

A PRELIMINARY ANALYSIS OF AERONAUTICAL SERVICES IN AIR NAVIGATION ACTIVITY

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INFRAERO - Brazilian Airport Infrastructure Enterprise, Brazil

DECEA - Air Space Control Department regulates Air Navigation activity in Brazil and authorizes military and civilian organizations to provide aeronautical services. This article presents a preliminary analysis of Brazilian Air Navigation activity involving the following aeronautical services provided by a civilian organization: Air Traffic Control, Management and Telecommunication; Aeronautical Meteorology; and Aeronautical Information. This analysis is based on civilian psychologists' professional practice and has the main purpose to subsidize Human Factors preventive approaches and studies to contribute to more proactive and predictive safety interventions; improvements on organizational safety culture, workers' performance and interfaces (BRASIL, 2010a; ABERGO, 2010).

1. Air Navigation Activity in Brazil

DECEA - Air Space Control Department is a military institution subordinated to COMAER - Aeronautical Command, subordinated to Defense Ministry, responsible to regulate and inspect Brazilian Air Navigation activity, based on ICAO - International Civil Aviation Organization publishing about the following specialized aeronautical services: Air Traffic Control, Management and Telecommunication; Aeronautical Meteorology and Cartography; Aeronautical Information; Flight Inspection; Search and Rescue. Therefore, it is also the Brazilian aeronautical authority which homologates and authorizes SISCEAB - Brazilian Air Space Control System following systemic links to provide these services: 4 military CINDACTA - Air Space Control and Defense Centers; one military SRPV - Flight Protection Regional Service; 79 military Detachments; several civilian EPTA - Telecommunications and Air Traffic Services Stations; and the civilian INFRAERO - Brazilian Airport Infrastructure Enterprise. Initially, a summary of the main aeronautical services in Air Navigation activity will be presented, emphasizing the ones provided by INFRAERO, which will be the focus of this analysis, as follows: Air Traffic Control, Management and Telecommunication; Aeronautical Meteorology; and Aeronautical Information (BRASIL, 2010a; ABERGO, 2010).

1.1. Air Traffic Control, Management and Telecommunication Service

Air Traffic Services consist of standard phraseology communication between ATC - Air Traffic Controller and Air Traffic Center or between ATC and aircraft pilots, aiming at achieving safety flight purpose. The complexity level of air traffic scenery determines the type of service that shall be offered by the following operational segments:

1.1.1. Aeronautical Telecommunications Radio Stations. They provide appropriate flight information services to aircraft pilots about the existence of other aircrafts and obstacles in the same air space. There are more than 90 stations installed into Brazilian aerodromes, of which 72 are INFRAERO stations operated by PNA-OEA - Air Navigation Professionals-Aeronautical Station Operators, responsible to transmit messages using AFTN - Aeronautical Fixed Telecommunications Network, of which fifty are AFIS - Aerodrome Flight Information Services.

1.1.2. TWR – Aerodrome Control Towers. They provide Aerodrome Control Services of aircraft maneuver, take-off, landing and overflying, for collision avoidance with other aircrafts, obstacles and vehicles if moving in the aerodrome runway. TWR jurisdiction area embraces aerodrome's air traffic circuit and maneuver. INFRAERO has 22 TWR, operated by ATC named PTA - Air Traffic Professionals.

1.1.3. APP - Approach Centers. They provide Approach Control Services of aircraft take-off and landing, for its appropriate separation of other aircrafts or obstacles. TMA - Terminal Maneuvering Area and CTR - Control Zone are APP jurisdiction space. In Brazil, there are 47 APP, of which 13 are INFRAERO APP, operated by PTA.

1.1.4. ACC – Area Control Center. INFRAERO doesn't provide this service, which is operated by DECEA ATC for monitoring aircrafts during air route, to guarantee their safety separation. FIR - Flight Information Regions consist of ACC jurisdiction area, which embraces several TMA and air routes. There are 5 ACC settled in Brazil, linked by a communication structure involving: 380 DECEA SMA - Aeronautical Mobile Service, which are radio communication stations; DECEA SFA - Aeronautical Fixed Service for telecommunication among different Air

Traffic Centers by phone networks; and DATACOM AFTN for communication of planning, aircraft landing / take-off, arriving / retarding flights, engine failures monitoring and logistic purposes among aircrafts and air companies.

1.1.5. Air Navigation Groups and Units. They provide complementary air traffic control services' support to give information flight. INFRAERO has 69 Air Navigation Groups and 51 Air Navigation Units.

1.2. Aeronautical Meteorology Service

INFRAERO MEG - Meteorologist and PMET - Meteorologist Technician are responsible for this service. So, they publish noticed and predicted meteorological information involving visualization, treatment and diffusion, associated to DECEA REDEMETS and OPMET networks' coordination. This service is composed by:

1.2.1. CNMA - Aeronautical Meteorological National Center. It is settled at CINDACTA I, situated at Brasília City (Federal District) and operated by 2 meteorological information bases: OPMET, responsible to make routine national and international meteorological reports (METAR, TAF, SPECI, SIGMET); and REDEMETS (BRASIL, 2010b), which uses AFTN to publish meteorological information in order to integrate meteorological stations known as REM - Meteorological Stations Networks. There are 3 types of REM: EMS - Surface Meteorological Stations / Classes I, II and III, operated at aerodromes to collect meteorological information about landing runway conditions and its codification and transmission for meteorological data basis services, of which 68 are INFRAERO EMS, using INFORMET network; EMA - Altitude Meteorological Stations, which are equipped with a hydrogen gas balloon attached to a sounding lead with sensors and GPS - Global Position System, to be thrown at atmosphere, aiming at collecting, codifying and transmitting information for data basis of Aeronautical Meteorology Vigilance System of the World Meteorology Organization, and of which 5 are INFRAERO EMA; and ERM - Meteorological Radar Stations, operated by DECEA CMV - Vigilance Meteorological Centers to complement meteorology vigilance in adverse conditions for air operations of high Air Traffic density areas.

1.2.2. CMV - Vigilance Meteorological Centers. There are 4 DECEA CMV in Brazil, localized at ACC and responsible for FIR meteorological conditions vigilance that may affect air operations. INFRAERO has no CMV.

1.2.3. CMA - Aerodrome Meteorological Centers. Their purpose is to support air operations and air traffic services operated at aerodromes, and to diffuse meteorological information and weather forecast predicted by other centers to the crews and the flight operator dispatchers. INFRAERO has 68 CMA linked to EMS.

1.2.4. CMM - Military Meteorological Centers. They are situated at COMAER air bases operated by DECEA to support military aviation in restricted places. INFRAERO, as a civilian organization, has no CMM.

1.3. AIS - Aeronautical Information Service

It consists of collecting, generating, processing and publishing necessary information for planning and execution of a safety flight. INFRAERO has 66 AIS Rooms operated by PNA-TIA - Air Navigation Professionals-Aeronautical Information Technicians, based on DECEA AIS publications, as follows:

1.3.1. IAIP - Integrated Aeronautical Information Publication. Documents based on ICAO standardized publications: AIP - Aeronautical Information Publication, with aeronautical permanent information and long duration modifications' registers; AIP Supplement, which publishes AIP temporary and permanent modifications and organizes its changes; NOTAM - Notice to Airmen, which complements AIP, ROTAER - Air Routes Auxiliar Manual, AIP Supplement and Aeronautical Charters, containing information to establish or modify any aeronautical installation, service, procedure or danger for operators uncharged of flight operations; BIP - Previous Flight Information Bulletin, prepared by AIS operators or emitted by NOTAM data basis, to attend pilots planning flights; AIC - Aeronautical Information Circular, with explanation, advisement, administration or technical information.

1.3.2. ROTAER - Air Routes Auxiliar Manual. It consists of DECEA brazilian publications created to help pilots to plan their flights and to navigate the national territory.

2. INFRAERO Aeronautical Services in Air Navigation Activity

2.1. Purpose

EPTA and INFRAERO provide brazilian aeronautical civilian services in Air Navigation activity, homologated by DECEA. The ones provided by INFRAERO are: Air Traffic Control, Management and Telecommunication; Aeronautical Meteorology and Information. The main purpose of this article is to make a preliminary analysis of INFRAERO services developed by organic operators, based on its psychologists' practice contribution, aiming at subsidizing Human Factors approaches and studies to implement proactive and predictive safety interventions; and improvements on organizational safety culture, workers' performance and interfaces.

2.2. INFRAERO main characteristics

INFRAERO is a civilian mixed economy and an indirect public administration enterprise guided by brazilian CLT - Labor Rules Consolidation and, in which concerns Air Navigation activity, also by DECEA regulations

(BRASIL, 2009b; BRASIL, 2008c). Its mission consists of: "providing Airport and Air Navigation structure and services, contributing to the national integration and the sustainable development of the country" (BRASIL, 2010c). It has 67 airports, of which 28 are international and the others are domestic ones. It has 28.000 employees, of which 13.293 are organic and the others are outsourced staff. It has 1.585 professionals working on aeronautical services: 576 PTA; 38 MEG; 332 PMET; 432 PNA-OEA; 198 PNA-TIA; 19 PNA-ESP - Air Navigation Professionals-Specialists (BRASIL, 2011). INFRAERO has: 72 Aeronautical Telecommunications Radio Stations operated by PNA-OEA, of which 50 are AFIS; 22 TWR; 13 APP; 69 Air Navigation Groups; 51 Air Navigation Technical Units; 68 EMS and CMA; 5 EMA; and 66 AIS Rooms operated by PNA-TIA.

2.3. Problematic

Every DECEA regulation is based on ICAO publications (ICAO, 1998; ICAO, 2002; ICAO, 2000; ICAO, 2005; ICAO, 2006), which, from the 90 decade on, started to establish Human Factors and Ergonomics requisites with the purpose of: minimizing human errors as the main contributor aspect of aeronautical accidents; and defining instruments and methods to identify, monitor and control systemic threats that may motivate them. ICAO Human Factors and Ergonomics specific documents admit human error as a normal condition, but introduce instruments, techniques and methods to understand, address and learn about possible systemic threats which may lead to it, aiming at reducing human contributions to aeronautical accidents (BRASIL, 2010d).

Human Factors is: "The group of sciences which studies all elements which contribute to men interactive relations, in a certain context, surrounded by several systems, determined by their dynamics, efficiency and efficacy. It concerns the optimization of human well being and system global performance for adapting work sets to human characteristics, abilities and limitations, for an efficient, effective and safe performance" (BRASIL, 2010d).

In order to attend ICAO requirements (ICAO, 1998; ICAO, 2002; ICAO, 2000; ICAO, 2005; ICAO, 2006), brazilian aeronautical authorities – DECEA, ANAC - National Civil Aviation Agency and CENIPA - Aeronautical Accident Prevention and Investigation Center – do their best to bring up to date their own regulations, based on ICAO Human Factors and Ergonomics requisites, in which there are relevant psychological aspects to be issued.

Psychologists' participation on aeronautical accidents and incidents prevention and investigation in Brazil is an old practice, but on air traffic control incidents prevention and investigation is a recent initiative, requiring, besides their professional qualification (BRASIL, 2008b), also the definition of interdisciplinary procedures to improve operators performance on aeronautical services in Air Navigation activity. Therefore, since 2008, INFRAERO psychologists have been overcoming their place in this field (BRASIL, 2010f), but, still, much has to be done to reduce the distance between work prescriptions and workers real practice (GUÉRIN, 2006), improve operators work rules and procedures (DÉJOURS, 2008), monitor human errors and organizational threats (REASON, 1990 and 1997), make possible predictive and proactive safety interventions, reduce air traffic incidents.

2.4. Human Factors Indicators - Psychological Aspects

This article is based on INFRAERO psychologists' practice of the last 3 years on Human Factors related to aeronautical services in Air Navigation activity. Since 2008, DECEA regulations (BRASIL, 2009b; BRASIL, 2008c) started to require psychologists' participation on air traffic incidents prevention and investigation, what was accomplished by INFRAERO, which had, initially, only 2 psychologists in Air Navigation sectors for this job. In 2010, the need for more psychologists became evident in this area, a regulation was elaborated (BRASIL, 2010f) and more 8 psychologists were acquired, one for each region of Brazil.

According to ICAO, there are 3 types of safety interventions in aviation: predictive, proactive and reactive (ICAO, 2006). Reactive safety intervention after aeronautical occurrences happens to be more common. On the other hand, predictive and proactive safety interventions, before aeronautical occurrences, require efforts to intensify Human Factors approaches and studies to identify Human Factors indicators to be continuously managed.

CENIPA recent publications' upgrade (BRASIL, 2008) emitted a combination of safety regulations related, not only, to Material Factors contribution, but also to Human Factors contribution for aeronautical accidents investigation analysis, introducing a new classification consisted of 3 aspects: psychological, physician and operational (BRASIL, 2008d). Before 2008, there were only the first 2 Human Factors' aspects – psychological and physician, and the operational aspect was analyzed separately, as an Operational Factor, similar to Material Factors.

Each day more, modern advanced technological development requires an interdisciplinary performance among professionals of different branches, so that they may apply Human Factors concepts, interacting with their scientific, technical and specialized knowledge for a better understanding of operators' real work (GUÉRIN, 2006) and organizational environments (REASON, 1990 and 1997). INFRAERO CADOC - Aeronautical Occurrences Data Basis is a System developed to register INFRAERO aeronautical services information in Air Navigation activity all over the country, not including Human Factors indicators related to Psychological Aspects of operators' performance yet. This represents a blank to be fulfilled, in CADOC or other appropriate Data Basis System,

considering predictive and proactive measures to be profitable before air traffic incidents and occurrences' consolidation. INFRAERO psychologists' latest practice may contribute to understand and define them, as follows.

2.4.1. Air traffic control incident investigation. Since 2008, DECEA introduced a regulation (BRASIL, 2008c) to oblige psychologists' investigation of air traffic control incident, by defining standardized procedures to analyze Human Factors psychological aspects concerning individual, psychosocial and organizational variables. Every time an air traffic incident occurs at INFRAERO, psychologists ought to investigate these aspects contribution possibility in interface with operational investigators. The investigation process result consists of filling out RICEA - Air Control Incident Report, with both psychological and operational aspects, each of them considered as a parcel of Human Factors contribution to the incident analyzed, making possible integrated *feedback* and actions for necessary improvements on safety. This consists of a reactive safety intervention, in accomplishment to DECEA regulation (BRASIL, 2008c), and needs to be monitored by a Human Factors Indicators Data Basis System, in complement to CADOC, for a permanent follow-up of aeronautical occurrences causes' statistics indicating what should be improved and helping to adopt a more predictive and proactive safety intervention in the future.

2.4.2. TRM. Since 2005, in accomplishment to ICAO publication (ICAO, 1998; ICAO, 2005), DECEA started to implement TRM Training (BRASIL, 2005a; BRASIL, 2009b and 2010e). In 2008, INFRAERO, in accomplishment to DECEA regulation (BRASIL, 2005a; BRASIL, 2009b and 2010e), introduced DECEA Facilitator TRM Training, as a support to prepare INFRAERO own facilitators (psychologists and operators) to implement internal TRM, which main purpose is: introduce team techniques to improve team behavior abilities at work related to leadership, decision making, situational awareness, communication, stress management and team interaction (BRASIL, 2005a). It was a positive experience, but, still, much has to be done to develop methodologies to identify operational restrictions that need to be improved with TRM and taken to operational practice routine, as a continuous process to assure TRM effectiveness. This requires TRM understanding as a global Program and represents a challenge to be reached by psychologists and operators' interdisciplinary intervention focused to: TRM initial consciousness as part of organizational culture; operators' performance follow-up after training for periodic feedback and improvements; INFRAERO basis TRM instruction as a civilian reference.

2.4.3. Operators health inspection. Pilots, flight attendants, ATC and PNA-OEA are, annually, required to upgrade their CCF - Heath Certification Ability at CEMAL - Aeronautical Medicine Center, which regulates aeronautical professionals health inspection (BRASIL, 2003). CEMAL is a military institution, subordinated to DIRSA - Aeronautical Health Directory, subordinated to COMAER, subordinated to Defense Ministry. INFRAERO PTA (ATC) and PNA-OEA have do be submitted to CEMAL health inspection but, as a civilian public administration enterprise, operators, regulated by CLT, are also obliged to make periodical health exams with an internal labor physician staff, in accomplishment to MTE - Labor Ministry regulations (BRASIL, 1978). This points out to a double procedure of operators' health evaluation process, based on 2 different sources of regulations – Defense Ministry and Labor Ministry – indicating the possibility of divergent health restrictions diagnosis emitted by physicians from both institutions, which may take operators, temporarily, out of work. Still, if the operator stays out of work for health reasons for more than 15 days, he must be submitted to INSS - National Social Security Institute medical expertise, regulated by MPS - Social Security Ministry (BRASIL, 2004), which represents a third institution, based on a diverse regulation. INSS medical expertise often doesn't know enough about operators' job attributions on aeronautical services in Air Navigation activity for emitting a well based health report. Therefore, misunderstandings resulted from over-prescriptions, concerning operators' health conditions, may happen because of an apparent inappropriate conduction of their health destination and recovery, what may end up deviating them, definitely, from work operation, without perspectives of return. In 2010, INFRAERO psychologists tried to search for a solution to this situation by promoting an interdisciplinary meeting among physician representatives of the different institutions here referred – CEMAL, INFRAERO and INSS, which pointed out to the possibility of realizing a Mixed Health Council composed by CEMAL and INSS physicians, inside CEMAL, with the main purpose of deciding together about operators health restrictions instead of sending them to INSS medical expertise evaluation, outside CEMAL. Mixed Health Council is a procedure that has been conducted for pilots and flight attendants health restrictions' cases for years, but not for INFRAERO PTA (ATC) and PNA-OEA (BRASIL, 1967; BRASIL, 1968), because of the existence of three different institutions regulations – Defense Ministry, MTE and MPS, required to be upgraded, which represents a strong obstacle for this necessary change. This consists of a Human Factors indicator which requires, not only, well based integrated interventions on Human Factors, but, also, political determination to make that change. Besides, there is another Human Factors indicator about health subject that just started to be studied by INFRAERO psychologists, involving operators' absence from work causes and operators' out of work for illness causes, which needs to be monitored.

2.4.4. Audits, inspections and other safety procedures. Air Navigation activity variability requires a minimum acceptable level risk management. Therefore, ADSO - Operational Safety Audit / VSO - Operational Safety

Inspection are instruments for monitoring SGSO - Operational Safety Management System (ICAO, 2005; BRASIL, 2008a) in accomplishment to Operational Safety Program. Before SGSO, DECEA and INFRAERO implemented a Quality Program, requiring Quality Audits, in accomplishment to DECEA regulations (BRASIL, 2009b). There are some differences between DECEA and INFRAERO Safety Operational Program and Quality Program implementation. One involves the fact that DECEA developed a unique ADSO / VSO for both Operational Safety and Quality Programs, using a common instrument and application form resulting in only one report, which facilitates this practice; and INFRAERO developed a different and complementary ADSO / VSO for both Programs, representing a duplicity on application forms and reports related to safety monitoring procedures, which may bring some difficulties to both processes. Another difference concerns that DECEA ADSO / VSO, has psychologists' participation in the inspectors' group, which may represent a misunderstanding on the way of conducting this process; and INFRAERO psychologists don't participate of ADSO / VSO, because of the belief that inspection function may create a barrier for this kind of professionals to operators' real needs, which must be understood and supported by them. INFRAERO psychologists use to make periodic visits to operational sets in order to observe operators' work performance, make interviews and look for uncomfortable situations to be improved. Operators also visit INFRAERO psychologists to talk about work situations and relationships, so that latent conditions (REASON, 1990 and 1997) may, gradually and periodically, be visualized and issued. Until 2010, there were no INFRAERO standardized procedures for this psychological attribution, but, in 2011, there were created the following Programs to be implemented: Operators Psychological Follow-up Program, using psychological instruments involving psychological tests, questionnaires and interviews; and Psychoactive Substances Safety Program, aiming at increasing consciousness about chemistry substances abuse. Before standardization, psychologists had more freedom to make observations and researches; after standardization, they got more precision information to be compared, monitored and improved. A balance between subjective observation without standardization and objective information with standardization must be reached, so that appropriate proactive and predictive safety interventions for each situation can be implemented. Studies to validate the referred Programs and instruments consist of relevant Human Factors indicators to be monitored by a needed Human Factors Data Basis System.

2.4.5. Operators acquirement and transfer process. INFRAERO public service exams for staff acquirement are implemented regionally and the participants compete for job positions according to their classification. So, each may be placed for work at any city belonging to the region he once applied the exams, not always coincident with the place he lives with his family. In case of backlists, the participant may accept the opportunity to place a job position out of the initial region he took exams, in order not to wait too long to be called, by signing a contract determining the possibility of his transfer to any operational set all over the country, according to the enterprise services needs, which may happen when, for instance, there are changes on the airport operation affecting the operational set of aeronautical services and reducing job shifts, scales and staff. In this case, is hard to preserve the appropriate operation function and find someone interested to be transferred. On the other hand, there are many cases of transfer resulting from the operator will, which happens because of his option for a job position at an operational set situated out of the region he originally made exams, often into a very small city, without a minimum social-cultural structure for living, and far away from where he was born or has family, which leads him to ask for transfer to another city where he can get a better living, closer to his family. In this case, it turns out to be a transfer process not that simple, because getting a job position at a better operational set at a developed city depends on another operator's will to go to another operational set. This process frequently last too much time, leading the operator either to overcome the situation and adapt himself to it, giving up the transfer process; or to loose motivation, exposing himself to develop illnesses, possibly reflecting on delays, absences and firings, prejudicing his stability at work, which takes too long for him to be consciousness of the health symptoms, justifying, in time, medical help (GUÉRIN, 2006); besides, the delay of the transfer process may, gradually, contribute to deteriorate, even more, his health condition. INFRAERO has a proper regulation (BRASIL, 2005b) to prescribe the transfer process, but doesn't have solutions for the problems described: the operator's transfer before his health consummation by not satisfying his expectation for the transfer; and the transfer process emerged from the enterprise initiative with a negative impact over the operator. In both cases, he ends up asking for psychologists' help, who also don't have solutions, trying to sensitize managers about them. This brings on the need for studies related to: public service exams rules changes involving operators allocation; transfer process regulation upgrade based on the difficulties here exposed; precise information about possible transfers and firings causes aiming at defining appropriate methodologies, parameters, criteria and encouragements to conduct proactively this process.

2.4.6. Instructors training and ability. To be an INFRAERO operator, he must realize public service exams followed by a specific operational course at ICEA - Space Air Control Institute, situated at São José dos Campos City, SP, during 4 to 8 months, depending on the function, as part of the selective process for admission. After this course, according to the participant' classification, he chooses a job operational set to work and realizes health

exams by psychologists and physicians, but this step should be done before ICEA Course, aiming at reducing INFRAERO cost investment in case of participants reproof, as the Course is paid by it. The last selection step corresponds to On-the-Job-Operational-Training, taught and supervised by internal instructors of the operational set chosen by the operator to work. There is no instructor standardized profile for this training, the instructor is selected according to his local operational time and experience. Besides, he doesn't always have a specific course ability to prepare him as an instructor and doesn't perceive financially for this practice, which represents a different treatment compared to other INFRAERO organic instructors. It is also relevant to consider the lack of standardization related to contents and methodologies for all instructors to conduct this training, which may lead the new operator to possible concepts and practices' errors, hard to be corrected later. These problems require interdisciplinary studies (operators, psychologists and instructors), focused to this training teaching process, aiming at: determining a specific standardized Program in terms of content, methodology and comprehension levels, to each INFRAERO aeronautical service training; developing an Instructor Ability Course to prepare instructors for this function.

2.4.7. Air traffic control per operator. According to DECEA, operators workload is related to the maximum number of simultaneous controlled aircrafts by one operator and is evaluated according to the sum of times dispended with: communication, and transmission/reception; coordination manual activities (strips fulfillment); planning and air traffic distribution activities. The time duration of diary operational service shifts may vary from six to twelve hours of continuous work, according to: simple and accumulated operational positions workload; operational service function time; and operational set characteristics. Operators must do their specific tasks on a turn function system in every shift service aiming at: standardizing procedures and distributing workload equally; and maintaining operators in good technical conditions to perform any task of his specialty. Besides, the computation of operational staff of ATC sectors per operational position is calculated based on: shifts services positions X number of hours per shift X 30 days = staff number per month and per shift / prescribed monthly workload = operational staff per shift; where operational staff of operational sector is the sum of operational staff of all shifts (BRASIL, 2007). DECEA inspection towards this prescription not always follows the velocity of air traffic aeronautical service variability and dynamics in Air Navigation activity. SGTC - Management TWR System is used by INFRAERO TRW ATC to monitor high levels of air traffic control with the possibility to manage operation time per operator, representing a follow-up instrument in complement of DECEA regulation (BRASIL, 2007). But the use of this facility is not always prioritized in operational sets because of operational immediate demands of fast air traffic responses by operators, which consists a gap in terms of controlling the distribution of operators work on operational positions for monitoring their performance profitability. Workload per operator in operational air traffic control performance requires be better studied with psychologists' participation to be continuously monitoring.

3. Conclusion

INFRAERO aeronautical services in Air Navigation activity points out to some relevant Human Factors Indicators here analyzed: air traffic control incident investigation is a recent attribution of INFRAERO psychologists to analyze psychological aspects in complement to operational aspects contributing to their occurrence, pointing out to the need of aeronautical occurrences causes' statistics; TRM has to be a Program consolidated as a continuous practice on the organizational culture, requiring a follow-up methodology to monitor its results after Training and also an internal instruction; operators health inspection needs CEMAL Mixed Health Council for INFRAERO PTA (ATC) and PNA-OEA health restrictions, and studies related to operators' absence from work causes and operators' out of work for illness causes; audits, inspections and other safety procedures consider that it isn't appropriate psychologists participation on inspections and audits, but it's necessary to validate INFRAERO Operators Psychological Follow Program, Psychoactive Substances Safety Program and respective instruments; operators acquirement and transfer process points out to the need of studies to reduce operators transfers and firings; instructors training and ability requires a standardized instruction Program, an instructor profile and an Instructor Ability Course; and air traffic control per operator needs to be prioritized to monitor operational performance and workload. The analysis was based on INFRAERO psychologists' experiences and emphasis was done to the need of a Human Factors Indicators Data Basis System as an instrument to continuously monitor Human Factors issues.

This analysis could comprehend other Human Factors discussions, but were selected the ones considered more relevant to evoke reflections with scientific basis about safety approaches and studies demands to understand: the purpose of ICAO (ICAO, 1998; ICAO, 2002; ICAO, 2000; ICAO, 2005; ICAO, 2006) and DECEA (BRASIL, 2009b; BRASIL, 2008c) prescriptions as a reference to be accomplished, but not as a barrier for necessary improvements on real work (GUÉRIN, 2006), considering its variability and dynamics compared to required tasks; the understand operators work rules and procedures (DÉJOURS, 2008) as an aid to subsidize operators performance, not making them static enough to hide system faults, human errors and organizational threats (REASON, 1990 and 1997), which must become evident to be treated; the importance to keep opened communication channels among

operational sets and crews, and upgrade knowledge to transform operators performance in more safe, comfortable and effective. This may guide the implementation of more predictive and proactive safety interventions to INFRAERO aeronautical services in Air Navigation activity, contributing to improvements on organizational safety culture, workers' performance and interfaces (BRASIL, 2010a; ABERGO, 2010).

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