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PRINCIPLES OF RISK BASED OVERSIGHT (RBO)

(Presented by Canada)

EXECUTIVE SUMMARY

This paper will discuss the concepts and principles of risk based oversight (RBO) and will propose a basic framework for its implementation. With the recent introduction of safety management systems and the state safety programs, regulators are compelled to consider the use of a risk based approach to surveillance activities. Additionally, the growth in the aviation industry and the parallel increase in resource demands faced by regulators, require an alternate approach to the traditional fixed oversight frequency approach. To be effective, the risk based approach must consider certain fundamental elements: risk assessment methodologies, data availability and confidence in the state safety program (SSP) as a whole. This paper will propose a framework for RBO based on an approach that considers individual state's capabilities.

Action: Information only.

1. INTRODUCTION

1.1 ICAO Annex 19, Appendix 1 – Critical Element 7 (CE-7) speaks to the obligations of the State to implement a surveillance system as a critical element. "The State shall implement documented surveillance processes, by defining and planning inspections, audits, and monitoring activities on a continuous basis, to proactively assure that aviation licence, certificate, authorization and/or approval holders continue to meet the established requirements. This includes the surveillance of personnel designated by the Authority to perform safety oversight functions on its behalf."

1.2 Annex 19 does not dictate how surveillance is to be conducted or planned; it merely requires that an effective system be put in place. Typically, surveillance has been conducted at fixed intervals using traditional audit and inspection techniques. This approach does not reflect individual risk, nor does it reflect another key program element of Annex 19 which is to assess system effectiveness.

[1] French language version provided by Canada
(8 pages)

1.3 This paper proposes an alternate approach to surveillance and surveillance planning. Many regulators utilize some form of risk assessment to determine surveillance intervals. Typically, this involves using all available data to make judgments about the safety performance of certificate holders. Conversely, some regulators still use a fixed surveillance method which applies the same level of scrutiny to all organizations regardless of what surveillance data suggests. Often times, risk based oversight is conducted using a non-standardized approach with judgments, in respect to risk, being made in a makeshift manner once a year to accommodate the surveillance planning cycle.

1.4 This paper also proposes a continuous monitoring approach to risk based oversight by requiring regular review of certificate holders' risk levels and using impact data to adjust surveillance frequencies in answer to any changes to the risk picture in an organization.

1.5 For the purpose of this paper, risk based oversight (RBO) is defined as: *an oversight program that utilizes an enterprise's risk profile to determine the frequency with which the enterprise is subject to surveillance.* Additional information on how risk profiles are developed is included below. On the other hand, performance based oversight (PBO) is defined as: *the State's assessment of the level of compliance exhibited by an enterprise in respect to the aviation regulations.* The assessment determines effective or non-effective performance and is one of many inputs into RBO decision making.

2. DISCUSSION

2.1 Prior to 2012, Transport Canada Civil Aviation (TCCA) used a set of national risk indicators, published in internal policy documents, to contract or expand surveillance cycles. Whereas the policy defined the indicators, it did not define how they were to be collected or used to make a final determination of risk. As such, the application of these indicators was different across TCCA's 5 operational regions and 2 headquarters operational units. This resulted in non standard usage and the application of different weighting or criticality characteristics based on regional perceptions of risk rather than on national policy.

2.2 In recognition of this, in 2007 TCCA began work on the development of a risk based oversight system that would provide standardized risk weightings for enterprises, take into consideration the impact on the aviation system (size and complexity) and would apply a variable surveillance frequency based on risk. The model that emerged can be used in any regulator as a template for developing a risk based oversight system.

2.3 The output of TCCA's risk based oversight system is a risk profile for all enterprises that is derived from its risk indicator level and impact value. The risk profile produces a relative ranking of all certificate holders based on risk information. The risk indicator level (RIL) uses a series of inputs from a variety of data sources. The RIL is derived from:

- the Risk Score from the Risk Indicator Database (described in step 1 below);
- results of pervious surveillance (i.e. severity of findings of non-compliance);
- availability of surveillance information (i.e. occurrence reports and/or internal reporting systems); and
- whether or not the enterprise has implemented a safety management system.

2.4 The impact value is derived from an assessment of various facts related to the enterprise that help define its impact on the Canadian aviation system. The impact value for an air operator/approved maintenance organization is described in step 2. Depending on the type of certificate held, the impact criteria may vary, however the process is the same.

2.5 **Step one** in the process is to determine what indicators adequately capture the risk picture for your operators. In Canada, we defined the following "hazard areas" as effective indicators of risk within an enterprise:

- Labour Difficulties
- Management Practices
- Quality Assurance
- Change In Scope, Product Line Or Facility
- Change In Contracting For Goods and/or Services
- Turnover in personnel
- Change in key personnel
- Safety record
- Regulatory record
- Seasonal or specialized operations

2.6 Each hazard area has a series of questions linked to it, for a total of 77 questions in all. Each question is designed to capture information relating to the hazard area and to further develop the "risk profile" for the enterprise. Examples of questions are:

- Is the organization changing contractual obligations on a frequent basis for similar services?
- Is the certificate holder using an increased number of foreign or offshore contractors?
- Does the change in contracting for services negatively affect the operation?

Each question is posed in a manner that results in a "yes" response increasing the risk score and a "no" response decreasing it.

2.7 In recognition that some hazard areas are more safety critical than others, these areas have been weighted based on safety importance. This provides a level of assurance that the risk profile focuses on the critical elements. There are three key data entry points that must be respected. The first (and most challenging stage) is the baseline entry of risk information. At this point the inspector must address all of the questions and develop an accurate set of responses to populate the data. The second entry point is the day to day, routine updating of the data. As information becomes available, the response to questions should be re-evaluated to determine if a change is required. Routinely, inspectors should seek to update the information. This is important as it provides a mechanism for continuous monitoring in between planned surveillance activities. The final opportunity for data entry comes during the annual surveillance planning phase (for TCCA, typically in the autumn). This phase constitutes a validation of the existing data to facilitate accurate surveillance planning based on risk.

2.8 The hazard areas and questions are automated in the National Aviation Safety Information Management System (NASIMS) database. The database automatically generates a risk score based on inputs to the questions. The risk score is not designed to be an indication of an enterprise's level of compliance with regulations, nor is it designed as an indicator that an enterprise is safe or unsafe. It does, however, numerically represent conditions or changes associated with an enterprise that have the potential of resulting in safety and/or non-compliance issues. Analysis of the risk score is used by planners and managers (along with other information and data inputs) for determining the frequency at which enterprises are subject to surveillance and to assist in resource allocation for those surveillance activities. Analysis of the score may also assist in determining when other unplanned surveillance activities are warranted or when additional data gathering exercises may be required.

2.9 **Step 2** in the process is to consider other aspects that contribute to the safety risk profile of an enterprise. This involves assessing the impact the enterprise has on the aviation system and provides the opportunity to make a clear distinction between the effects of a large air carrier, operating into multiple cities, compared to an aerial applicator, crop dusting in remote areas. The impact value of an enterprise is generated by considering the size and scope of an operation and includes such factors as:

- how many certificates in different categories are held;
- the number of employees and bases.
- the number and different types of aircraft;
- the type of operations (e.g. specialized approved maintenance organization, domestic airline, international operations, etc).

2.10 **Step 3** in the process is to introduce the risk profile into the risk based oversight planning process. In conjunction with the development of the NASIMS risk profile program, TCCA also revised its surveillance planning process to accommodate practical risk based planning. In the past, planning occurred on an annual cycle, however, with the advent of enterprise based risk profiles, it became necessary to plan based on a much longer outlook.

2.11 TCCA uses a simple matrix (shown below) to plot the alpha numeric values of the risk indicator level and impact value. The Y axis represents the impact value score and is given an alphabetical designation. The X axis shows the numeric calculation of the risk indicator level. The intersection of these points provides an alpha numeric rating that is used for surveillance planning purposes.

Table 1

IMPACT VALUE							
	Extensive	E	1E	2E	3E	4E	5E
	High	D	1D	2D	3D	4D	5D
	Moderate	C	1C	2C	3C	4C	5C
	Low	B	1B	2B	3B	4B	5B
	Negligible	A	1A	2A	3A	4A	5A
			1	2	3	4	5
			Very Low	Low	Moderate	High	Very High
			RISK INDICATOR LEVEL				

2.12 Each alpha numeric rating represents a proposed surveillance frequency. The frequencies described below specify how often program validation inspections (PVI), or in the case of enterprises that have an SMS in place, PVIs and assessments are to be completed.

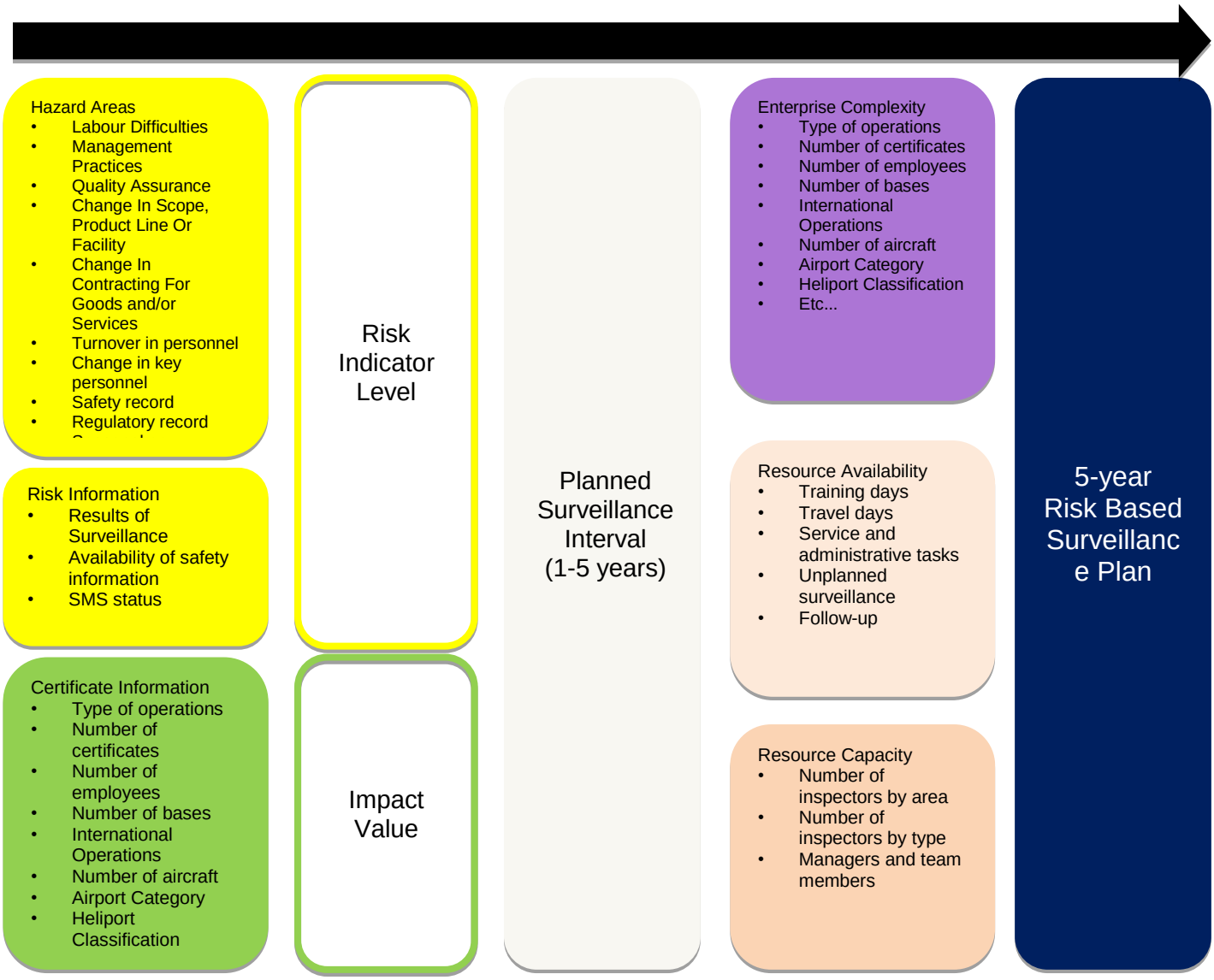
SIM Value	Surveillance Interval	
	Non-SMS Enterprise	SMS Enterprise
1A, 1B, 1C, 2A, 2B	5 year PVI	5 year Assessment
1D, 1E, 2C, 2D, 2E, 3A, 3B	4 year PVI	4 year Assessment
3C, 3D, 3E, 4A, 4B, 5A, 5B	3 year PVI	3 year PVI, 5 year Assessment
4C, 4D, 4E, 5C	2 year PVI	2 year PVI, 4 year assessment
5D, 5E	1 year PVI	1 year PVI, 3 year assessment

2.13 The system, as designed, also provides the flexibility to assign surveillance teams in accord with the resources required and based on the size and complexity of the enterprise. When determining team composition, managers should consider the expertise required to perform the work. In order to operationalize the risk based oversight planning system, TCCA analysed the available hours of the inspector workforce and was able to produce a number that represents the actual available inspector hours to conduct surveillance. The calculation deducts all time required for other activities such as certification activities, service work and training, and represents an accurate planning figure for surveillance.

2.14 In addition, standard times and team sizes have been developed for planning purposes, based on complexity of the enterprise and whether we're performing a PVI or an assessment. Using the risk profile and surveillance planning frequency of an enterprise, management has the ability to accurately forecast whether the surveillance plan is achievable, to identify resource shortfalls and reallocate resources where necessary. The system provides a complete methodology for risk based oversight planning. Now that Transport Canada has implemented RBO, the next step is to validate that we have the correct surveillance frequencies and continue to maintain an acceptable level of safety.

2.15 While the Canadian perception of what is a good indicator of risk may differ slightly from other States, the model can be adjusted to reflect these differences. Moreover, the interval of the frequency should reflect the acceptable level of safety defined by the State. The steps in this process represent a risk methodology that can be modified to reflect the national perception of risk and the rankings you choose to apply. The whole process is shown in diagram 3 below.

Diagram 3



2.16 For risk based oversight to be successful, there are several prerequisites for the State:

- A need for continuous monitoring of enterprises to ensure that changes in level of risk are captured and managed;
- A collaborative relationship with the industry it regulates in order to obtain the necessary data;
- Adequate data sources to provide supplemental information to support information derived from risk indicators; and
- An extended planning outlook based on the longest acceptable interval. This helps ensure that all operators are subject to surveillance within the prescribed outlook period. This will provide the State with a complete picture of enterprise surveillance, thereby guaranteeing that low risk enterprises are subject to surveillance even when that surveillance is planned at a five year interval.

The ability to undertake additional unplanned surveillance activities to maintain an adequate level of monitoring between planned surveillance activities.

3. PERFORMANCE BASED OVERSIGHT (PBO)

3.1 There remains confusion in respect to the difference between PBO and RBO. PBO is an assessment by the State of the level of compliance of an enterprise with the aviation regulations. In other words, the State is looking at how effectively the enterprise complies with the aviation regulations and not just whether the enterprise complies. After all, an enterprise can be compliant but not effective.

3.2 Therefore, in order to be effective, the PBO methodology must be able to assess whether the required performance or objectives established in the regulations have been met in a manner that is appropriate to the enterprise. In order to do this, the State must establish a performance based regulatory framework. These types of regulations define an objective rather than a specific, prescriptive requirement that can only be met in one way. Examples include safety management and quality management systems. Performance based regulations provide the enterprise with the flexibility to tailor regulatory compliance based on size, complexity and the most appropriate method of meeting the objective for the enterprise. In order to assess an enterprise's performance, the State must have a surveillance methodology that distinguishes levels of compliance and rewards good performance.

3.3 In prescriptive regulatory schemes, compliance can be achieved without it being effective compliance. The goal of performance based regulations is to encourage effective compliance. Effective compliance builds confidence and demonstrates to the regulator that the enterprise is capable and has the systems in place to effectively ensure compliance on an on-going basis.

3.4 In PBO, the performance of the enterprise – effective or not effective is used as an input into the risk profile of the enterprise. As such, PBO becomes a data source for risk based oversight.

4. SUMMARY

4.1 The Conference is asked to consider adopting RBO as a methodology for surveillance planning. Risk based oversight provides a mechanism for recognising enterprises that are considered lower risk and who demonstrate effective compliance; thereby allowing the State to focus surveillance on enterprises that require additional attention. Accepting that the prerequisites and system requirements described in this paper must be in place before RBO can be implemented, the use of a risk based methodology is good safety practice and worth the effort. A robust and standardised approach to RBO benefits the State because it provides a system wide risk picture. The continuous monitoring approach recommended herein provides an additional layer of surveillance monitoring to: first of all address shifts in the risk profile of the enterprise, but also to assure the regulator that the established surveillance intervals are appropriate.

4.2 In a time of resource scarcity and continued growth in all sectors of the aviation industry, States are being called upon to respond to these competing challenges in an appropriate manner. RBO recognises that not all enterprises are created equal and allows the State to allocate resources more effectively using informed judgements in respect to risk. The application of these principles to surveillance planning provides a mechanism for applying resources where they are most required. The Canadian model provides a blueprint for risk based oversight that is easily adaptable in order to meet the needs of all States.

Notes:

* This paper uses the term risk based oversight. In Canada the term risk based surveillance is used to express same thing.

*The term enterprise is used in Canada to describe the holder of one or more TCCA issued certificate.

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