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WORKING PAPER

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Agenda Item 30: Aviation Safety and Air Navigation Policy
30.3 Relevant Outcomes of the High-level Conference on COVID-19, Safety Stream (HLCC 2021)

SAFETY NETWORK

(Presented by Chile, co-sponsored by 20 Member States of LACAC[2], Guyana and Suriname)

EXECUTIVE SUMMARY

This working paper presents an understanding at a level intended to facilitate risk-based decision-making and proposes ways to accelerate the recommendations in Annex 19 and Doc 9859 regarding the implementation and consolidation of State Safety Oversight (SSO). The concepts of direction and control in decision-making of the policy-making bodies relating to operational risk management (Aviation) necessitate quality and timely information to act (decide) in the complex environment of the National Aviation System (NAS). In the value chain, information systems and the collection of data and the consolidation of these data into a knowledge structure provide the safety authorities with a level of understanding that facilitates decision-making on risks in the NAS. This value chain that connects the entities in an NAS is known as the network and, when this network is a dominant component in the design of more specific data exchange, it is referred to as network centric.

The complexity of the NAS and the adoption of SARPs require radical changes in the regulations, organization, functions and culture of States, a process that is not simple and, what is more, is slow. These structural obstacles affect the effective action of the CAA with respect to operational risk management, causing the decision-making process to be reactive and undermining proactive action.

Additionally, the data structure is another component that is in need of updating, a change that, if carried out synchronously and in sequence with the updating of the organizational, functional and cultural structures, leads to additional delay in the implementation of the SSP. However, asynchronous development between regulatory adaptation and the design of data structures can expedite SSP oversight capability. The key concept to accelerate SSO is to prioritize the implementation of the information domain (data structure) while consolidating the regulatory framework.

[1] Spanish version provided by Chile.
[2] Argentina, Aruba (Kingdom of the Netherlands), Belize, Bolivia (Plurinational State of), Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela (Bolivarian Republic of).

Action: The Assembly is invited to request ICAO to: a) consider this proposal as a suggestion relating to implementation of the SSO; b) disseminate the experience with network-centric design, specifically for the purpose of safety management by States (SMS); c) identify and include the advantages of information domains and network-based action as part of the priorities for achieving agility in a State's operational risk-based decision-making cycle; and d) promote training on tools that facilitate the implementation of SDCPS in States.	
Strategic Objectives:	This working paper relates to the Strategic Objectives of Safety and Economic Development of Air Transport
Financial implications:	*For the aviation community:* Financial implications are expected if some of the measures described in this working paper are adopted. *For ICAO: not determined.*
References:	Annex 19 – *Safety Management* Doc 10004, *Global Aviation Safety Plan* Doc 9859, *Safety Management Manual* Literature referenced in footnotes

1. INTRODUCTION

1.1 State Safety Oversight (SSO) capability is based on the SSP concept set out in Annex 19, but it is also a new approach for each country because it amounts to managing change. The new paradigm is based on the complementarity of a triad of functions — surveillance, the safety management system (SMS) and a safety data collection and processing system (SDCPS). This triad should facilitate the effective implementation of safety risk management. However, this entails a major challenge owing to the nature of the constitutional systems in individual States. The development and incorporation of the SARPs relating to safety in the NAS is affected by the obstacles inherent in government bureaucracy; the most difficult thing to achieve is the organic and legal changes and/or adaptations needed. Additionally, Doc 10004, the *Global Aviation Safety Plan* (GASP) considers the SSP (as a programme) in connection with the incremental target of zero fatalities by 2030; accordingly, the targets in the GASP call for innovation in the implementation of the SSP.

1.2 The SDCPS as an element in the SSO is a critical factor in safety risk management, that is, in the triad: Surveillance, SMS and SDCPS, the latter being essential for an effective State risk management (SRM) process. Even though the incorporation of SDCPS is hard to achieve because it is costly and complex (hardware, software, networks, communications system, etc.), experience in the management and military spheres has shown that the information system design gap is one of the processes that can be resolved most quickly, that is, there is an advantage with respect to the time variable. Today there is a recognition of the contribution to change management that is made by the **information domain** when it complies with the requirements of accuracy, relevance and timeliness.[3] Additionally, the multiplier effect (synergy) in the use of the network as an essential element in the conduct of operations has been established. Therefore, the design of a safety network is presented as a convenient and feasible solution to accelerate the SSO capacity of CAAs.

1.3 What this working paper advocates is that, as an initial step in the implementation of SSP, the network will provide a status report on the operational risk in the NAS in less time than it takes

[3] "Sistema de Observación y Prospectiva Tecnológica" (monograph), http://www.060.es.

to update standards, organization and functions. The question is how to speed up inclusion of the safety network. The proposal made here is that it should be done through **modular development and on the basis of prototype development and/or applications prototyping**.

2. PROPOSAL FOR THE SAFETY NETWORK

2.1 The impact of the changes that information technologies have undergone and continue to undergo is amazing. The great dilemma that arises in this evolutionary turmoil is: how can aviation organizations adopt an SDCPS that is coherent with and adaptable to changes in information technologies (IT)? The response to this continuous change is a design that is flexible and allows for technology and related processes to be updated. Simulation is a useful tool to address gaps resulting from the dynamism of IT, but it involves the use of tools that sometimes delay the implementation of the SDCPS. Another way to do it is through prototype design, and the experience in Chile shows that this is the way that offers the greatest flexibility because it allows for a construction that is more realistic and better suited to the user's requirements. Regarding the methodology, the proposal should be bottom up and, within this process, there are two development axes: horizontal and vertical. On both axes, the design of data exchange (transactionality) should be through the development of **prototype modules**[4] that enable the analysis and evaluation of the usefulness of the information generated (output for decision-making).

2.2 The horizontal axis is the exchange of data and information between air services providers (ASPs) that interact directly with air operations, that is, data modules (prototypes) in areas whose activities are directly related to air operations, for example: the data transaction between operations-air traffic services (OPS-ATS); between operations-airfields (OPS-AGA); between OPS-ATS-AGA. Each of these relationships is an information exchange module, and, in the first instance, the use of mandatory reports established in the SMS is suggested, since they contain data relating to the origin of events. In the framework of asynchrony, it is not imperative that all ASPs have their SMS accepted by the State, but it is required that they adopt the culture of mandatory and voluntary reporting.

2.3 On the vertical axis are the data requirements that streamline the analysis and conclusion of the information. The purpose of this axis is to provide the different levels of management with the possibility of acting within their own sphere (OPS, ATS and AGA, etc.), but without restricting the vertical transactionality of the information. Management levels are understood as the following stages of decision-making:

a) Executive: the level that is directly involved in air operations and is the source that provides the basic information. It is also the level that can act with immediacy whenever an event occurs that may result in a high-risk classification (HRC).

b) Operational: the level that captures information and analyses the relationship between the executive levels to identify new hazards and/or deviations from the indicators established in the State's safety programme. This level should act with flexibility to evaluate the performance (SMS) of the ASPs and monitor their acceptance and adoption of risk-mitigation guidelines.

c) Strategic: the last level that receives information for the purposes of State Risk Management (SRM). It is also the level that can monitor the coexistence of the

[4] In this way it is possible to ensure updating.

executive policies from ICAO, that is, GASP, NASP, resolutions, circulars, etc., all of these under the heading of safety.

2.4 This horizontal and vertical iteration is the main characteristic of the network-centric design and also constitutes the multiplier effect with respect to cognitive capacity for a situational recognition of the State's risk, facilitating timely and effective decision-making. At the same time, it strengthens the relationship between the State and ASPs, creating a space for solutions of common interest regarding gaps in the NAS. The implementation under the prototype design approach provides flexibility for the adjustments specific to multiplicity of information transactions. It is this last characteristic that necessitates agility to the SSO and a strengthening of the SSP.

3. EXPERIENCE IN IMPLEMENTING A SAFETY NETWORK

3.1 Mention should be made of the following considerations in connection with the adoption of an SDCPS:

a) complexity of the NAS demands that action should be taken efficiently, and then the advantages of the network design can contribute to the consolidation of the SSO and the SSP;

b) the implementation of an SDCPS should be considered as a short-term project, the main constraint being the definition of the data for the information that will enable identification of the State's safety risk situation;

c) interaction should be on the horizontal axis (functions) and on the vertical axis (management levels), without restricting the exchange of information or actions in favour of risk mitigation in the respective fields of action; and

d) the incorporation of an SDCPS based on a network design may be costly if a top-down approach is taken; it is therefore suggested that development should be based on implementation of prototypes and/or applications modules.

3.2 ICAO, through the SARPs, specifies that the State should develop an effective safety risk management (SRM) capability. The implementation process is dependent on States' freedom of action (regulatory), as well as on the allocated budget, and is therefore a matter of law, that is, financial resources and human resources.

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