquiries have encouraged me to conduct a research - through the Laboratory of Ergonomics of Activity, Cognition and Health (Ergonomia da Atividade, Cognição e Saúde - ECoS), at Universidade de Brasília (UnB), in collaboration with SNA, ABRAPAC, ASAGOL, and ATL. The research aimed to find out the global perception of regular public passenger air transport pilots on QLW, while they perform their work, based on the representations they manifest about their work context, management practices, and experiences of tiredness and well-being in the organizational context of the companies for which they work.

This research has had the participation of 164 pilots, from five companies in the researched aviation sector. Data has been collected through a Quality of Life at Work Evaluation Inventory (IA_QVT)[4], which has been adapted for the target audience. Data has also been treated and assessed based on the theoretical and methodological approach of Activity Ergonomics Applied to the Quality of Life at Work (EAA_QVT)[5]. Pilots have been invited to speak up about their work conditions and organizational support, work organization and their social and professional relationships, professional recognition and growth, use of flight technologies, work management practices, tiredness due to work and positive and negative affections that sustain their relationship to their general work context.

Research has shown that, even though the hours of rest (defined by air companies) being within the limitations recommended by law, they are not enough for promoting proper rest, health, and operational safety...

As sources of discomfort at work, pilots have reported: lack of respect, acknowledgment, and professional perspectives; inefficient management, jobs, and salaries processes; inefficient planning and management of flight schedules; food and rest unsatisfactory conditions; and troubled maintenance of the link between work and social life. Those results have shown that Work Organization, Professional Recognition and Growth, Work Conditions and Organizational Support, as well as the Work-Social Life Link, represent the greatest structuring factors for QLW, which are determinant for the pilots' work context. For the category, QLW means:

- Having enough time for quality rest
- Having time to dedicate to their personal life (social and family interaction)
- Having the duration of work better arranged, through balanced planning of flight schedules
- Being recognized and appreciated through the best management, career, and wage policies
- Having a more quality in-flight nutrition

The background of the question has been the fact that the time dimension has taken a central role on the conception of QLW among pilots. The results found that pilots' work overload, fatigue, and personal exhaustion were associated to the malfunctions of work processes and time, regarding their work journey, rest conditions, downtime, and vacations. That has revealed the existence of misfits in the way the pilots' work is organized, and that affects and steals their free time, because of a feeling of fatigue that usually does not cease. So, although love and pleasure are involved in their engagement to work, which is simply materialized by the opportunity to fly, what needs to be given back to those pilots is their time for living, in an effort to recover their dignity, and the meaning of their work in its completeness: 'We love what we do, but we need time for ourselves!!' (quoted from a pilot who has responded the research).

Research has shown that, although flight and rest times are established by airlines and are within limits recommended by law, they are not enough to promote rest, health and safety in operations, highlighting the importance of research about fatigue among pilots, especially studies that investigate the feeling of fatigue, understanding it through a systemic, dynamic and multidimensional perspective[6,78]. Living in constant fatigue puts at risk the pilots' physical, mental and social well-being, leading to restrictions on their personal and social life; musculoskeletal, cardiac, metabolic and psychiatric diseases; and sleep, fatigue, and stress disorders, that pose potential safety hazards.

Some critics have been made to work management practices in airlines, which tend to value productivity over the respect for workers. According to pilots, that respect should be shown through the recognition of their work with more efficient and fair financial compensation and career progression policies; more efficient flight schedules, allowing for adequate rest, enough for carrying out work journeys and maintaining a healthy social life; also, better in-flight nutritional conditions.

Those effects, arising from the context and work management practices, have influenced and had an impact on performing activities, on the health of the people who perform it, and on the operational safety. That constitutes a vicious cycle, in which the work context, by negatively affecting the QLW of the pilots, is also affected in its efficiency and productivity, by the repercussions on the well-being of those professionals. That is shown by illness at work and consequent leaves due to health reasons; by dissatisfaction, discontent and the decrease in work commitment due to a low perception of organizational support, the lack of recognition and opportunities for professional growth; and the occurrence of aircraft incidents and accidents, due to pilots' tiredness and fatigue. The lives of people are potentially at risk. That should not be ignored.

Operational safety literature usually explores human error as the cause for aircraft accidents; But by tracing the causal route of those errors, their origins are found in the following dimensions: (a) organization and system (managerial decisions and organizational processes); (b) assignment and environment (work conditions); (c) personnel (performance, errors, and violations); and (d) organizational defenses (regulation, training and technology)[9]. A great part of them, and that is not a coincidence, has been appointed by pilots as sources of discomfort.

In that sense, this research has had the contribution of an innovative theatrical and methodological QLW approach for operational safety management literature. An alternative to the dimensions of work has been shown, as those are commonly found in the origins of human errors in aircraft accidents, unveiling a complementary perspective to the 'Swiss cheese model'[10], suggested by ICAO for hazard identification and risk management.

I invite the aeronautical community to discover the performed QLW scientific diagnose, visiting the complete version of the research[11], which has offered strategic subsidies to be used in the dialogue between SNA, ABRAPAC, ASAGOL, ATL, ANAC, CENIPA, and air companies, for developing policies and measures aiming for operational safety and quality of services in air transport, through fostering the well-being at the workplace for pilots.

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Case study: an analysis of the quality of nutrition of Brazilian crew members

By Fabiano Paes Gonçalves*

The World Health Organization (WHO) reports that three among the ten key factors associated with the loss of years for diseases or premature death in countries in the American continent refer to changeable nutrition patterns.
Namely:

- Alcohol abuse;
- Being overweight;
- Insufficient consumption of fruits and vegetables.

Alcohol consumption alone is accountable for 4% of all of the mortality in the world, which highlights how negatively impactful it is to people's health. In the excess of weight matter, a global study led by the Institute of Metrics and Health Assessment (IHME), at the University of Washington, in the United States, has shown that 2.2 billion people (30% of global population) is overweight or some degree of obesity, which may lead to several diseases related to that condition.

Insufficient consumption of fruits and vegetables, on the other hand, can lead to several illnesses, such as diabetes - which, according to the International Diabetes Federation, kills more than AIDS, malaria, and tuberculosis combined. In Brazil, one person dies every six seconds, due to that disease.

Some studies report the quality of nutrition of crew members around the world. However, there was no similar research in Brazil. So, in 2015, the LATAM Brazil Crew Association (ATL) has led a study, in partnership with Universidade de São Paulo (USP), and a team of nutritionists. The research has resulted in a scientific paper, which is available at: (http://www.revistas.usp.br/rgpp/article/view/133194/138591).

This study has shown the nutrition of crew members in the Brazilian aerial modal, besides being monogamous (having little menu variation), is well below nutritional and health recommendations. As an example, we can refer to meals taken between journeys, presenting high levels of cholesterol (45% higher than recommended) and lack of fiber, calcium, and iron.

Crew members, as well as athletes, need to be extra careful with nutrition, considering their nutritional status is closely related to their performance. Research shows extremely high[1] presenteeism levels (70%), and those are caused by health issues and have much to do with their nutrition and sleep disorders. Therefore, careful monitoring is necessary, where physicians and nutritionists will offer guidance on adequate nutrition, that can complete or compensate the professional's individual deficits, minimizing the occurrence of diseases.

[1] Presenteeism: Lack of full performance at work due to some sort of pathology.

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Boarding and deboarding of armed passengers: the need for following regulatory requirements

By Adriana Freisleben de Zanetti*

The presence of fire guns on board in commercial flights, especially after September 11th, should be limited to strict situations, considering the needs of protection in civil aviation – notably in regards to prevention acts linked to illicit interference.

ANAC's Resolution no. 461, for January 25, 2018, rules the procedures for boarding and deboarding of armed passengers.

In the first place, that Resolution will only allow for armed boarding passengers who are public agents, and meet the following cumulative criteria: the first one is that they have a functional gun license (due to their roles). At the registry form, add an annotation that this prerogative is not extensive to retired, reformed or reserve public agents. Only active public agents are allowed to board with a gun, which needs to be duly registered in the name of the bearer. The second requirement is the effective need to carry a gun during the period of time between entering the boarding room and deboarding at the destination.

According to the resolution, that need is limited to the following cases: the escort of public authority or witness, or the escort of a guarded passenger; the execution of a surveillance technique, or the transfer to the airport in which the agent will integrate, immediately after landing, an operation that requires immediate access to the gun. The actual need should be proven by the presentation of a specific document from the institution in which the agent is registered (i.e., Federal Police, State Police, ABIN, Army Command, etc.), where the precise indication of dates and the stretch linked to the mission are written.

Article 5 of the Resolution provides for the limited number of weapons per authorized passenger. Boarding of two weapons (handgun or revolver) per public agent will be allowed, and they can be accompanied by ammunition, limited to one main charge and two spare charges each. In case it is a long gun, such as precision rifle, the number of pieces per agent is also limited to two (as in safety agents jargon, 'whoever has a gun,

has no gun at all'). Rifles should be properly boarded and locked in their cases.

The passenger who falls within the limits of the Resolution should appear to the Federal Police room at the boarding airport (or, if that does not exist, at the office that is accountable for the aerodrome circumscription), with the needed advance, for verifying the required documents. Discharging of weapons is the sole responsibility of the boarding passenger, who cannot manipulate the weapon in public spaces, and should only use the restricted areas of the aerodrome for that matter.

The Federal Police will assess the weapon and documents, and check if it fulfills the regulatory requirements. As soon as the authorization form is expedited, a copy should be presented to the air operator (the Resolution also allows for the electronic version of the document). Exceptionally, pursuant to §1 of art. 11 of ANAC's Resolution n. 461/2018, the Federal Police may deny boarding of armed agents, even if all the requirements have been met, based on a concrete risk assessment, which should be duly written and substantiated. For example, the law enforcement agent may identify that the weight of the weapon exceeds other legal commands (RBAC 175), or that it cannot be securely accommodated, due to the specificity of the flight.

On the occasion of the armed passenger's check-in, the air operator should require presentation of the armed boarding authorization form, which has been issued by the local Federal Police. The operator should check if the information on the form is in compliance with the quantitative limits and weapon accommodation requirements that are set in the Regulation.

The operator should also inform the armed agent about the procedures for entering the boarding room. At the registry form, inform that the passenger who is authorized to board with a weapon could eventually be authorized to board with other items that might me forbidden to other passengers, as long as they are a part of the operational equipment. However, in no case the boarding of tear gas or other similar incapacitating gases should be allowed.

It is an obligation of the company to inform to the destination base about the boarding of an armed passenger. The air operator should also inform the flight's crew about the armed passenger, in a discreet way, in order to preserve the confidentiality of the fact that a weapon is on board and of the passenger's identity. In the case there is more than one armed agent per flight, the operator, though the crew, should inform each armed passenger about the presence of the other armed passengers, indicating the number of their seats.

Article 24 of Resolution 461/2018 allows for the operator and the aircraft captain to deny, in exceptional cases, the boarding of the armed agent, as long as they provide a written justification explaining the potential concrete risk of the accommodation in the aircraft, regarding the safety of the other passengers or the usual operation of the aircraft.

The crew is also responsible for supervising the armed agent's behavior on board, as the resolution provides for the following rules: the armed passenger shall stay in the seat that has been assigned in the boarding pass (unless the captain determines, for safety reasons, that they need to change seats); the agent shall not consume alcoholic beverages during the eight hours that precede the boarding, and also shall not drink any alcohol during the flight; they shall carry their weapon in a discreet way, and should not manipulate it during the flight; in case of a turmoil on board, they are required to act in strict conformity with the aircraft captain's instructions; the weapon should only be charged after deboarding, in a specific space, designated by the local airport authority for that purpose.

The crew is also responsible for alerting the agent, at boarding, that an accidental discharge of the weapon on board could lead to depressurizing and damages to fuel lines, control cables, electric wiring and water systems, which could result in catastrophic proportion accidents.

Failure to comply to any of these safety measures shall imply on the compulsory deboarding of the agent, with no prejudice to other applicable sanctions, in civil, criminal, and administrative spheres.

Have good and safe flights, everyone!

* ***Adriana Freisleben de Zanetti*** *is a Federal Judge and has a Master's degree in Law from PUC University. She is a professor at undergraduate and graduate Law courses, and honorary member of the Brazilian Lawyers Institute (IAB), Private Pilot and former flight attendant.*

Evidences of cabin automation in aeronautical accidents

By Brazilian Air Force Lieutenant Colonel Fábio Baeta Freire

The following paper has been presented by the author at the Brazilian Air Force Command and General Staff course, at the Universidade de Força Aérea, in 2017. A few textual and graphic alterations have been made, only for the purposes of updating information on aeronautical occurrences investigation analysis performed by CENIPA, as well as of adapting to the magazine's editorial standards.

Interaction between pilot x machine has not always been a friendly one, as several accidents have been seen, in which automation has been pointed out as a 'contributing factor', such as the case of American Airlines (AA 965) Boeing 757, flying to the United States through Colombia, in December, 1995, which has crashed to the ground and killing almost 200 people.

Such situations have stimulated several researchers to carry out studies, especially in the 1990's, aiming to assess threads to flight safety arising from automation.

However, over twenty years after those studies, can we affirm we have reached a harmonious relation and, specifically, a synergic one, between automation and pilots? Could we say the issues found by those studies have been overcome? Could new relations have been risen, from this third crew member, the 'autopilot'?

Thus, Brazilian regular aviation accidents that happened between 2006 and 2015 have been studied. Investigations from those have been concluded by CENIPA, and materialized by Final Reports, which present the entity's official version over those matters.

On automation issues, references to Ken Funk et al. (1999)[1], a Ph.D. professor at the University of Oregon, United States, have been used, referring to his research, Flight Deck Automation Issues, which has been based on the research performed by Federal Aviation Administration (FAA HUMAN FACTORS TEAM, 1996).

PR-GTD/NX600L (B 77-8EH/EMB 15) – Collision of Aircrafts in Flight Sept 29, 2006

Due to several contributing factors, the two aircrafts, both modern and with a high automation level, have crashed and have led to the fall of PR-GTD.

Among those contributing factors, a decrease of 'situational awareness' has been identified. In one point of the report, the investigator reports, regarding NX600L:

> [...] pilots have reduced situational awareness regarding the flight they were performing, to the point that they did not realize the Transponder had stopped transmitting, as they were focused on solving the Manaus NOTAM, trying to retrieve the time that should have been used on the ground and equate that issue, and in other measures associated to aircraft acquaintance and flight planning [...][2].

According to the investigation, even with little experience with the Legacy 600 aircraft (the Captain had a little over five hours of flight), as well as the route to be flown, and being that the first navigation to be done by that crew in the Brazilian air space, pilots have shown they did not keep track of the flight, performing parallel activities, as well as exchanging information with control organs for almost sixty minutes. Here, we can see the possibility of overconfidence in the machine, which generates a lenient behavior, transferring to automation some accountability, as that was 'controlling' the flight route maintenance.

So, a proximity to the third question at Funk et al. (1999) arises:

Table 1: Brazilian Regular Aviation Accident Summary, from 2006 to 2015

DATE	ANV MTR	ANV TYPE	TYPE OF ACCIDENT	PLACE
09/29/2006	PRGTD	B-737 8EH EMB-135	In flight aircraft collision	Peixoto de Azevedo
06/16/2006	PPVQG	MD-11	With landing gear	Brasília
07/16/2007	PTMFK	ATR-42-300	Loss of control on the ground	São Paulo
07/17/2007	PRMBK	A-320	Loss of control on the ground	São Paulo
04/21/2008	PTOCV	LEARJET 35A	In-flight engine failure	Coari
05/05/2008	PRMHK	A-320	Collision to an obstacle on the ground	São Luís
05/25/2009	PTMVN	A-330	Caused by in-flight meteorological event	Pirassununga
09/08/2009	PRMYA	A-320	Caused by in-flight meteorological event	Varginha
12/17/2009	PRMTL	B-727-2J7	Caused by in-flight meteorological event	Manaus
02/17/2010	PRUUT	EMB-500	Running of the runway	São Paulo
08/25/2010	PRPSJ	EMB-145	Landing prior to the runway	Vitória da Conquista
02/21/2011	PRTTI	ATR-72-212	With landing gear	Altamira
07/13/2011	PRNOB	L-410	In-flight engine failure	Recife
01/06/2012	PRTKB	ATR-42-500	Air traffic	Guarulhos
02/07/2012	ECGLE	A-340	Caused by in-flight meteorological event	Rio de Janeiro
03/24/2012	PRWJA	B-737-322	Caused by in-flight meteorological event	Navegantes
09/01/2013	PTMVL	A-330	Caused by in-flight meteorological event	Águas internacionais
03/28/2014	PROAF	F-28 MK0100	System/component failure	Brasília
05/30/2014	PRTKB	ATR-42-500	Other types	Coari
09/25/2014	PRGOR	B-737-76N	Caused by in-flight meteorological event	Confins

Source: Author, adapted from FCA 58-1 (CENIPA, 2016) and Accident Final Reports

> Pilots might become lenient due to overconfidence over automation and they can **fail on performing adequate system surveillance (management)**, getting to the point, in some cases, to abdicate the responsibility, transferring it to automation (FUNK et al.,1999, p.115, our translation and emphasis).

PR-MBK (A 20) – Losing control on the ground July 17, 2007

The aircraft performed the route Porto Alegre-RS to São Paulo-SP, at nighttime, operating by instruments, with light rain and a slippery runway. After landing, pilots were not able to slowdown the aircraft, which has surpassed runway limits, colliding with buildings and catching fire.

As well as the previous case, 'situational awareness' is among the contributing factors described by the investigator:

> [...] the loss of situational awareness has been raised as a consequence to the lack of perception of the pilots. In that sense, aircraft automation, although complex, was not able to offer pilots sufficient clear and precise stimuli in order to favor their understanding about what was happening in the moments preceding the landing [...][3]

The understanding to which the previous citation refers is, among other factors, the fact that the aircraft aerodynamic breaks did not open, a consequence of its automation, for the fact that one of the throttles were not in idle position. That rationale has happened although the aircraft was in landing configuration, meaning, landing gear and flaps ready, as well as being on the ground, with one of the engines at the reverse range and one of the brakes pressed by the pilots.

An approximation of the pilots' behavior to question number five at Funk et al. (1999) can be seen:

> **Automated systems behavior**, meaning, what they are doing at the time and what they will do in the future, based on pilots' input and other factors, **might not be clear to pilots,** possibly **resulting in a reduction of their awareness** over the action and automation goals (FUNK et al.,1999, p.115, our translation and emphasis).

PR-TKB (ATR 42) – Air traffic Jan. 6, 2012

During the performance of a STAR Congonhas, with an engaged AP, one of the pilots has inputted an erroneous height in the flight director. The aircraft surpassed the chart's minimum height and got closer to another aircraft that was flying in a lower level, generating collision alarms at the TCAS. As a response, the pilot has performed an evasive maneuver, and one of the passengers had serious injury.

We are able to see an approximation to Funk's third question, as the pilots have shown low situational awareness,

experiencing difficulties to monitoring the actions of the aircraft, allowing for it to surpass the minimum height, showing no reaction: "[...] pilots might become lenient due to overconfidence over automation and they can fail on performing adequate system surveillance (management) [...]" (FUNK et al.,1999, p.115, author's translation).

For this case, it might make sense to also consider the action of the fifth question at Funk et al. (1999), as the pilot did not visualize what was happening at the time, or:

> **Automated systems behavior**, meaning, what they are doing at the time and what they will do in the future, based on pilots' input and other factors, **might not be clear to pilots,** possibly **resulting in a reduction of their awareness** over the action and automation goals (FUNK et al.,1999, p.115, our translation and emphasis).

It should be noted that, although not being perceived by the pilots, the behavior of the aircraft was exactly what has been selected by the crew, through the flight director.

EC-GLE (A 40) – Meteorological events Feb. 7, 2012

During a landing procedure at Galeão, the crew has been oriented by the control entity to fly towards a fix, that was located outside of the procedure chart they were performing. Pilots looked towards the nacelle's interior, focusing on FMS. When they drew their attention to the outside, they realized they would be flying over the top of a heavy formation, and turned the fasten seatbelts warning on. However, 15 seconds later, the aircraft faced severe turbulence, culminating with seven light injuries to passengers and one severe injury to a crew member, who was not able to fasten their seatbelts in a timely manner.

The accident investigator has concluded that the pilots' diversion of attention is a "fact," and that the pilots have focused in the internal part of the aircraft, failing to keep adequate surveillance (even if momentarily) to the exterior: "[...] the captain and the first officer drew their attention towards the inside of the cabin, at the time for inputting the fixed TOKIM in the FMS [...]"[4]

This situation responds to the Funk's first question, which is:

> The demand for attention in pilot-automation interaction could significantly interfere on the execution of critical tasks for flight safety, **leading to effects such as distractions, 'heads down' (pilots inserting data in the FMS - Flight Management System)**, etc. (FUNK et al.,1999, p.115, our translation and emphasis).

CONCLUSION

In summary, three of the five questions about automation raised by Funk et al. (1999) have been present in four of the fourteen accidents that have been analyzed. That might reveal that one of the most important factors is still on **how hard it is for pilots to keep constant surveillance over automation, as well as being in a position to interfere, whenever necessary**. Besides, we can infer that issues about automation, which have been investigated over twenty years ago, still have influence over flight safety, despite the evolution of automated systems.

According to James Reason, event in the face of complex systems, the operator's action is necessary, as designers are not able to forecast all possible and probable failures in flight environments, nor are capable of developing automated responses to all cases. So, when all the barriers and defenses fall; when the most remarkable and trustful technology fails; when inputs, software, cables, rationales and bits are not enough, there will only be the pilot and their essential psychomotor skills: will that be enough? It has to be!

References:

1. FUNK ET AL. Flight Deck Automation Issues. **The International Journal of Aviation Psichology**. p.109-123, Aug.1999.
2. BRASIL. Comando da Aeronáutica. Centro de Investigação e Prevenção de Acidentes Aeronáuticos. **Relatório Final de Acidente Aeronáutico nº 22/CENIPA/2008**, Brasília-DF, 2008, p.215.
3. BRASIL. Comando da Aeronáutica. Centro de Investigação e Prevenção de Acidentes Aeronáuticos. **Relatório Final de Acidente Aeronáutico nº 67/CENIPA/2009**, Brasília-DF, 2009, p.101, grifo nosso (emphasis ours).
4. BRASIL. Comando da Aeronáutica. Centro de Investigação e Prevenção de Acidentes Aeronáuticos. **Relatório Final de Acidente Aeronáutico nº 09/CENIPA/2013**, Brasília-DF, 20013, p.16, grifo nosso (emphasis ours).

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Phraseology

At the IFALPA Conference 2017 in Montreal, Canada the following Conference Statement was made:

"The 72nd IFALPA Conference in Montreal, Quebec, Canada calls upon all aviation professionals, particularly pilots, and air traffic controllers, to strictly adhere to the use of standard ICAO phraseology. The use of standard ICAO phraseology will improve communication and clearance understanding and thereby significantly reduce R/T confusion."

Radiotelephony (RTF) provides the means by which pilots and ground personnel communicate with each other. The information and instructions transmitted are of vital importance in the safe and expeditious operation of aircraft. Incidents and accidents have occurred in which a contributing factor has been the use of non-standard procedures and phraseology. The importance of using correct and precise standardized phraseology cannot be overemphasized enough.

ICAO phraseologies are contained in procedures found in Annex 10 — Aeronautical Telecommunications, Volume II — Communication Procedures including those with PANS status and in the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) and the Manual of Radiotelephony, Doc 9432.

ICAO phraseologies are developed to provide efficient, clear, concise, and unambiguous communications, and constant attention should be given to the correct use of ICAO phraseologies in all instances in which they are applicable. The examples contained in these documents are not exhaustive, but merely representative of radiotelephony phraseology in common use. If it is necessary to use plain language, it should be used according to the same principles that govern the development of phraseologies in that communications should be clear, concise, and unambiguous.

It is important that transmitted speech is clear and satisfactorily received. The following are some points to consider:

- Before transmitting, listen on the frequency to be used to ensure that there will be no interference with a transmission from another station;
- Use a normal conversational tone, and speak clearly and distinctly;
- Maintain an even rate of speech not exceeding 100 words per minute. When it is known that elements of the message will be written down by the recipient, speak at a slightly slower rate;
- Maintain the speaking volume at a constant level;
- A slight pause before and after numbers will assist in making them easier to understand;
- The transmission of long messages should be interrupted momentarily from time to time to confirm that the frequency in use is clear and, if necessary, to permit the receiver to request repetition of parts not received.
- Ideally, there should not be more than three instructions in one transmission.
- Unnecessary phraseology such as greetings or extraneous verbiage should not be transmitted.

An example of where standard phraseology is important is the Read-back. The read-back requirement is essential and directly relates to the possible seriousness of a misunderstanding in the transmission and receipt of ATC clearances and instructions. Strict adherence to read-back procedures ensures not only that the clearance has been received correctly but also that the clearance was transmitted as intended. It also serves as a check that the right aircraft, and only that aircraft, will take action on the clearance.

The use of plain language required when phraseologies are not available should not be taken as licence to chat, to joke or to degrade in any way good radiotelephony techniques. All radiotelephony communications should respect both formal and informal protocols dictating clarity, brevity, and unambiguity.

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Situational awareness

By Bruno Blaya

In the last few months, we have seen several Operational Safety Events (ESO) about the reduction in situational awareness. Those events range from low to high criticality, resulting from threatening cognitive distortions to alertness and, as a consequence, to situational awareness. Among them, we have identified: erroneous flap selection prior to taking off, runway incursion, depressurization caused by erroneous system configuration, EGPWS alert, speed exceedance, autopilot decoupling not perceived, flap load relief, and unintended slide inflation.

Situational awareness is a mental representation and a comprehension of objects, events, people, united systems, interactions, environmental conditions, threats, and other factors associated to a specific situation that might affect the development of human tasks.

In simple terms, to have situational awareness is “to know what happens to find out what to do,” also defined as simply as “what do I needed not to be surprised,” or, intuitively, is one of the answers for at least one of the following questions: What is happening and why does that happen? What will happen from now on? What can I do now?

Human error participation as a contributing factor in accidents in high technology complex systems has also been increasing in the last decades, throughout the global industry. However, such growth is not only due to physical and cognitive limitations pertaining to human beings,

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but for ignoring or inadequately considering operators' interfaces with the other elements of complex sociotechnical systems. Example: Man-Machine/System, Man-Man and Man-Environment.

Among the features of the evolution of advanced technology systems, the ones that can be highlighted are the progressive detachment of the operator from manual system direction and the redundant protection against failure mechanisms project, which can lead to a human dependency for operation.

Researchers highlight that performance gains resulting from that evolution have generated, as a sub product, the need for operator precision that goes beyond their control actions and, frequently, is also beyond their mental or psychomotor capacities. Such changes in operators work conditions and the increasing automation of productive processes have led to a progressive exchange in activities, for typically physical, to increasingly more mental.

In cognitive psychology, situational awareness refers to the active content of a decision-making human being's mental model, and a draft of the evolutionary state of the tasks they need to perform. The main purpose of situational awareness is to allow for a way of taking adequate and efficient decisions. It is even more reinforced by acquisition, representation, interpretation, and utilization of all relevant information, for making sense of situations, increasing the capacity of foresight to further events, promoting competence for smart decision making and control maintenance.

Fatigue, psychosocial issues incurring from stressing agents (trauma, routine, and chronic), automatism among pilots, meds, inefficient CRM (poor communication, lack of efficient and assertive input, power distance), lack of technical knowledge, overconfidence, impulsiveness, among others, are in general the threats that most affect situational awareness reduction.

Among human factors in aviation investigation, situational awareness is a key concept and, in fact, it is in any context in which the consequences of the use of technology and the increase of complexity in situations can negatively influence human decision making. Having knowledge of complete, precise and current situations is highly appreciated and also essential for those who are responsible for having control over complex, highly dynamic and risky situations, such as fighter pilots, airline pilots, air traffic controllers, emergency management personnel, and surgeons.

Reduced situational awareness can have, as a result, failure in decision taking, and is considered one of the main causes on development of accidents related to human error.

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Support, participation and representativeness

ASAGOL was founded on July 15, 2003, with the mission of caring for flight safety and the well-being and professional and moral growth of its associates, by being their voice and face before their employers.

We foster technical and cultural exchange with the National Aeronaut Union (SNA) and the Civil Aviation Pilots Brazilian Association (ABRAPAC) and LATAM Crew Members Association (ATL), supporting them at their fair defenses before Brazilian authorities.

We provide guidance and assistance to our associates, for the enforcement of laws and regulations pertaining the aeronaut profession.

Benefits and Partnerships

We offer benefits and partnerships considering the enhancement of quality of life for our associates and their family, namely:

- Social Aid
- Legal Advice
- Car Insurance
- Health and Dental Care (AMIL)
- Private Pension Plans
- PIT - Temporary Disability Plan
- PPCM - Loss of License and Death Plan

Flight Safety

We are members of the Aircraft Accidents Prevention National Committee (CNPAA), where we work on supervising the National Training Commission (CNT) and are members of the Hot Air Balloon Danger National Commission.

We are part of a work group that is supervised by the Civil Aviation Secretary (SAC), aiming to stablish guidelines and measures for reducing the risk of hot air balloons in aviation related activities.

ASAGOL
ASSOCIAÇÃO DOS AERONAUTAS

Our latest flights

Stops
Availability to assist technically and in research with the group, on questions about Flight Schedules.

Crew members' health
Initiatives with the HR and the Medical Department of the company.

PIT/PPCM Plans
The Mutual Assistance Plans for Temporary Disability, Permanent License Loss and/or Death are an additional security measure, offered to associates, by ASAGOL.

Aeronaut Law
Intense support to the SNA activities at National Congress, aiming to pass PL 8255/14.

Brazilian Aeronautical Code
Cooperation and support to SNA, in order to ensure the interests of workers in the forthcoming CBA reform.

FRMS
Technical and scientific support for developing the Brazilian Civil Aviation Regulation (RBAC) on the Risk of Fatigue Management System.