



International Civil Aviation Organization

**WORKING PAPER**

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(Information paper)

## ASSEMBLY — 37TH SESSION

### TECHNICAL COMMISSION

#### Agenda Item 26: Safety management and safety data

#### DEVELOPMENT AND INTRODUCTION OF AN INTEGRATED ADMINISTRATIVE AND MANAGEMENT SYSTEM FOR AERONAUTICAL SAFETY IN THE BOLIVARIAN REPUBLIC OF VENEZUELA

(Presented by Venezuela (Bolivarian Republic of))

#### EXECUTIVE SUMMARY

In this working paper, the National Institute of Civil Aeronautics of the Bolivarian Republic of Venezuela (*Instituto Nacional de Aeronáutica Civil – INAC*) presents a project to implement safety management system (SMS)/State safety programme (SSP) using an integrated administrative and management system for civil aeronautical safety (AEROSIG), with the intention of providing a useful reference for other States, thereby creating a cooperative and collaborative environment which may lead the way towards the cultural transformation process which SMS implementation involves.

In technological terms, this system represents an effective way to generate the aeronautical knowledge required to optimize administrative and operational safety processes and bring about appropriate decision-making in matters of civil aeronautical safety in general. It is a question of changing from a reactive environment to a proactive setting in which it is possible to detect conditions and uncertain events and thereby mitigate risk, progressing towards effective SMS/SSP management based on technological developments, with immediate impact and at low cost.

<i>Strategic Objectives:</i>	This working paper relates to Strategic Objective A.
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<sup>1</sup> Spanish version provided by Venezuela (Bolivarian Republic of).

## 1. INTRODUCTION

1.1 Within the context of a cultural shift towards implementation of safety management system (SMS)/State safety programme (SSP) in the Venezuelan aeronautical system, the Venezuelan National Institute of Civil Aeronautics (*Instituto Nacional de Aeronáutica Civil - INAC*) has developed a systematic and systemic process of continuous improvement, driven by the development of **best practice**, generating aeronautical intelligence for administrative and safety management and for managerial decision-making which, together, contribute to optimizing the system as a whole.

## 2. DISCUSSION

2.1 In 2004, INAC started up an ambitious project, involving a substantial investment amounting to around 260 million dollars, to renovate and update the aeronautical infrastructure required to optimize the safety of the Venezuelan aeronautical system. This project was developed jointly with the Technical Cooperation Bureau of the International Civil Aviation Organization (ICAO), representing evidence of the effectiveness of the Organization's coordination of international cooperation and the political will of the government of the Bolivarian Republic of Venezuela, and resulted in the incorporation of radars, radio aids, aeronautical telecommunications systems and various cutting edge air navigation support systems, which enabled the Maiquetia FIR to significantly improve service levels and, consequently, to achieve a positive impact on safety. Thus, between 2004 and the present time, INAC has concentrated its efforts on the implementation of this most complex project and on the development of regulations to provide the necessary procedural framework to consolidate the investment made. This was validated by the ICAO, USOAP and USAP Audit Programmes, carried out in 2008 and 2009 respectively, in which the Venezuelan Government demonstrated its firm commitment to the commendable aim of guaranteeing the safety of all persons using the system, ranking among the top third of countries worldwide in terms of safety, according to those audits.

2.2 It is appropriate to point out an event which occurred in 1999 which will in some way function as a catalyst for the Venezuelan government's adjustment to the safety directives generated by ICAO since 2007. This event was the creation of a new constitutional framework for the Bolivarian Republic of Venezuela, which acknowledges, in its precepts, the legitimate right of citizens to take an active role in the various processes that concern the social, economic and political aspects of their lives, which ultimately highlights the fact that aeronautical safety is not a duty but a right which must be exercised by all users of the aeronautical system.

2.3 Since 2008, in this strategic context and in consonance with aeronautical trends developed by ICAO, the Venezuelan Government has undertaken an even greater challenge by which it seeks to bring about the cultural shift which will give structure to the achievements made to date, as it is conscious that the human factor is the driving element as well as the object and subject of change, without which all regulatory and technological progress would lack meaning.

## 3. TECHNOLOGY AS FACILITATOR OF THE SMS/SSP IMPLEMENTATION PROCESS

3.1 It is a question of creating a cultural environment which allows the adoption of a constant monitoring and control system, managing the data/information/knowledge network over a structure

designed using a system of objectives/indicators/goals/requirements, which in turn enables the construction and maintenance of a process for danger identification and risk management that will foster continuous improvement over and above the acceptable safety levels established for the Venezuelan aeronautical system. Additionally, not only must the direct scope of safety be addressed but also a series of administrative practices must be introduced to impact positively on aeronautical safety in its systemic design.

3.2 The aeronautical safety system must develop the capacity to produce aeronautical knowledge through the management of data and appropriate information. This knowledge must form the basis of a harmonization and standardization process that will allow the introduction of a paradigm that will transform supervisory action into a learning and facilitation process, establishing self-supervision as an inherent aspect of the sector's culture, from which a risk management process may be introduced to optimize acceptable safety levels for the Venezuelan aeronautical system day to day.

3.3 To achieve all this, INAC has developed a far-reaching technological project with regard to systemizing and automating the various civil aeronautical safety procedures, thereby generating a technological architecture for the establishment of "an integrated administrative and management system for civil aeronautical safety (AEROSIG)".

#### 4. **AEROSIG OPERATION**

4.1 In the first phase of the project, INAC plans to develop a technological tool that will enable the deployment of an intelligence system which will process data in real time and use it to generate useful information and intelligence for aeronautical decision-making. This system is called an EARLY WARNING SYSTEM and it enables real-time display of variables associated with safety and cross-referencing of these variables to produce patterns and behaviour guides, and the development of simulations to create the most favourable potential future scenarios, for effective development of aeronautical safety.

4.2 The architecture of this tool is based on three fundamental axes:

- a) a consultation process, based on the Balanced Scorecard method, to determine indicators, goals and objectives in line with aeronautical organization strategy;
- b) a data gathering process, by which "wherever it may be" structured data may be incorporated and processed according to user needs (a); and
- c) a process by which a display allows the presentation of indicators and statistical manipulation of information, which is then transformed into aeronautical safety knowledge.

4.3 This first AEROSIG phase also incorporates three levels, namely:

- a) Descriptive: Enables identification, in real time, of everything that goes on in the system;
- b) Pattern detection: Performs cross-referencing of variables to determine the behaviors and patterns that explain events; and

- c) Prospective analysis: Performs simulations which build potential future scenarios to predict aeronautical events.

4.4 At the present time, AEROSIG (see Appendix B to the Working Paper) is in its second phase, which involves the development of an information system which will include all services generated by the aeronautical safety process, air navigation and air transportation.

4.5 With the AEROSIG work, INAC has been able to reduce response times considerably and has managed to change from a reactive culture to a proactive one with the ability to anticipate uncertain events, thereby enabling effective risk management. It undoubtedly constitutes a fundamental tool for the achievement of a culture which values aeronautical safety, and one which can not only make changes in terms of aeronautical safety at local level but also regionally and globally.

4.6 Implementation of AEROSIG also generates added value through its capacity to analyze and monitor SMS introduction phases, which enables an implementation path to be established through customary practice in an iterative process, making AEROSIG a continuous improvement tool for SMS.

4.7 With a substantially smaller investment than that spent in 2004 by INAC, AEROSIG is, by far, the information system that has had the most impact on the progress of the Venezuelan aeronautical system towards implementation of an SMS/SSP culture.

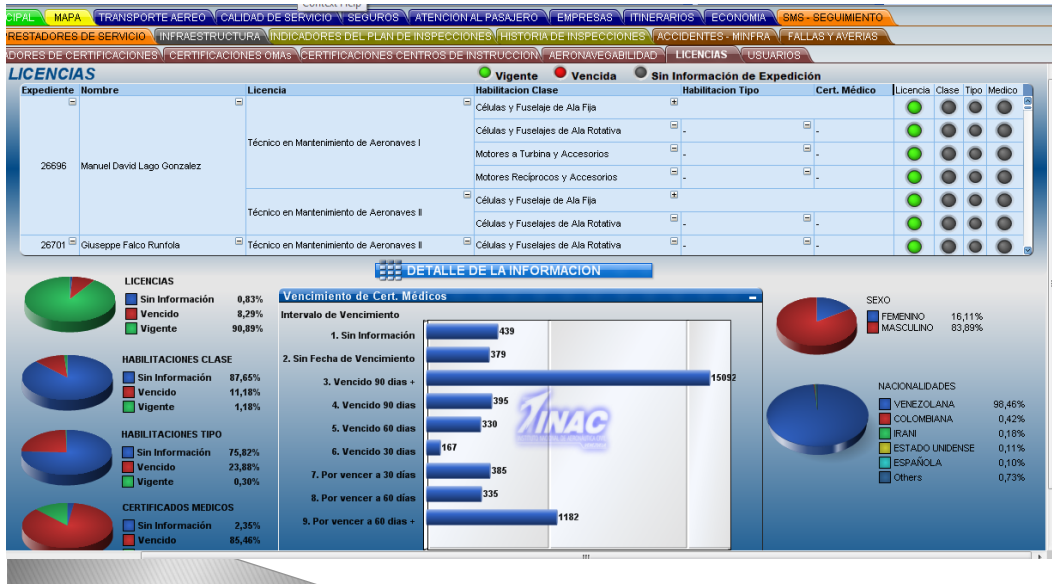
## 5. CONCLUSIONS

5.1 In the ongoing search for tools and technological aids capable of optimizing, operating and guiding the civil aeronautical safety implementation process for ICAO member States, the Government of the Bolivarian Republic of Venezuela recommends the incorporation of AEROSIG for possible implementation at regional and global level, thereby allowing the global aeronautical system to benefit from a tool that will directly contribute to the process of cultural change required by ICAO for progression towards the development of an SMS culture.

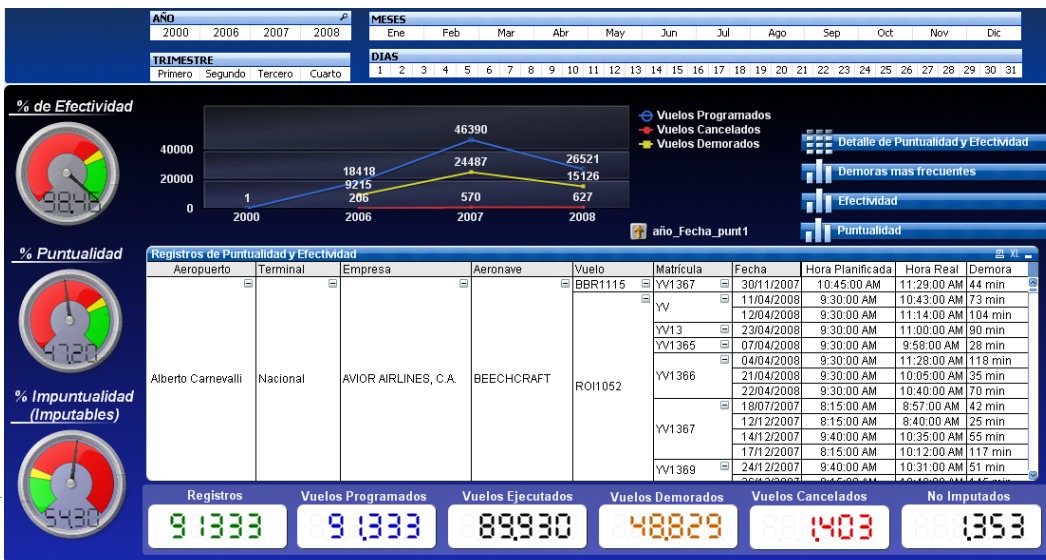
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APPENDIX A

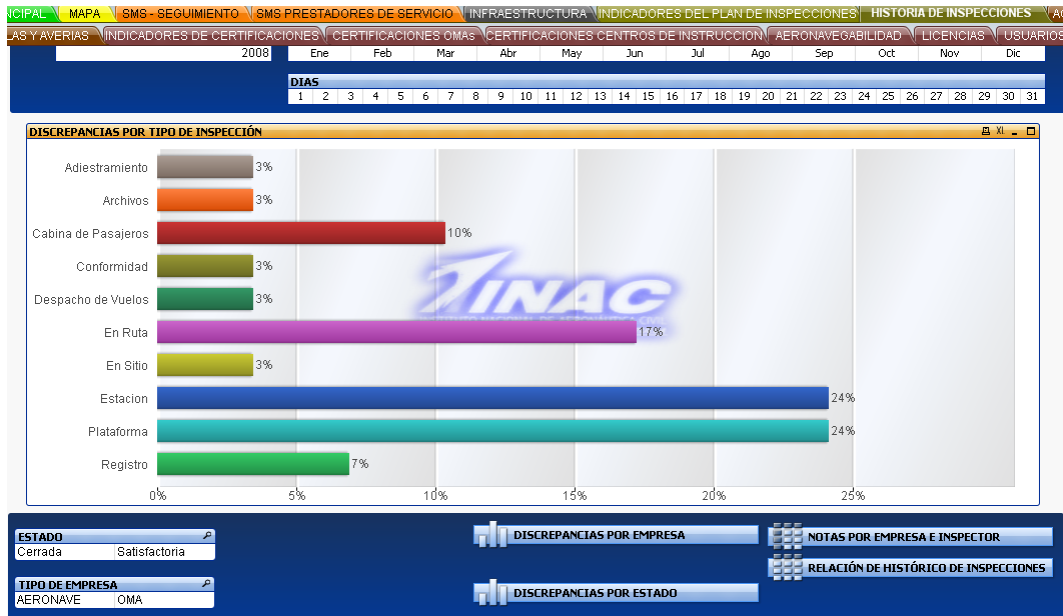
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Air Transport Service Quality



# Inspections Analysis



APPENDIX B

