

SRVSOP manual on examples of risk-based surveillance (RBS) planning methodologies

M-GEN-004

The examples of methodologies in this manual use safety data collected through questionnaires or checklists (CLs), under the proactive method framework only.

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BACKGROUND

1. Purpose

1.1 The purpose of this manual is to provide examples of methodologies for risk-based surveillance (RBS) planning, using safety data collected through questionnaires and checklists (CLs) within the framework of the proactive approach only. These sample methodologies can be used to guide SRVSOP State inspectors in the various specialties comprising the safety oversight system.

***Note 1.** – Data collection through questionnaires and CLs is one of the forms of the proactive method of data collection. Another is the automatic collection of data through the flight data analysis programme (FDAP), known in the industry as the flight operations quality assurance programme (FOQA). This method, and others that exist in the industry, such as the engine condition monitoring programme (ECMP), are not addressed in this document.*

***Note 2.** - Proactive processes enable States to identify and address precursor and contributor elements towards accidents and serious incidents, and to strategically manage safety resources to maximise safety improvements.*

***Note 3.** - The continuous RBS process, using data collected from different sources through reactive and proactive methods of safety data collection, is addressed in the safety inspector's manuals of each SRVSOP technical area.*

1.2 This manual contributes to the implementation of the safety management standards contained in Annex 19 to the Convention on International Civil Aviation, which urges States to proactively mitigate safety risks before they result in aviation accidents and incidents.

1.3 The effectiveness of safety management activities is strengthened when these are implemented in a formal and institutional manner, through the State safety programme (SSP) and the safety management system (SMS). SSP and SMS systematically deal with safety-based risks, improve the safety performance of every service provider and, collectively, improve the safety performance of the States. Within this SSP/SMS environment, risk-based surveillance (RBS) plays an important role in the identification of hazards and in the management of safety risks.

2. Content

This manual has been developed in chapters, so that CAA inspectors may apply and review the methodologies established in each of the audit areas hereunder:

- a) Chapter 1 – Example of a risk-based surveillance (RBS) planning methodology for the area of personnel licensing (PEL);
- b) Chapter 2 – Example of risk-based surveillance (RBS) planning methodologies for the area of aircraft operations (OPS);
- c) Chapter 3 – Example of a risk-based surveillance (RBS) planning methodology for the area of airworthiness (AIR); and
- d) Chapter 4 – Example of a risk-based surveillance (RBS) planning methodology for the area of aerodromes and ground aids (AGA)

3. Preparation of texts

The texts in this manual have been drafted by the SRVSOP Technical Committee, with the cooperation of specialists from member States of this Regional System, pursuant to Immediate Objective No. 4 of Regional Project RLA/99/901, and applying the principle of using plain language to permit proper understanding of the information herein.

4. References

For the development of this manual, guidelines contained in ICAO Doc 9859 – Manual on Safety Management, Fourth Edition, 2018, have been taken into account.

5. Status of guidelines

5.1 This manual shall be considered as a guideline, providing States with a base document to carry out risk-based planning and monitoring for the various service providers, based on proactive safety data collected through questionnaires and checklists (CLs) only, in order to ensure the safe conduct of air operations.

5.2 The examples of methodologies developed in this manual do not constitute the only methodologies to be used; CAAs can use other methodologies enabling the identification of the following indicators:

- a) risk indicator (IdR); and
- b) exposure indicator (IdE).

6. Amendments

6.1 Amendments are opportunities for improvement, and are an important mechanism to keep the manual updated, taking into account the development of the aviation industry and the changes constantly introduced to ICAO documents, as well as to the Latin American Regulations (LARs).

6.2 SRVSOP member States and international organisations are invited to inform, via electronic mail to icaosam@icao.int any observations and changes they might deem necessary to introduce in this manual, especially as regards application, use and scope, which will be taken into account when preparing future editions.

CHAPTER 1

EXAMPLE OF A RISK-BASED SURVEILLANCE (RBS) PLANNING METHODOLOGY FOR THE AREA OF PERSONNEL LICENSING (PEL)

1. Objective

This chapter provides guidance to CAA inspectors with respect to the RBS planning methodology of civil aviation training centres (CIACs) certified to conduct aircraft flight training, that is, the LAR 141 Type 2 and Type 3 CIACs. This methodology permits prioritising the RBS activities of those CIACs exposed to a greater risk level and, therefore, guarantees a more efficient use of CAA resources.

2. Scope

This methodology is only based on data collected through questionnaires and CLs, under the proactive safety data collection method.

3. Introduction

3.1 The RBS planning methodology for every CIAC uses the combination of the following two (2) values:

- a) risk indicator (IdR); and
- b) exposure indicator (IdE).

3.2 The IdR for a CIAC is obtained from applying the organisation risk profile (ORP) with regard to the determination of its risk characteristic, according to risk factors predefined by the CAA. IdR is the numerical expression of the ORP.

3.3 On the other hand, the IdE of a CIAC is determined by the size and complexity of its operations. The IdE is the numerical expression of the training centre's risk exposure.

3.4 The IdR and IdE combination is used to determine the type, size of the sample and frequency of the audits and inspections that should be conducted at each CIAC within a specific period of time.

3.5 The inspector shall use the RBS planning Excel spreadsheet to register the necessary information to determine the IdR and IdE, and the tool will calculate the surveillance intensity and the size of the sample to examine.

3.6 The criteria to modify both the frequency and the scope of each surveillance activity are described in the Manual on certification of civil aviation training and instruction centres (MCIE).

4. Classification of risk-based surveillance activities

4.1 All CAA RBS activities can be grouped into two (2) categories: scheduled and unscheduled, announced or unannounced, where scheduled activities are those conducted at given intervals specified in the RBS plan and, the unscheduled are those carried out in response to negative trends, performance outside the alert control criteria, uncertain or unforeseen events such as accidents, incidents, IdR increase, changes in the IdE, complaints, etc.

4.2 With respect of scheduled surveillance activities, the CAA will:

- a) determine an IdR and an IdE for each CIAC, using the methodology outlined in paragraphs 5.5 and 5.6 in this chapter;
- b) establish and implement an RBS programme for CIACs, using the procedures established in the MCIE and in this section;

- c) draft an RBS plan for each CIAC, on the basis of the current RBS programme, using the procedures established in the MCIE and in this section; and
- d) continuously monitor the RBS plan of every CIAC, based on their actual performance and on the frequency and scope modification criteria established in the MCIE.

4.3 With regard to unscheduled RBS activities, the CAA will continuously monitor: the safety performance of each CIAC, RBS activity results, undesired trends, and other sources of information, in order to determine whether it becomes necessary to conduct surveillance activities in addition to those scheduled inspections in the training centre's surveillance plan.

5. Determination of the type and frequency of inspections

5.1 The RBS plan that the CAA should develop for each CIAC will contain the type of activities to be carried out and the specific calendar for their execution, as well as the scope of each activity, as applicable.

5.2 At the training centres, the CAA will conduct the following types of inspection to the:

- a) theoretical training programme;
- b) flight training programme;
- c) facilities and aerodromes;
- d) flight training logs;
- e) manuals and documents;
- f) competence of instructors and examiners;
- g) student proficiency tests;
- h) training material and aids;
- i) aircraft and flight simulation training devices;
- j) quality assurance systems;
- k) records of students, instructors and examiners;
- l) satellite CIACs; and
- m) safety management system (SMS).

5.3 The CAA will draft an annual RBS plan for every CIAC, in accordance with the procedure hereunder.

5.4 Identification of the training centre

The first step in the planning process is to identify the CIAC for which the RBS plan will be drafted. Even though it seems obvious, this is a very important step since each surveillance plan is unique to each organisation, given the size, risk profile and complexity combination. Likewise, criteria applicable to CIAC surveillance activities will be established, in accordance with the MCIE.

5.5 Determination of the risk indicator (IdR)

5.5.1 The CIAC IdR is obtained from the application of the ORP developed by the CAA, which will be processed by the group of inspectors designated for the initial surveillance (baseline) of the CIAC and, thereafter, continuously, when the CAA considers that the training centre has undergone changes that might modify its ORP.

5.5.2 The IdR is obtained from a combination of risk data collected by the CAA. This indicator is a representation of the probability that risks are being properly managed by the CIAC. The methodology used to determine the IdR for a CIAC is detailed in **Appendix A** and in the current paragraph of this chapter.

5.5.3 The IdR is the numerical representation of the changes and/or circumstances associated to a CIAC regarding the potential of finding itself in an unsecure situation or in regulatory non-compliance. The IdR results from a profile developed from thirty-four (34) weighted risk parameters and three (3) risk levels, depending on the specific situation of the CIAC, which would correspond to an arithmetical value of 1 (most desirable), 2 (average) and 3 (least desirable) and whose result would be totalled in a scoring system that is expressed in the following five (5) risk categories of the training centre, according to the range in which the score falls, as determined by the PEL inspectors during surveillance:

- a) 1: **very low** organisation risk profile;
- b) 2: **low** organisation risk profile;
- c) 3: **moderate** organisation risk profile;
- d) 4: **high** organisation risk profile;
- e) 5: **very high** organisation risk profile.

5.5.4 The first ORP is determined as shown in Appendix A to this chapter, and is obtained through a weighted scoring system that may give a result between one hundred (100) and three hundred (300) points upon application of the risk factors. This value will be used in calculating the IdR when applying the criteria in Table 1-1.

Table 1-1 – CIAC risk indicator (IdR)

ORP result	IdR value	CIAC category represented in the organisation risk profile (ORP)	Definition
> 0 < 140	1	Very low ORP	Very high probability of risks being adequately managed.
≥ 140 < 180	2	Low ORP	High probability of risks being adequately managed.
≥ 180 < 220	3	Moderate ORP	Moderate probability of risks being adequately managed.
≥ 220 < 260	4	High ORP	Low probability of risks being adequately managed.
≥ 260 ≤ 300	5	Very high ORP	Very low probability of risks being adequately managed.

5.5.5 The CAA should have a database to store all surveillance activity results to allow for determining, at any time, the score of the risk parameter related to regulatory compliance for each CIAC. In addition, a database would permit the identification of which part of the requirement presents findings based on the established coding, and its impact on the safety risk in terms of the associated hazard. For example, if CIAC facilities are being examined to see if it has an operations central location, whose coding is CL-17-1, and the requirement question has two directions, each direction will be identified as 17-1-1 and 17-1-2, and will have a corresponding predetermined associated hazard taxonomy. This permits objective identification of which part of the requirement question has issues and, also, control in any information technology system used for establishing trends.

5.5.6 The CAA should use the result of this assessment in its decision-making process and to monitor the deficiencies identified in the inspections and/or audits carried out in accordance with the State's safety risk-based surveillance programme.

5.5.7 The IdR value shall be transferred to Table 1-4 - RBS frequency matrix, to determine surveillance frequency.

5.6 Determination of the exposure indicator (IdE)

5.6.1 The exposure indicator of a CIAC is determined based on the size and complexity (small, medium and large) of the operations carried out by the CIAC. The IdE is the numerical representation of the exposure of the CIAC to risks, and the probability that the consequences of those risks will materialise. This indicator is determined according to:

- a) the number of students in flight training;
- b) the number of aircraft;
- c) the number of satellite CIACs, if applicable;
- d) the ratings granted; and
- e) fleet variety.

5.6.2 Likewise, the IdE is defined according to a scoring system. This value is the representation of the impact of the organisation on the aviation system.

5.6.3 Using Table 1-2, the values described in the central rating column must be entered in the right column.

Table 1-2 – CIAC exposure indicator (IdE), scoring system

Criterion	Rating	Value
Size of the organisation	Large = 3 points Medium = 2 points Small = 1 point	3 2 1
Number of students (flight)	More than 41 = 3 points 21 to 40 = 2 points Up to 20 = 1 point	
Number of aircraft	More than 8 = 3 points 3 to 8 = 2 points Up to 2 = 1 point	
Number of satellite CIACs	2 or more = 3 points 1 = 2 points 0 = 1 point	
Number of ratings granted	5 or more = 3 points From 2 to 4 = 2 points 1 = 1 point	
Fleet variety	3 or more = 3 points 2 = 2 points 1 = 1 point	
Total score		

5.6.4 Once values have been assigned, add the values in the right column and use Table 1-3 to obtain the exposure indicator.

Table 1-3 – Determination of the exposure indicator, in letters

Total score Table 3-6-2	Description	Letter
6	Very low impact on the aviation system. Very low hazard exposure.	A
$\geq 7 \leq 9$	Low impact on the aviation system. Low hazard exposure.	B
$\geq 10 \leq 12$	Moderate impact on the aviation system. Moderate hazard exposure.	C
$\geq 13 \leq 15$	High impact on the aviation system. High hazard exposure.	D
$\geq 16 \leq 18$	Very high impact on the aviation system. Very high hazard exposure.	E

5.6.5 The letter obtained in Table 1-3 should be transferred to Table 1-4 - RBS frequency matrix, to determine surveillance frequency.

5.7 Determination of frequency

5.7.1 The IdR and IdE combination is used to determine the frequency and scope of surveillance to be conducted on each CIAC within a specific period of time. It is also used to modify the RBS frequency and scope in real time and on an on-going basis.

5.7.2 Using the risk-based surveillance (RBS) planning Excel spreadsheet, on the basis of IdR and IdE, and using Table 1-4 below, the surveillance frequency applicable to each CIAC will be determined. According to the result, the level of intensity may be rigorous (12 months), normal (24 months) or reduced (36 months), thus establishing surveillance frequency.

Table 1-4 – RBS frequency matrix

RBS frequency		Risk indicator (IdR)				
		Very high	High	Moderate	Low	Very low
Exposure indicator (IdE)		5	4	3	2	1
Very high	E	5E	4E	3E	2E	1E
High	D	5D	4D	3D	2D	1D
Moderate	C	5C	4C	3C	2C	1C
Low	B	5B	4B	3B	2B	1B

RBS frequency		Risk indicator (IdR)				
		Very high	High	Moderate	Low	Very low
Exposure indicator (IdE)		5	4	3	2	1
Very low	A	5A	4A	3A	2A	1A

	RBS intensity		
	Rigorous	Normal	Reduced
RBS frequency	12 months	24 months	36 months

5.8 Determining the scope of surveillance

Once the CAA has available, reliable and sufficient safety data and has the ability to determine the areas of greatest safety concern or need, through the processing and analysis of all safety information that unequivocally points to this situation, and once undesirable trends have been identified, the CAA will proceed to plan inspections, audits and surveys focused on the areas where the consequences of risks are most likely to materialise. Accordingly, the CAA shall require the implementation of appropriate measures, continuous improvement of safety performance, and early control of events that could potentially be catastrophic and cause damage and fatalities. Further guidance on determining and/or modifying the scope of RBS activities is provided in the MCIE.

5.9 Determination of the sample

5.9.1 By using the risk-based surveillance (RBS) Excel spreadsheet, and considering that full inspection of all CIAC activities, such as records, training programme, etc., is an impractical and, in some cases, unnecessary task, the sampling method shall be applied to determine a sample size appropriate to the IdR and IdE of each CIAC and, thus, determine the adequate number of each type of inspection, in accordance with the list in paragraph 5.2. Sampling is a scientific research tool that allows to determine which part of a reality under study (population or universe) should be examined in order to make inferences about that population. Sampling consists of randomly selecting a representative part of the universe or population, inspecting it and deciding whether it meets certain specifications; in this case, compliance with the applicable requirements. This method will be applied to determine the sample of facilities, records, personnel, aircraft, students, etc., to be inspected based on their total numbers and the IdR and IdE levels for each CIAC.

5.9.2 The inspector shall use the risk-based surveillance (RBS) Excel spreadsheet to record the information needed to determine the IdR and IdE, and the tool will calculate the frequency and scope of surveillance, in addition to the size of the sample to examine, using the sample model of the International Standardization Organization (ISO).

Table 1-5 – RBS frequency matrix

Combinations of table 3-6-4 →	3E, 4D, 4E, 5C, 5D, 5E	1D, 1E, 2C, 2D, 2E, 3B, 3C, 3D, 4A, 4B, 4C, 5A, 5B	1A, 1B, 1C, 2A, 2B, 3A
RBS frequency →	Rigorous (12 months)	Normal (24 months)	Reduced (36 months)
Population ↓	Sample ↓		
2 to 8	3	2	2
9 to 15	5	3	2
16 to 25	8	5	3
26 to 50	13	8	5
51 to 90	20	13	5
91 to 150	32	20	8
151 to 280	50	32	13
281 to 500	80	50	20

5.9.3 If the result of entering the IdR and IdE of CIAC “X” in the surveillance intensity matrix is 5D, the criterion “rigorous” will be applied to the frequency of inspections. To that end, the sample values included in the second column of Table 1-5 will be used. For example, if CIAC “X” has a total of fifteen (15) flight instructors (population), five (5) competence inspections for this staff (sample) will be included in the annual surveillance plan.

5.10 Development of the surveillance plan for each CIAC

5.10.1 For the development of the surveillance plan, the following criteria will be applied, depending on the type of inspection:

5.10.1.1 **Main base inspection.** - A base inspection or base audit consists of twelve (12) sub-inspections. This inspection/audit shall be conducted, whenever possible, on a continuous basis, trying to avoid that the twelve (12) sub-inspections are completed in a very long period of time. Base inspections/audits provide a very good indication of the level of safety regulatory compliance and performance of the CIAC, since they address a variety of factors.

5.10.1.2 Depending on the surveillance intensity level obtained from the matrix, the frequency of a service provider's base inspections/audits can vary between 12, 24 or 36 months, according to the following table:

	RBS intensity level		
	Rigorous	Normal	Reduced
RBS frequency	12 months	24 months	36 months

5.10.1.3 **Inspection of additional bases.** – The number of CIAC satellites to be inspected each year will be determined by the size and complexity of the CIAC. Inspections shall be distributed equally throughout the year. Whenever possible according to the sample size, priority will be given to the inclusion of the additional base with the largest amount of workload and the additional base with the least workload. The additional bases inspected will vary from one year to the next, eventually covering 100%.

6. RBS tools using questionnaires and CLs only

6.1 The proposed Excel solution will reduce the time required by users to complete each phase of the process, by providing consistent workflows. The proposed and installed system architecture is component-based and highly customisable to allow deployment of those components to build an exact fit solution.

6.2 The architecture of the Excel solution:

- a) Provides one-time data entry to avoid duplication of effort, minimise entry errors, and improve workflow and operational process efficiency; and
- b) Is based on simple implementation procedures.

6.3 The five (5) spreadsheets were developed in MS Excel 2016.

6.4 Detailed explanation of the spreadsheets that are part of the CIAC RBS planning Excel tool

The State will be required to implement the five (5) spreadsheets detailed below:

- a) a spreadsheet for compiling the results of the CLs used in risk-based surveillance audits and inspections;
- b) a spreadsheet for compiling the results of the SMS effectiveness assessment tool;
- c) a central database spreadsheet containing the results of risk-based surveillance activities;
- d) a spreadsheet for RBS planning and for frequency and scope modification; and
- e) safety performance indicator (SPI) diagram book with target and alert level settings for monitoring safety performance.

6.4.1 Spreadsheet for compiling the results of LCs used in risk-based surveillance audits and inspections

6.4.1.1 This spreadsheet includes the CLs used in RBS inspections and shall process the results of regulatory requirement compliance statements expressed as:

- a) Satisfactory;
- b) Unsatisfactory; or
- c) Not applicable.

6.4.1.2 Likewise, this workbook shall process the results on the status of implementation and IdRs that correspond to the review of the evidence or proof presented by the CIAC, in order to comply with the guidelines for the review of such evidence or proof. These results will correspond to the following:

- a) Not applicable / IdR not applicable;
- b) Implemented / IdR not applicable;
- c) Not implemented / IdR negligible
- d) Not implemented / IdR minor
- e) Not implemented / IdR major
- f) Not implemented / IdR hazardous
- g) Not implemented / IdR catastrophic

6.4.1.3 Although there are five (5) categories for the evaluation of the status of implementation of each guideline in the requirement, the IdR for each guideline has been pre-defined in the CLs, based on an analysis of the severity of the consequence of the associated hazard.

6.4.1.4 The CL guidelines will be identified with a unique and predefined code using the hazard taxonomy to which they correspond in cases of non-compliance. With the identification and grouping by taxonomy, it is expected that trends will be identified for failures, defects, malfunctions and incidents, as well as by type of service providers and by aviation sector.

6.4.1.5 This workbook includes a worksheet that contains the taxonomy of the hazards involved in the evidence review guidance so that users can refer to this taxonomy.

6.4.1.6 This tool will determine the ORP risk factor corresponding to the rate of regulatory compliance, based on the assessment of the severity of the risk of each guideline for the review of evidence from the LCs used in a CIAC RBS.

6.4.2 **Spreadsheet for compiling the results of the SMS effectiveness assessment tool**

6.4.2.1 This workbook has been developed in accordance with the SMS effectiveness assessment tool elaborated by the SRVSOP Technical Committee (CT) on the basis of the document published by the Safety Management International Collaboration Group (SM ICG).

6.4.2.2 With this tool, State inspectors will assess the components and elements within the SMS framework, distributed in forty-seven (47) compliance and performance indicators that permit determining the level of maturity of SMS processes.

6.4.2.3 A weighted scoring system will be applied, which logically expresses the maturity of SMS processes. For each indicator, and as per its significance for SMS maturity, the following weights will be assigned: 0.5 low, 1 moderate, 1.5 high, and 2 very high.

6.4.2.4 For the maturity levels expressed as present (P), satisfactory (S), operational (O) and effective (E), arithmetic values of 1, 2, 3 and 4 will be assigned, respectively. Once the level of maturity for each compliance and performance indicator is determined, the arithmetic values assigned will be added and multiplied by the weightage. Likewise, the result of each indicator will be totalled into the arithmetic sum, resulting in a total score.

6.4.2.5 Finally, the range in which the total score is placed will express the situation corresponding to the risk parameter of the CIAC's ORP related to the level of maturity of its SMS.

6.4.2.6 This tool will determine the risk factor of the ORP corresponding to the level of effectiveness of the CIAC SMS processes.

6.4.3 **Central database spreadsheet containing the results of risk-based surveillance activities**

6.4.3.1 This spreadsheet contains the fields corresponding to the type of findings recorded, the description of the findings, unmet regulatory requirements, correction deadline, correction date, date of acceptance of corrective actions by the CAA, as well as the decisions, gradual compliance measures and follow-up carried out by the CAA.

6.4.3.2 This tool will determine the risk factor of the ORP corresponding to the rate of CIAC audit/inspection findings by the CAA (only 1 and 2 weight findings, observations are excluded) for the last 24 months.

6.4.4 **Spreadsheet for risk-based surveillance (RBS) planning and frequency and scope modification**

6.4.4.1 The purpose of this spreadsheet is to determine the frequency and scope of surveillance activities conducted through safety audits, inspections or surveys. This book will also permit the modification of surveillance frequency and scope, based on on-going CIAC performance, as well as other sources and safety performance results for that CIAC.

6.4.4.2 The IdR of the training centre shall be determined through application of the ORP, involving a specific number of risk parameters applicable to the CIAC. In average, PEL will have thirty-four (34) risk parameters per CIAC.

6.4.4.3 The risk parameters of the ORP will be weighted to establish the individual impact of each parameter on the overall calculation of the ORP. This weighting would be done initially by dividing 100 by the number of applicable parameters and then, depending on the average value of each parameter, changing it to a value greater than the average, if it is considered to have a greater individual impact on the risk profile of the CIAC or, conversely, weighting it with a value below the average if it is considered to have a lesser impact on the risk profile of the training centre.

6.4.4.4 Each risk parameter has three (3) levels, corresponding to the following:

- a) Level 3, is the least desirable situation in terms of ORP;
- b) Level 2, is the average situation; and
- c) Level 1, is the most desirable situation.

6.4.4.5 Each level selected is associated to an arithmetical value of 1 for Level 1, 2 for Level 2 and 3 for Level 3. Once the arithmetical value corresponding to the level of each risk parameter is determined, this value will be combined with the weighting assigned to each risk parameter, which will result in a score.

6.4.4.6 The score obtained for each risk parameter will be added, and the result will produce a number from 1 to 5, which will be associated with the range of the total score obtained, and will qualify the ORP of the CIAC. The ORP category of the training centre will correspond to the following:

- 1: **very low** organisation risk profile;
- 2: **low** organisation risk profile;
- 3: **moderate** organisation risk profile;
- 4: **high** organisation risk profile; and
- 5: **very high** organisation risk profile.

6.4.4.7 The CIAC IdE shall then be determined and calculated based on a five (5) variable scoring system for each training facility that will indicate the level of exposure of the organization's activities, in terms of size and complexity and impact on the safety management of the State's aviation system. For each variable, three (3) possible scenarios are established with an arithmetical value score from 1 to 3; where 1 would be the variable score expressing minimum complexity, 2 significant complexity and 3 major complexity. The result of each variable will be added up and the total will be placed in the range corresponding to the letters A to E, the exposure level will correspond to the following:

- A: Very low** impact on the aviation system;
- B: Low** impact on the aviation system;
- C: Moderate** impact on the aviation system;
- D: High** impact on the aviation system; and
- E: Very high** impact on the aviation system.

6.4.4.8 The RBS planning tool includes a surveillance frequency and scope modifier that will be a matrix where the IdR and IdE will be transferred. If the result falls in the red region, surveillance frequency and scope will be rigorous; if it falls in the yellow region, surveillance frequency and scope will be normal; and if it falls in the green region, surveillance frequency and scope will be reduced. See Table 1-6.

Table 1-6 – Matrix for the determination of RBS frequency

RBS frequency		Risk indicator (IdR)				
		Very high	High	Moderate	Low	Very low
Exposure indicator (IdE)		5	4	3	2	1
Very high	E	5E	4E	3E	2E	1E
High	D	5D	4D	3D	2D	1D
Moderate	C	5C	4C	3C	2C	1C
Low	B	5B	4B	3B	2B	1B
Very low	A	5A	4A	3A	2A	1A

RBS frequency	RBS intensity level		
	Rigorous	Normal	Reduced
	12 months	24 months	36 months

6.4.4.9 **Appendix A** to this chapter shows a CIAC ORP.

6.4.5 SPI diagram book with target and alert level settings for monitoring safety performance

6.4.5.1 This book has already been developed and is available; nevertheless, it was updated to incorporate the new terminology and criteria in Doc 9859, fourth edition.

6.4.5.2 With this tool, the ORP risk factor pertaining to compliance with safety performance objectives and goals will be determined.

6.5 General search

General search involves retrieving records from the database, in accordance with search criteria specified by the user. The search can also cover other sources of information, such as on-screen data.

6.6 Advanced search

It may be necessary to add an advanced search to the system to make it as flexible as possible. The search module will be designed in such a manner that it isolates the specific details of the application's search. The search function has a series of limited data and, depending on its configuration, it can conduct the required type of search without further intervention of the programmer. It should be possible to add other kinds of searches, related to other types of data, with relatively little effort.

6.7 Reports

There is a need to generate reports on the outcome of audits and inspections where the CLs have been used. The tool allows exporting the results in PDF format for easy use. In this regard, the tool will generate four (4) reports:

- a) Surveillance outcome report: type of findings recorded, deadline for correction, date of correction and date of acceptance of corrective actions by the CAA.
- b) Trend report of the results of the applied CLs: results of the number of satisfactory, unsatisfactory or non-applicable questions. Also, results grouped by hazard taxonomy, by guidance, ratio of guidance not implemented to risk in terms of severity of associated hazard, percentage of effective implementation of applicable regulatory requirements or regulations, among others.
- c) Reports of RBS planning in terms of frequency and scope of surveillance tasks.
- d) Information on the resulting trends will be presented in graphs and on pre-established State data tables.

7. Records

7.1 The CAA shall retain and maintain the records associated with RBS planning, as evidence of the determination of the frequency, scope and sample of surveillance activities, as well as the analyses of available safety information on the basis of which the frequency and scope of the surveillance plan were modified.

7.2 Following is a list, which should not be regarded as rigorous, of the records to be kept and the recommended retention periods:

- a) The ORP and its corresponding IdR, initially applied to establish the RBS baseline. In addition, all the spreadsheets used in the determination of this baseline ORP. It is recommended that they be kept for at least five (5) years;
- b) The analysis of the available safety information used in the modification of RBS frequency and scope applied in the RBS cycle. It is recommended that it be kept for at least two (2) years.

APPENDIX A TO CHAPTER 1 - CIAC RISK PROFILE QUESTIONNAIRE (SURVEILLANCE)

1. The civil aviation training centre risk profile (ORP) will be applied during the establishment of the RBS baseline for LAR 141 Type 2 and Type 3 CIACs.
2. In the right column, write the 3, 2 or 1 risk level value, depending on what better describes the current situation of the CIAC, in accordance with each of the questions.
3. If there is insufficient data to establish the situation of a risk factor, if the answer provided by the CIAC or the data are not credible or cannot be verified, or if the issue addressed in the question has not been developed by the training centre, assign a value of 3.
4. ORP risk factors are weighted to establish the individual impact of each factor on the global calculation of the ORP. This weighting is carried out by dividing 100 by the number of factors applicable and, then, on the basis of the average value of each factor, modifying it to a greater value than the average, if it is considered that they have a greater individual influence over the organisation's risk profile or, on the contrary, weight with a value lower than the average, if it is considered that they have a lesser influence over the organisation's risk profile (refer to weighting column).
5. For each risk factor there are three (3) levels, which correspond to the following:
 - a) Level 3 is the least desirable situation, in terms of the organisation risk profile (ORP);
 - b) Level 2 is the average situation; and
 - c) Level 1 is the most desirable situation.
6. Each level selected is associated to an arithmetical value of 1 for Level 1, 2 for Level 2 and 3 for Level 3. Once the arithmetical value corresponding to the risk factor level is determined, this value will be combined with the weighting assigned to each risk factor, which will result in a score.
7. The score obtained from each risk factor will be added, and the result will produce a number from 1 to 5, which will be associated with the range of the total score obtained, and will qualify the training centre's ORP. The CIAC ORP category will correspond to the following:
 - (1): **very low** organisation risk profile;
 - (2): **low** organisation risk profile;
 - (3): **moderate** organisation risk profile;
 - (4): **high** organisation risk profile; and
 - (5): **very high** organisation risk profile.
8. Once the profile is completed, add the values in the right column in order to obtain the ORP value, as per Table 1-A-1 in Appendix A to Chapter 1.

Table 1-A-1 – CIAC risk profile questionnaire

		RISK LEVEL / PROFILE (CIAC)					
Item	CIAC risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
1	Perception of the general public	Perceived as an undesirable CIAC - from the perspective of the employee or customer	Perceived as an average CIAC - from the perspective of the employee or customer	Perceived as a desirable CIAC - from the perspective of the employee or customer	1 2 3	1.52	1.52 3.03 4.55
2	CIAC financial status	More losses than profits	Cover their costs most of the time	Consistently profitable		1.22	
3	CIAC experience (years of operation)	More than 5 years	Between 5 and 10 years	More than 10 years		1.22	
4	CIAC safety culture	Individual employees and the CIAC in general show lack of interest or have a negative attitude or behaviour regarding safety and quality issues	Individual employees or the CIAC in general do not manifest any consistent positive or negative attitude or behaviour regarding safety and quality issues	Individual employees and the CIAC show a positive and healthy attitude and behaviour regarding safety and quality issues		1.52	
5	Experience and qualification of the manager (as of the date of the evaluation)	Has less than 3 years experience in aviation and no technical qualifications	Has more than 3 years experience in aviation or technical qualifications	Has more than 3 years experience in aviation and the technical qualifications in aviation		1.52	

		RISK LEVEL / PROFILE (CIAC)					
Item	CIAC risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
6	Accountable manager – Safety / quality functions	There are no safety / quality functions in the terms of reference (TORs) of the manager responsible	The TORs of the accountable manager have a negligible or no mention of safety / quality functions	The final responsibility for safety and quality is clearly stated in the TORs of the accountable manager		1.22	
7	Experience and qualifications of the safety manager (SM)	Has less than 5 years experience in civil aviation safety / quality, or has no technical qualifications	Has more than 5 years experience in civil aviation safety / quality, and technical qualifications in aviation	Has more than 15 years experience in civil aviation safety / quality, and technical qualifications in aviation		1.22	
8	Experience and qualifications of the quality systems (QM) manager	Has less than 5 years experience in QM, or has no technical qualifications	Has more than 5 years experience in QM, and counts with technical qualifications	Has more than 15 years experience in QM, and counts with technical qualifications		1.32	
9	Multitasking of safety / quality management (SM / QM) staff	The safety manager (SM) or quality manager (QM) holds other executive position(s) within or outside the CIAC	The terms of reference of the safety manager (SM) or quality manager (QM) include other functions not directly related to safety / quality. For example: information technology (IT), administration, training, etc.	The safety manager (SM) and quality manager (QM) do not hold any other executive position(s) within or outside the CIAC and their terms of reference do not include other functions directly related to quality / safety		1.32	

		RISK LEVEL / PROFILE (CIAC)					
Item	CIAC risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
10	Experience of the head of flight training	Has 2 years experience as flight instructor, and 500 hours of flight time in this function	Has three years experience as an instructor and 1000 hours of flight time in this function.	More than 3 years experience as flight instructor, 1500 hours in this function and experience in the position of chief flight instructor		1.52	
11	Average experience (hours of flight) of flight instructors	From 300 to 500 hours	From 501 to 1000 hours	More than 1000 hours of flight		1.52	
12	Safety responsibility structure	The safety management function / manager's office is responsible for, or subordinate to, some operational functions	The safety management function / office / manager is accountable to senior management, and is independent of all operational functions	The safety management function / office / manager has direct responsibility and reports to the chief executive officer (CEO)		1.32	
13	Quality responsibility structure	The quality management function / office / manager, is responsible for, or subordinated to, some functions unrelated to quality / safety	The quality management / office / manager function is accountable to senior management and is independent of all operational functions	The quality management function / office / manager has direct responsibility and reports to the chief executive officer (CEO)		1.32	

		RISK LEVEL / PROFILE (CIAC)					
Item	CIAC risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
14	Ratio of internal safety and quality control personnel to all technical operational personnel	1 to more than 20	1 to 15 and 20	1 to less than 15		1.32	
15	Combined turnover of accountable manager, safety manager, quality manager and flight instructors during the last 24 months	3 or more	2	1 to none		1.32	
16	Average age of training aircraft	> 12 years	8 to < 12 years	< 8 years		1.32	
17	Multiplicity of aircraft types	More than 3 aircraft types	3 aircraft types	2 aircraft types		1.72	
18	Average findings per aircraft identified in the last CAA airworthiness inspection	More than 5	From 2 to 4	1 or less		1.72	
19	Percentage of failed students on annual CAA theoretical evaluations (licences and ratings)	More than 20%	Between 20% and 10%	Less than 10%		1.52	

		RISK LEVEL / PROFILE (CIAC)					
Item	CIAC risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
20	Percentage of students failing the annual CAA proficiency evaluation (licences and ratings)	More than 20%	Between 20% and 10%	Less than 10%		1.52	
21	CIAC surveillance by CAA - Overall performance rating	Less than 75% implementation of all applicable requirements	Between 75% and 90% implementation of all applicable requirements	More than 90% implementation of all applicable requirements		1.72	
22	CAA comprehensive CIAC surveillance - Number and level of findings (in last 24 months)	Any Level 3 finding, or more than three Level 2 findings, for the period under evaluation	No more than three Level 2 findings, for the period under evaluation	No Level 3 or Level 2 finding for the period evaluated		1.72	
23	Resolution of findings as a result of CAA inspections	Deadlines set by CAA are not met	Only some of the findings are solved before the deadlines set by the CAA	Meets the deadlines set by the CAA		1.72	
24	Annual audits conducted by the CIAC	Inexistence or inefficiency of internal audit processes	Only internal audits conducted, and CIAC has evidence regarding compliance with the process	Internal and external audits are conducted, and CIAC has evidence regarding compliance with the process		1.72	

		RISK LEVEL / PROFILE (CIAC)					
Item	CIAC risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
25	Hazard identification and risk assessment (HIRA) programme	Has no active and functional HIRA programme	Has a HIRA programme in place. Has completed or reviewed 1 to 3 risk assessment projects (for all operational employees) in the past 12 months	Has a HIRA programme in place, for all main operational areas		1.72	
26	Mandatory reporting incident rate (per 1000 flight hours (FH)) in the last 24 months	More than 0.4 incidents per 1000 FH	Between 0.2 and 0.4 incidents per 1000 FH	Less than 0.2 incident per 1000 FH		1.72	
27	In-flight shutdown (IFSD) rate due to maintenance or operational problems every 1000 FH	More than 0.08 incidents per 1000 FH	Between 0.04 and 0.08 incidents per 1000 FH	Less than 0.04 incidents per 1000 FH		1.72	
28	Average application rate of the fleet's minimum equipment list (MEL) per 1000 FH (over the last 24 months)	More than 30 MEL applications per 1000 FH	Between 10 and 30 MEL applications per 1000 FH	Less than 10 MEL applications per 1000 FH		1.72	
29	Application rate of exemptions granted by the CAA per aircraft	More than 1 exemption per year	Between 0.5 and 1 exemptions per year	Less than 0.5 exemptions per year		1.52	

		RISK LEVEL / PROFILE (CIAC)			Result	Weighting	Score
Item	CIAC risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
30	Person presiding CIAC safety committee	There is no SMS committee, or it is presided by junior management	The SMS committee is chaired by the SMS/QMS deputy accountable manager or manager directly answering to the SMS accountable manager	The SMS committee is presided by the SMS accountable manager		1.52	
31	Hazard reporting system	None implemented	Hazard reporting system implemented	Hazard reporting system implemented. In addition to a hazard identification procedure in conjunction with the incident investigation process		1.72	
32	Regulatory compliance rate based on the risk severity assessment for each guidance for the review of evidence from the checklists used in the CIAC RBS	> 0.48	> 0.25 ≤ 0.48	≤ 0.25		1.72	
33	Level of effectiveness of the safety management system (SMS) processes in a CIAC	≤ 184.5 points	> 184.5 ≤ 369 points	> 369 points		50.00	

		RISK LEVEL / PROFILE (CIAC)					
Item	CIAC risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
34	Compliance with safety objectives and targets	In the twelve (12) months prior to surveillance, any SPI exceeded one point above alert 3 standard deviation (SD), or two consecutive points exceeded alert 2 SD, or 3 consecutive points exceeded alert 1 SD	In the twelve (12) months prior to surveillance, any SPI has exceeded one point above alert 1 SD	In the twelve (12) months prior to surveillance, no SPI has exceeded the alert levels		1.72	
TOTAL SCORE							

CHAPTER 2

EXAMPLE OF RISK-BASED SURVEILLANCE (RBS) PLANNING METHODOLOGIES FOR THE AREA OF AIRCRAFT OPERATIONS (OPS)

Section 1 – ICAO Safety Information Monitoring System (SIMS) methodology

1. Introduction

1.1 This section describes the principles and procedures of the risk-based surveillance (RBS) system, for the use of States as a mechanism for the generation of efficiency and optimisation of the resources assigned to surveillance activities.

1.2 Risk-based surveillance is defined as the “methodology for the planning, implementation and follow-up of continuous surveillance activities, based on the individual risk profiles of each air operator, to determine the frequency of inspections and the prioritisation of aspects to be inspected”.

1.3 When surveillance activities are planned and executed on the basis of the individual risks of each air operator, a more efficient use of resources is achieved by prioritising those aspects with a higher level of risk.

2. Application

2.1 The general principles of this methodology are applied to the flight operations area.

2.2 States are free to adopt or adapt these procedures, in accordance with the needs and nature of their operations.

2.3 Risk-based surveillance should be applied and understood as an integral part of the State Safety Programme (SSP).

2.4 This methodology is intended for planning, implementing and monitoring surveillance activities, and also for following up findings. This methodology cannot be used to determine the number of inspectors required by the CAA or for any purpose other than that described in this paragraph.

3. Planning of risk-based surveillance

3.1 RBS planning permits determining the minimum number of inspections to be conducted to an air operator in a 12-month period, taking into account two factors: **the safety performance level**, and the **operational complexity level**.

3.2 The combination of both values will determine the surveillance intensity that each air operator requires. The surveillance intensity might be, for each air operator, high, medium or low.

3.3 The safety performance level, the operational complexity level, the surveillance intensity and the minimum sample size to be inspected, are determined using the RBS web application that is part of the integrated Safety Trend Analysis and Reporting System (iSTARS) on the ICAO website <https://portal.icao.int/space/Pages/Risk-Based-Surveillance.aspx>.

3.4 The safety performance questionnaire contains a series of questions divided into five (5) areas: safety management; organisation and human resources; infrastructure and equipment; regulatory compliance; and operational practices, which identify the individual capability of each air operator to adequately manage risk, to meet regulatory requirements and to implement best practices to achieve an acceptable level of safety during the provision of its services. The safety performance level is measured from 0 to 10, with 10 being the optimum performance. Being divided into areas, the result of the questionnaire allows for the identification of the strengths and weaknesses of each air operator to protect itself against operational risks.

3.5 The questionnaire on the safety performance level must not be completed by one single person, to avoid bias in any of the criteria. Under the RBS concept, surveillance planning, implementation, validation and follow-up activities should be carried out by a group of technical experts familiar with the air operator and the products or services it offers, and decisions must be made by consensus.

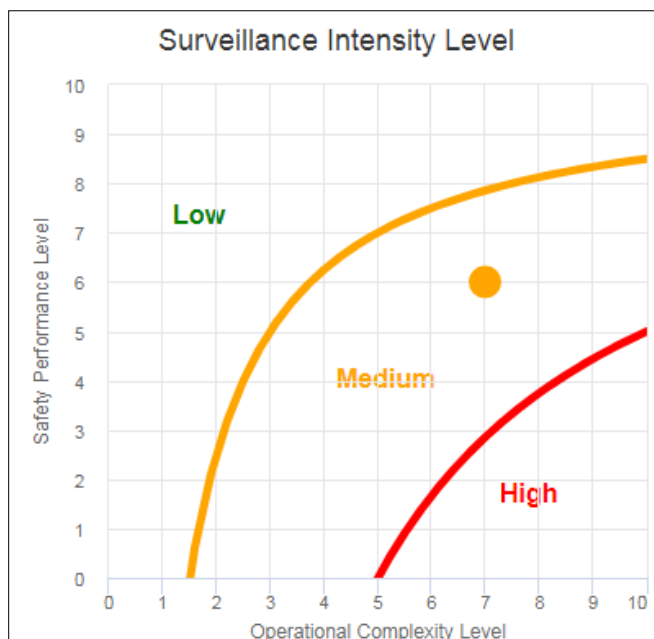


3.6 **Questionnaire on size and complexity** - It consists of six (6) questions aimed at determining the level of complexity of an air operator and consequently its exposure to risk. The operational complexity level is measured from 0 to 10, 10 being the maximum possible complexity.

The figure shows a questionnaire form for 'Operational Complexity Level'. It includes a bar chart at the top showing an 'Overall' score of 7 on a scale from 0 to 10. Below the chart are six input fields for different criteria:

Criteria	Value
Annual Flights	4000 to 45000 *
Aircraft	17 or more *
Aircraft Models	2 to 4
Destinations	11 to 50
Is International	Yes *
Average Fleet Age	5 to 15 years *

3.7 The **combination** of the safety performance level and the operational complexity level, will determine the surveillance intensity to be applied to the air operator:



3.8 This level, in turn, will permit determining the type and number of inspections required for each air operator during the next twelve (12) months, and will include a suggested frequency in a 52-week calendar:

The sample size is defined using the ISO sampling model. The base inspection is unique and its period only depends on the intensity.

Activity Type	Related Population	Minimum Activities	Periodicity
Route Inspection - Cabin	Stations	8	2 months
Route Inspection - Flight Deck	Stations	8	2 months
Ramp Inspections	Aircraft	13	1 month
Station Inspections	Stations	8	2 months
Check Pilot Inspections	Check Pilots	3	4 months
Base inspection	-	1	18 months

The attached schedule integrates all the above inspections with their respective samples and distributes them over one year, 52 weeks. The base inspection schedule covers 3 years.

- The results are unique to each air operator and cannot be applied by analogy to an air operator of similar size, type of operation, or complexity.
- The number of inspections determined by the application is the minimum number of inspections that must be conducted to the air operator during a 12-month period; the CAA may programme and implement a larger number of inspections, if deemed appropriate.
- The conduct of fewer inspections than determined by the application will not enable the CAA to reliably determine the overall safety level of the air operator.
- The calculation for inspection planning must be carried out at least once every twelve (12) months, or in shorter periods in case of special circumstances faced by the air operator, such

as significant changes in size, type of operation, base of operations, accidents or serious incidents, etc.

4. Implementation of risk-based surveillance

4.1 Risk-based surveillance is not intended as a compliance verification activity, but rather as an opportunity to identify deficiencies that could affect or compromise acceptable levels of safety. To achieve this, it is very important that the CAA properly prepare its surveillance activities in such a way as to maximise opportunities to identify deficiencies. Each time that a deficiency is identified through surveillance and followed up until it has been adequately resolved, safety improvement is achieved, which is ultimately the primary objective of CAA activities.

4.2 To this end, risk-based surveillance involves the comprehensive analysis of all available information, enabling the determination of those aspects or areas where there is a greater probability of identifying or discovering findings. During the implementation stage of risk-based surveillance, special emphasis is placed on information preparation and analysis activities. To this end, it is essential for the CAA to have an adequate safety data collection and processing system (SDCPS).

4.3 The preparation and implementation of inspections should always be carried out by a group of inspectors to allow for an analysis of available information from different points of view and to make decisions by consensus.

4.4 The implementation of risk-based surveillance is aimed at optimising the use of CAA resources and achieving the greatest possible improvement in safety. The objective of adequate preparation of each inspection activity is: to maximise the possibility of identifying existing findings, and to prioritise the verification of those aspects that represent a greater risk to operations:

- a) **Maximise the possibility of identifying findings.** – Under the risk-based surveillance (RBS) concept, sufficient time must be allocated to properly prepare each inspection. Inspectors shall analyse all available information from as many sources as possible, such as:
 - i) results of previous surveillance activities;
 - ii) history of sanctions, such as limitations, suspensions, revocations, etc.;
 - iii) accident and incident history;
 - iv) interviews with air operator staff;
 - v) complaints or claims from users;
 - vi) the media;
 - vii) social networks;
 - viii) results of the RBS application questionnaire; and
 - ix) any other source of information identified by the CAA.

The analysis and discussion of all information available should enable the group of inspectors to agree and determine a list of “expected findings”.
- b) **Identification of inspection items.** - Following the identification of the expected findings, the group should identify those items on the list that represent a higher level of risk, and therefore are important to be inspected. This prioritisation is not related to the expected findings, but rather to the level of risk of the item to be inspected, or other factors such as items that have not been inspected in the recent past. The purpose is to help inspectors prioritise certain inspection items when time is limited or very limited.

4.5 Once the intended findings have been determined and the items on the checklist have been prioritised, the inspectors will have a specific list of items to be inspected before any others to ensure the best use of the time available, maximise the possibility of findings, and safeguard safety. The team of inspectors will then define, based on: the type of inspection, the required competence of the inspectors, and the time available, the appropriate number of inspectors to carry out the inspection and organise the distribution of the workload.

4.6 Once the workload has been distributed among the inspectors, each inspector will become familiar with the regulatory aspects and procedures of the air operator in relation to the items he/she is responsible for inspecting.

4.7 With this procedure, the on-site inspection activity serves mainly to confirm the assumptions made during the preparation stage.

4.8 Depending on the time available, after having verified the priority items, the inspection team may inspect other areas.

5. Validation and follow-up of findings

5.1 During inspections, inspectors shall record all findings on the appropriate form, and obtain evidence to support their entries.

5.2 Just as important as the inspection preparation meeting is the validation meeting that follows the inspection. The group of inspectors shall meet to share their findings and discuss together to confirm or dismiss them, *i.e.*, whether or not they violate a specific section of existing regulations or the air operator procedures. The subsequent review of inspections should always be carried out by a group of inspectors to allow for an analysis of the available information from different perspectives and to allow for consensus decisions to be taken.

5.3 For recording, monitoring and control purposes, each finding will be assigned a number of 1, 2 or 3 according to its level of risk, as detailed below:

- a) **Level 1 finding** - Has a minor impact on the safety of operations.
- b) **Level 2 finding** - Has moderate impact on safety of operations and, therefore, requires mitigation
- c) **Level 3 finding** - Has a major impact on safety; therefore, the service cannot continue to be provided under the existing conditions.

5.4 The corresponding actions for each level of finding are set out in the inspector's manual of procedures.

5.5 Even if surveillance activities are properly planned, prepared and implemented, the CAA must ensure that there is adequate and continuous follow-up to the findings identified during inspections. It is only through the implementation of appropriate and timely corrective action that safety improvements will be achieved and it is only at this point that the surveillance programme will be successful, valuable and can be considered effective.

5.6 For the implementation of risk-based surveillance, the CAA shall have in place a safety data collection and processing system (SDCPS) suitable for the monitoring of findings that will enable it to record, identify and consult quickly at least:

- a) the quantity, description and date of the findings identified
- b) the level of risk of each finding;
- c) the inspector responsible for monitoring and verifying the closure of the findings;
- d) the time allowed for the air operator to resolve the findings;

- e) the findings for which the deadline for resolution has expired;
- f) findings for which the deadline for resolution is close to expiry; and
- g) general statistics on monthly, quarterly, half-yearly and other compliance.

5.7 The system should also provide automatic warnings when deadlines are approaching and when they have already expired.

5.8 The identification and follow-up of findings, by themselves, do not contribute to the improvement of safety. The CAA must ensure that all findings are closed in a timely manner, and that correction and/or mitigation actions taken by air operators are the result of appropriate identification of the root cause.

6. Measuring surveillance performance

6.1 In order to facilitate the measurement of the performance of surveillance activities, so that timely corrective action can be taken to ensure that continuous improvement is achieved, the CAA will establish surveillance indicators, which will in turn form part of its SSP indicators.

6.2 Surveillance performance will be measured by the following indicators:

- a) **Compliance rate.** - Number of inspections implemented out of total scheduled inspections.
- b) **Rate of findings per inspection.** - Number of findings over total implemented inspections.
- c) **Rate of closure of findings.** - Total closed findings over total overdue findings.

6.3 Once the RBS methodology has been implemented, the CAA will collect the results of surveillance activities and at the end of one hundred and eighty (180) days will determine the value of its indicators.

6.4 Based on the value of each indicator, the CAA will set SMART* performance targets to be achieved within a period of one (1) year. The targets shall be appropriate for the CAA to eventually achieve the following objectives***:

- a) **Compliance rate.** – 1.0
- b) **Rate of findings per inspection.** – 1.0
- c) **Rate of closure of findings.** – 1.0

* SMART: Specific, measurable, achievable, relevant and time-bounded.

** The target rate of findings per inspection may be reviewed once the surveillance activities and the ability of the air operator to identify and resolve safety concerns have reached an appropriate level of maturity.

Section 2 – SRVSOP methodology

1. Objective

This section provides guidance and direction to the principal operation inspectors of the CAA on the methodology for planning the RBS of air operators engaged in domestic and international, scheduled and non-scheduled operations. This methodology allows for the prioritisation of RBS activities of those operators who are exposed to a higher level of risk, and therefore ensures a more efficient use of CAA resources.

2. Scope

This methodology is based solely on data collected through questionnaires and CLs as part of the proactive safety data collection method.

3. Introduction

3.1 The RBS planning methodology for each air operator uses a combination of the following two (2) values:

- a) the risk indicator (RDI); and
- b) the exposure indicator (IdE).

3.2 The IdR of an air operator is derived from the application of the operator's risk profile (ORP) to the determination of its risk characteristic according to risk factors predetermined by the CAA. IdR is the numerical expression of ORP.

3.3 The IdE of an air operator is determined by the size and complexity of its operations. The IdE is the numerical representation of the air operator's exposure to risk.

3.4 The combination of IdR and IdE is used to determine the type, sample size and frequency of audits and inspections that should be conducted on each air operator in a specified time period.

3.5 The inspector should use the RBS planning Excel worksheet to record the information needed to determine the IdR and IdE, and the tool will calculate the intensity of surveillance and the size of the sample to be examined.

3.6 The criteria for modifying both the frequency and the scope of each surveillance activity are described in the manual for the operations inspector (MIO).

4. Classification of risk-based activities

4.1 All of the CAA's RBS activities can be grouped into two (2) categories: scheduled and unscheduled, announced or unannounced, where scheduled activities are those that are carried out at time intervals determined in the RBS plan, and unscheduled activities are those that are carried out in response to negative trends, performance outside the alert control criteria, uncertain or unforeseen events such as accidents, incidents, increased IdR, or changes in IdE, complaints, etc.

4.2 With respect to scheduled surveillance activities, the CAA will:

- a) determine an IdR and IdE for each air operator using the methodology in paragraphs 5.5 and 5.6 of this section;
- b) establish and implement an RBS programme for the air operator sector, using the procedures set out in the MIO and this section;
- c) develop a RBS plan for each air operator, based on the existing RBS programme, using the procedures set out in the MIO and this section; and
- d) continuously calibrate the RBS plan of each air operator on the basis of actual performance and the frequency and scope modification criteria set out in the MIO.

4.3 With regard to unscheduled RBS activities, the CAA shall continuously monitor the safety performance of each air operator, the results of RBS activities, undesired trends and other sources of information, in order to determine whether surveillance activities are required in addition to the inspections scheduled in the operator's surveillance plan.

5. Determination of the type and frequency of inspections

5.1 The RBS plan to be developed by the CAA for each air operator will contain the type of activities to be carried out and the specific timetable and scope of each activity, as appropriate.

5.2 In the area of air operators, the CAA will carry out the following types of inspections:

- a) Ramp inspections
- b) En route passenger cabin inspections
- c) En route cockpit inspections
- d) Flight log inspections
- e) Inspections of manuals and documents
- f) En route inspections to extended deviation time operations (EDTO) over water
- g) Inspections of competency checks/IDE
- h) Inspections of flight crew and EO/DV records
- i) Inspections of de-icing and anti-icing operations of aircraft on the ground
- j) Base inspections
- k) Monitoring of operator operations from ATC facilities
- l) Inspections to the management of significant changes
- m) Inspections to line checks
- n) Monitoring of the operational experience of the PIC
- o) Inspections of training programmes
- p) Operational control inspections
- q) Inspections of station facilities
- r) Inspections of simulators and other flight training devices

5.3 The CAA will draw up an annual RBS plan for each air operator in accordance with the following procedure:

5.4 Identification of the air operator

The first step in the planning process is to identify the air operator for which the surveillance plan will be developed. While obvious, this is a very important step because each surveillance plan is unique to each air operator given the size, risk profile and complexity combination. Likewise, the surveillance criteria applicable to the air operator will be established in accordance with the criteria set out in the MIO.

5.5 Determination of the risk indicator (IdR)

5.5.1 The IdR of the air operator is derived from the application of the ORP developed by the CAA, which will be processed by the group of operation inspectors (OI) during the initial (baseline) surveillance

of the air operator and then continuously when the CAA considers that the air operator has undergone changes that may modify its ORP.

5.5.2 The IdR is obtained from a combination of risk data collected by the CAA. This indicator is a representation of the probability of risks being adequately managed by the air operator. The methodology used to determine the IdR for an air operator is detailed in this paragraph and in Appendix A to this chapter.

5.5.3 The IdR is the numerical representation of the changes and/or circumstances associated with an air operator's potential for unsafe conditions or regulatory non-compliance. The IdR results from a profile developed from 37 weighted risk parameters and three (3) levels of risk depending on the specific situation of the air operator, which would correspond to an arithmetical value of 1 (most desirable), 2 (average) and 3 (least desirable) and which would be aggregated into a scoring system expressed in the following five (5) risk categories of the air operator according to the range of the score determined by operation inspectors during surveillance:

- 1: **very low** risk profile of the air operator;
- 2: **low** risk profile of the air operator;
- 3: **moderate** risk profile of the air operator;
- 4: **high** risk profile of the air operator;
- 5: **very high** risk profile of the air operator.

5.5.4 The first ORP is determined from the one shown in Appendix A of this chapter and is obtained through a weighted scoring system and can reach a result between one hundred (100) and three hundred (300) points when applying the risk factors. This value will be used in the calculation of the IdR, by applying the criteria of Table 2-2-1.

Table 2-2-1 – Risk indicator (IdR) of the air operator

ORP result	IdR value	Category of air operator represented in risk profile (ORP)	Definition
> 0 < 140	1	Very low ORP	Very high probability that risk is being adequately managed
≥ 140 < 180	2	Low ORP	High probability that risk is being adequately managed
≥ 180 < 220	3	Moderate ORP	Moderate probability that risk is being adequately managed
≥ 220 < 260	4	High ORP	Low probability that risk is being adequately managed
≥ 260 ≤ 300	5	Very high ORP	Very low probability that risk is being adequately managed

5.5.5 The CAA must have a database to store all the results of surveillance activities, enabling it to determine at any time the score of the risk parameter related to regulatory compliance for each air operator. Likewise, a database would be available to identify which part of the requirement is presenting findings based on the established coding and its impact on the safety risk in terms of the associated hazard. For example, if a flight crew member's competence related to the knowledge and skills of the flight crew whose coding is 121/135-8-1 is being verified, and the requirement question has two orientations, each orientation will be identified as 121/135-8-1-1 and 121/135-8-1-2 and will belong to a related predetermined hazard taxonomy. This permits an objective determination that what part of the requirement question is the one in trouble, while allowing for control in any computer system used for trending.

5.5.6 The CAA shall use the result of this assessment in the decision-making process and to follow up on deficiencies identified in inspections and/or audits conducted under the State's risk-based safety oversight programme.

5.5.7 The IdR value obtained shall be transferred to Table 2-2-4 - RBS frequency matrix, to determine the frequency of surveillance.

5.6 Determination of the exposure indicator (IdE)

5.6.1 The exposure indicator (IdE) of an air operator is determined by the size and complexity of its activities. The IdE is the numerical representation of the air operator's exposure to risk and the likelihood that the consequences of those risks will materialise. This indicator is determined according to:

- a) the annual number of flights;
- b) the number of aircraft;
- c) the number of aircraft models;
- d) the number of destinations;
- e) international operations; and
- f) average age of the fleet.

5.6.2 The IdE is also determined according to a scoring system. This value is the representation of the air operator's impact on the aviation system.

5.6.3 Using Table 2-2-2, the values described in the central rating column must be entered in the right-hand column.

Table 2-2-2 – Exposure indicator (IdE) of the air operator, scoring system

Criterion	Rating	Value
Number of annual flights	More than 45000 = 3 points	3
	4000 to 45000 = 2 points	2
	Less than 4000 = 1 point	1
Number of aircraft	More than 16 = 3 points	
	4 to 16 = 2 points	
	Less than 4 = 1 point	
Number of aircraft models	More than 4 = 3 points	
	2 to 4 = 2 points	
	1 = 1 point	
Number of destinations	More than 50 = 3 points	
	11 to 50 = 2 points	
	Less than 11 = 1 point	
International operations	Yes = 2 points	
	No = 1 point	
Average fleet age	More than 15 = 3 points	
	5 a 15 = 2 points	
	Less than 5 = 1 point	

Criterion	Rating	Value
	Total score	

5.6.4 Once the assignment of values is finished, add the values in the right column and use Table 2-2-3 to obtain the exposure indicator.

Table 2-2-3 – Determination of the exposure indicator, in letters

Total score Table 2-2-2	Description	Letter
$\geq 6 < 8$	Very low impact on the aviation system. Very low exposure to hazards.	A
$\geq 8 < 10$	Low impact on the aviation system. Low exposure to hazards.	B
$\geq 10 < 12$	Moderate impact on the aviation system. Moderate exposure to hazards.	C
$\geq 12 < 14$	High impact on the aviation system. High exposure to hazards.	D
$\geq 14 \leq 17$	Very high impact on the aviation system. Very high exposure to hazards.	E

5.6.5 The letter obtained in Table 2-2-3 should be transferred to Table 2-2-4 – RBS frequency matrix.

5.7 Determination of the frequency

5.7.1 The combination of IdR and IdE is used to determine the frequency and scope of surveillance that should be conducted on each air operator in a specific time period. It is also used to modify the frequency and scope of RBS in real time and on a continuous basis.

5.7.2 The surveillance frequency applicable to each air operator is determined using the risk-based surveillance (RBS) planning Excel spreadsheet, on the basis of the IdR and IdE, and using Table 2-2-4 below. According to the result, the level of intensity may be rigorous (12 months), normal (24 months) or reduced (36 months), thus establishing the frequency of surveillance.

Table 2-2-4 – RBS frequency matrix

RBS frequency		Risk indicator (IdR)				
		Very high	High	Moderate	Low	Very low
Exposure indicator (IdE)		5	4	3	2	1
Very high	E	5E	4E	3E	2E	1E
High	D	5D	4D	3D	2D	1D

Moderate	C	5C	4C	3C	2C	1C
Low	B	5B	4B	3B	2B	1B
Very low	A	5A	4A	3A	2A	1A

	RBS intensity level		
	Rigorous	Normal	Reduced
RBS frequency	12 months	24 months	36 months

5.8 Determining the scope of surveillance

Once the CAA has available, reliable and sufficient safety data and has the ability to determine the areas of greatest safety concern or need, through the processing and analysis of all safety information that unequivocally points to this situation and once undesirable trends have been identified, it will proceed to design inspections, audits and surveys focused on the areas where the consequences of risks are most likely to materialise. In view of this, the CAA shall require the implementation of appropriate measures, continuous improvement of safety performance, and early control of events that could potentially be catastrophic and cause damage and fatalities. Further guidance on determining and/or modifying the scope of RBS activities is provided in the MIO.

5.9 Determination of the sample

5.9.1 Using the risk-based surveillance (RBS) planning Excel Worksheet, and considering that inspecting 100% of all activities, e.g., flight logs, flight crew records, etc., of an air operator is impractical and, in some cases, unnecessary, the sampling method shall be applied to determine a sample size appropriate to the IdR and IdE of each air operator, and thus determine the appropriate number of each type of inspection as listed in paragraph 5.2. Sampling is a scientific research tool to determine which part of a reality under study (population or universe) should be examined in order to make inferences about that population. Sampling consists of randomly selecting a representative part of the universe or population, inspecting it and deciding whether it meets certain specifications--in this case, compliance with the applicable requirements. This method will be applied to determine the sample of facilities, records, personnel, routes, etc., to be inspected based on the total number of these and the IdR and IdE levels of each air operator.

5.9.2 The inspector shall use the RBS planning Excel spreadsheet to record the information required to determine IdR and IdE, and the tool will calculate the frequency and scope of surveillance, as well as the size of the sample to be examined, using the International Organization for Standardization (ISO) sample model.

Table 2-2-5 – RBS frequency matrix

Combinations of Table 2-2-4 →	3E, 4D, 4E, 5C, 5D, 5E	1D, 1E, 2C, 2D, 2E, 3B, 3C, 3D, 4A, 4B, 4C, 5A, 5B	1A, 1B, 1C, 2A, 2B, 3A
RBS frequency →	Rigorous (12 months)	Normal (24 months)	Reduced (36 months)
Population ↓	Sample ↓		
2 to 8	3	2	2
9 to 15	5	3	2
16 to 25	8	5	3
26 to 50	13	8	5
51 to 90	20	13	5
91 to 150	32	20	8
151 to 280	50	32	13
281 to 500	80	50	20

5.9.3 If the result of entering the IdR and IdE of an air operator "X" in the surveillance intensity matrix is 5D, then a "rigorous" criterion should be applied to the frequency of inspections. This will be done using the sample values contained in the second column of Table 2-2-5. For example, if the air operator "X" has a total of five (5) stations (population), then three (3) inspections of the stations of this air operator (sample) will be included in the annual rigorous surveillance plan.

5.10 Development of the surveillance plan for each air operator

For the development of the surveillance plan, the following criteria will be applied according to the type of inspection:

5.10.1 **Main base inspection** - A base inspection, or base audit, is composed of eight (8) types of inspections:

- Flight log inspections;
- Inspections of manuals and documents;
- Inspections of en-route EDTO over water;

- d) Inspections of flight crew and EO/DV records;
- e) Base inspections;
- f) Inspections to the management of significant changes;
- g) Inspections of training programmes; and
- h) Operational control inspections.

5.10.2 This inspection/audit will be completed, whenever possible, on a continuous basis, trying to avoid that the 8 inspections are completed in a very long period of time. Base inspections/audits provide a very good indication of the level of regulatory compliance and safety performance of the air operator, as they address a number of factors.

5.10.3 Depending on the level of surveillance intensity obtained from the matrix, the frequency of base inspections/audits of an air operator may vary between 12, 24 or 36 months, according to the following table:

	RBS intensity level		
	Rigorous	Normal	Reduced
RBS frequency	12 months	24 months	36 months

5.10.4 **Other inspections.** - In accordance with the size and complexity of the air operator, the number of other types of inspections to be scheduled will be determined by the result of the matrix in Table 2-2-5, obtained on the basis of the population and intensity of surveillance. Inspections will be distributed evenly over the established period according to the result of the intensity of surveillance. With respect to stations, the distribution will prioritise those with the greatest amount of workload.

6. RBS tools using questionnaires and CLs only

6.1 The proposed Excel solution will reduce the time required by users to complete each phase of the process by providing consistent workflows. The proposed and installed system architecture is component-based and highly customisable to allow deployment of those components to build an exact fit solution.

6.2 The Excel solution architecture:

- a) provides one-time data entry to avoid duplication of effort, minimise entry errors, and improve workflow and operational process efficiency; and
- b) is based on simple implementation procedures.

6.3 The five (5) spreadsheets were developed in MS Excel 2016.

6.4 Detailed explanation of the spreadsheets that are part of the Excel tool for planning the RBS of air operators

6.4.1 The State will be required to implement the five (5) spreadsheets detailed below:

- a) Spreadsheet for compiling the results of the CLs used in risk-based surveillance audits and inspections;
- b) Spreadsheet for compiling the results of the SMS effectiveness assessment tool;
- c) Central database spreadsheet containing the results of risk-based surveillance activities;
- d) Spreadsheet for planning the RBS and for changing the frequency and scope; and

- e) Safety performance indicators (SPI) diagram book with target and alert level settings for monitoring safety performance.

6.4.2 Spreadsheet for compiling results of LCs used in risk-based surveillance audits and inspections

6.4.2.1 This spreadsheet includes the CLs used in RBS inspections and shall process the results of regulatory requirement compliance statements expressed as:

- a) Satisfactory;
- b) Unsatisfactory; or
- c) Not applicable.

6.4.2.2 In the same sense, this spreadsheet shall process the results of the status of implementation and IdR that correspond to the review of the evidence or proof presented by the air operator, in order to comply with the guidelines for the examination of such evidence or proof. These results shall correspond to the following:

- a) Not applicable / IdR not applicable;
- b) Implemented / IdR not applicable;
- c) Not implemented / IdR negligible
- d) Not implemented / IdR minor
- e) Not implemented / IdR major
- f) Not implemented / IdR hazardous
- g) Not implemented / IdR catastrophic

6.4.2.3 Although there are five (5) categories for the evaluation of the status of implementation of each guideline in the requirement, the IdR for each guideline has been pre-defined in the CLs based on an analysis of the severity of the consequence of the associated hazard.

6.4.2.4 The CL guidelines will be identified with a unique and predefined code using the hazard taxonomy to which they correspond in cases of non-compliance. With the identification and grouping by taxonomy it is expected to identify trends by failures, defects, malfunctions and incidents, as well as by types of service providers and by aviation sectors.

6.4.2.5 This spreadsheet includes a worksheet that shows the taxonomy of the hazards involved in the evidence review guidance so that users can refer to this taxonomy.

6.4.2.6 This tool will determine the ORP risk factor corresponding to the rate of regulatory compliance, based on the assessment of the severity of the risk of each LC evidence review guideline used in an air operator RBS.

6.4.3 Spreadsheet for compiling the results of the SMS effectiveness assessment tool

6.4.3.1 This workbook has been developed in accordance with the SMS effectiveness assessment tool elaborated by the SRVSOP Technical Committee (CT) on the basis of the document published by the Safety Management International Collaboration Group (SM ICG).

6.4.3.2 With this tool, State inspectors will evaluate the components and elements within the SMS framework, distributed in forty-seven (47) compliance and performance indicators that permit determining the level of maturity of SMS processes.

6.4.3.3 A weighted scoring system will be applied, which logically expresses the maturity of SMS processes. For each indicator and as per its importance regarding SMS maturity, the following scores will be assigned: 0.5 low, 1 moderate, 1.5 high and 2 very high.

6.4.3.4 For the maturity levels expressed as present (P), suitable (S), operating (O) and effective (E), the arithmetical values 1, 2, 3 and 4 will be assigned, respectively. Once the level of maturity of each compliance and performance indicator is determined, the arithmetical values assigned will be added and multiplied by the weighting. Also, the result of each indicator will be totalled into the arithmetical sum, resulting in a total score.

6.4.3.5 Finally, the range in which the total score falls will express the situation corresponding to the risk parameter of the air operator's ORP related to the level of maturity of its SMS.

6.4.3.6 This tool will determine the risk factor of the ORP corresponding to the level of effectiveness of the air operator SMS processes.

6.4.4 **Central database spreadsheet containing the results of risk-based surveillance activities**

6.4.4.1 This spreadsheet contains the fields for the type of findings recorded, the description of the findings, unmet regulatory requirements, correction deadline, correction date, date of acceptance of corrective actions by the CAA, as well as the decisions, gradual compliance measures and follow-up carried out by the CAA.

6.4.4.2 This tool will determine the risk factor of the ORP corresponding to the rate of audit/inspection findings by the CAA for the air operator (weights 1 and 2 only, observations are excluded) for the last 24 months.

6.4.5 **Spreadsheet for RBS planning and frequency and scope modification**

6.4.5.1 The purpose of this spreadsheet is to determine the frequency and scope of the surveillance activities conducted through safety audits, inspections or surveys. In addition, this spreadsheet will permit modifying surveillance frequency and scope, upon considering the continuous performance of the air operator, as well as other safety sources and performances for said operator.

6.4.5.2 The air operator's IdR shall be determined through application of the ORP, consisting in a specific number of risk parameters applicable to the air operator. In average, OPS will have thirty-seven (37) risk parameters per air operator.

6.4.5.3 The risk parameters of the ORP will be weighted to establish the individual impact of each parameter on the overall calculation of the ORP. This weighting would be done initially by dividing 100 by the number of applicable parameters and then, depending on the average value of each parameter, changing it to a value greater than the average, if it is considered to have a greater individual impact on the risk profile of the air operator or, conversely, weighting it with a value less than the average if it is considered to have a lesser impact on the risk profile of the air operator.

6.4.5.4 Each risk parameter has three (3) levels, corresponding to the following:

- a) Level 3, least desirable in terms of ORP;
- b) Level 2, average; and
- c) Level 1, most desirable.

6.4.5.5 Each level selected is associated to an arithmetical value of 1 for Level 1, 2 for Level 2 and 3 for Level 3. Once the arithmetical value corresponding to the level of each risk parameter is determined, this value will be combined with the weighting assigned to each risk parameter, which will result in a score.

6.4.5.6 The score obtained for each risk parameter will be added, and the result will produce a number from 1 to 5, which will be associated with the range of the total score obtained, and will qualify the air operator's ORP. The air operator's ORP category will correspond to the following:

- 1: **very low** organisation risk profile;
- 2: **low** organisation risk profile;
- 3: **moderate** organisation risk profile;

4: **high** organisation risk profile; and

5: **very high** organisation risk profile.

6.4.5.7 The air operator IdE must then be determined and calculated based on a five (5) variable scoring system for each air operator that will indicate the level of exposure of the operator's activities, in terms of size and complexity and their impact on the safety management of the State's aviation system. For each variable, three (3) possible scenarios are established with an arithmetical value score from 1 to 3, where 1 would be the score of the variable expressing minimum complexity, 2 significant complexity and 3 greater complexity. The result of each variable will be added up and the total will be placed in the range corresponding to the letters A to E. The exposure level will correspond to the following:

A: Very low impact on the aviation system;

B: Low impact on the aviation system;

C: Moderate impact on the aviation system;

D: High impact on the aviation system; and

E: Very high impact on the aviation system.

6.4.5.8 The RBS planning tool includes a monitoring frequency and scope modifier that will be a matrix where the IdR and IdE will be switched. If the result falls in the red region, surveillance frequency and scope will be rigorous; if it falls in the yellow region, surveillance frequency and scope will be normal; and if it falls in the green region, surveillance frequency and scope will be reduced. See Table 2-2-6.

Table 2-2-6 – RBS frequency determination matrix

RBS frequency		Risk indicator (IdR)				
		Very high	High	Moderate	Low	Very low
Exposure indicator (IdE)		5	4	3	2	1
Very high	E	5E	4E	3E	2E	1E
High	D	5D	4D	3D	2D	1D
Moderate	C	5C	4C	3C	2C	1C
Low	B	5B	4B	3B	2B	1B
Very low	A	5A	4A	3A	2A	1A

RBS intensity level			
Rigorous		Normal	Reduced
RBS frequency	12 months	24 months	36 months

6.4.5.9 **Appendix A** to this chapter shows the ORP of an air operator.

6.4.6 **SPI diagram book with target and alert level settings for monitoring safety performance**

With this tool, the ORP risk factor pertaining to compliance with safety and performance objectives and targets will be determined.

6.5 **General search**

General search includes retrieving records from the database, in accordance with search criteria specified by the user. The search can also cover other collections of information, such as on-screen data.

6.6 **Advanced search**

It may be necessary to add an advanced search to the system to make it as flexible as possible. The search module will be designed in such a manner that it isolates the specific details of the application's search. The search function has a series of limited data and, depending on its configuration, it can implement the required type of search without further intervention from the programmer. It should be possible to add other kinds of searches, related to other types of data, with relatively little effort.

6.7 **Reports**

There is a need to generate reports on the outcome of audits and inspections where CLs have been used. The tool allows exporting the results in PDF format for easy use. In this regard, the tool will generate four (4) reports:

- a) Surveillance outcome report: type of findings recorded, deadline for correction, date of correction and date of acceptance of corrective action by the CAA.
- b) Trend report of the results of the applied CLs: results of the number of satisfactory, unsatisfactory or non-applicable questions. Also, results grouped by hazard taxonomy, by guidance, ratio of guidance not implemented to risk in terms of severity of the associated hazard, percentage of effective implementation of applicable regulatory requirements or regulations, among others.
- c) Reports of RBS planning in terms of frequency and scope of surveillance tasks.
- d) Information on the resulting trends will be presented in graphs and in pre-established State data tables.

7. Records

7.1 The CAA shall retain and maintain the records associated with RBS planning, as evidence of the determination of the frequency, scope and sample of surveillance activities, as well as the analyses of available safety information on the basis of which the frequency and scope of the surveillance plan was modified.

7.2 Following is a list, which should not be regarded as rigorous, of the records to be kept and the recommended retention periods:

- c) The ORP and its corresponding IdR, initially applied to establish the baseline of the RBS. Also, all the spreadsheets used in the determination of this baseline ORP. It is recommended that they be kept for at least five (5) years;
- d) The analysis of the available safety information used in the modification of the frequency and scope of the RBS applied in the RBS cycle. It is recommended that it be kept for at least two (2) years.

APPENDIX A TO CHAPTER 2 – AIR OPERATOR RISK PROFILE QUESTIONNAIRE (SURVEILLANCE)

1. The air operator risk profile (ORP) will be applied during the establishment of the RBS baseline for the air operator, as per LAR 121, or LAR 135.
2. In the right column, write the 3, 2 or 1 risk level value, depending on what better describes the current situation of the service provider, in accordance with each of the questions.
3. If there is insufficient data to establish the risk factor situation, if the reply provided by the air operator or the data are not credible or cannot be verified, or if the topic addressed in the question has not been developed by the air operator, assign a value of 3.
4. ORP risk factors are weighted to establish the individual impact of each factor on the global calculation of the ORP. This weighting is carried out by dividing 100 by the number of factors applicable and, then, on the basis of the average value of each factor, modifying it to a greater value than the average, if it is considered that they have a greater individual influence over the organisation's risk profile or, on the contrary, weight with a value lower than the average, if it is considered that they have a lesser influence over the organisation's risk profile (refer to weighting column).
5. For each risk factor there are three (3) levels, which correspond to the following:
 - a) Level 3, least desirable, in terms of the organisation risk profile;
 - b) Level 2, average; and
 - c) Level 1, most desirable.
6. Each level selected is associated to an arithmetical value of 1 for Level 1, 2 for Level 2 and 3 for Level 3. Once the arithmetical value corresponding to the risk factor level is determined, this value will be combined with the weighting assigned to each risk factor, which will result in a score.
7. The score obtained from each risk factor will be added, and the result will produce a number from 1 to 5, which will be associated with the range of the total score obtained, and will qualify the training centre's ORP. The air operator category will correspond to the following:
 - (1): **very low** air operator risk profile;
 - (2): **low** air operator risk profile;
 - (3): **moderate** air operator risk profile;
 - (4): **high** air operator risk profile; and
 - (5): **very high** air operator risk profile.
8. Once the profile is completed, add the values in the right column in order to obtain the ORP value, as per Table 2-A-1 In Appendix A to Chapter 2.

Table 2-A-1 – Air operator risk profile questionnaire

		RISK LEVEL/ PROFILE (AIR OPERATOR)					
Item	AIR OPERATOR risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
1	Perception of the general public	Perceived as an unwanted air operator - from the perspective of the employee or customer	Perceived as an average air operator - from the perspective of the employee or customer	Perceived as a desirable air operator - from the perspective of the employee or customer	1 2 3	1.19	1.19 2.38 3.57
2	Air operator financial status	The air operator faces major financial problems From 10 to 50 points	The air operator faces some financial problem From 51 to 79 points	The air operator seems not to face any financial problems From 80 to 100 points		1.19	
3	Air operator experience (years of operation)	More than 5 years	Between 5 and 10 years	More than 10 years		1.39	
4	Air operator safety culture	Individual employees and the air operator in general show lack of interest or have a negative attitude or behaviour regarding safety and quality issues	Individual employees or the air operator in general do not manifest any consistent positive or negative attitude or behaviour regarding safety and quality issues	Individual employees and the air operator show a positive and healthy attitude and behaviour regarding safety and quality issues		1.59	

		RISK LEVEL/ PROFILE (AIR OPERATOR)					
Item	AIR OPERATOR risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
5	Experience and qualifications of the manager (as of the date of the evaluation)	Has less than 3 years experience in aviation and no technical qualifications	Has more than 3 years experience in aviation or technical qualifications	Has more than 3 years experience in aviation and the technical qualifications in aviation		1.59	
6	Accountable manager – Safety/quality functions	There are no safety / quality functions in the terms of reference (TORs) of the accountable manager	The TORs of the accountable manager have a negligible or indistinct mention of safety / quality functions	The final responsibility for safety and quality is clearly stated in the TORs of the accountable manager		1.59	
7	Experience and qualifications of the safety manager (SM)	Has less than 5 years experience in civil aviation safety / quality, or has no technical qualifications	Has more than 5 years experience in civil aviation safety / quality, and technical qualifications in aviation	Has more than 15 years experience in civil aviation safety / quality, and technical qualifications in aviation		1.59	
8	Experience and qualifications of the quality system manager (QM)	Has less than 5 years experience in QM, or has no technical qualifications	Has more than 5 years experience in QM, and has technical qualifications	Has more than 15 years experience in QM, and has technical qualifications		1.39	

		RISK LEVEL/ PROFILE (AIR OPERATOR)					
Item	AIR OPERATOR risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
9	Multitasking of safety / quality management (SM / QM) personnel	The safety manager (SM) or quality manager (QM) holds other executive position(s) within or outside the air operator	The TORs of the safety manager (SM) or quality manager (SM) include other functions not directly related to safety / quality. For example: information technology (IT), administration, training, etc.	The Safety Manager (SM) and Quality Manager (QM) do not hold any other executive position(s) within or outside the air operator and their terms of reference do not include other functions directly related to quality / safety		1.39	
10	Safety responsibility structure	The safety management function / manager's office is responsible for, or subordinate to, some operational functions	The safety management function / office / manager is accountable to senior management, and is independent of all operational functions	The safety management function / office / manager has direct responsibility and reports to the chief executive officer (CEO)		1.79	
11	Quality responsibility structure	The quality management function / office / manager, is responsible for, or subordinated to, some functions unrelated to quality / safety	The quality management / office / manager function is accountable to senior management and is independent of all operational functions	The quality management function / office / manager has direct responsibility and reports to the chief executive officer (CEO)		1.39	

		RISK LEVEL/ PROFILE (AIR OPERATOR)					
Item	AIR OPERATOR risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
12	Ratio of safety and quality control personnel to all technical operational personnel	1 to more than 20	1 to 15 and 20	1 to less than 15		1.19	
13	Combined turnover of accountable manager, safety manager, quality manager and flight instructors during the last 36 months	3 or more	2	1 to none		1.39	
14	Status of growth or decline of the air operator (degree of change in the size and/or scope of its operations)	The air operator faces major problems relating to growth/ decline From 8 to 39 points	The air operator faces some problems relating to growth/ decline From 40 to 54 points	The air operator faces no major problems relating to growth/ decline From 55 to 80 points		1.19	
15	Average age of the fleet	> 12 years	8 to < 12 years	< 8 years		1.19	
16	Equipment and tools	Analogue	Analogue/digital	Digital		1.39	
17	Multiplicity of aircraft types	More than 4 aircraft types	3 to 4 aircraft types	Less than 3 aircraft types		1.19	
18	CAA inspections – number and level of findings (in the last 24 months)	Any Level 3 finding, or more than Level 2 findings for the period under evaluation	No more than three Level 2 findings for the period under evaluation	No Level 3 or Level 2 finding for the period under evaluation		1.39	

		RISK LEVEL/ PROFILE (AIR OPERATOR)					
Item	AIR OPERATOR risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
19	CAA inspections - Air operator inspection finding rate (Level 3 and 2 findings only, observations are excluded) for the last 24 months	Any Level 3 finding, or five findings per inspection per aircraft	More than 1 finding per inspection per aircraft	Less than 1 finding per inspection per aircraft		1.39	
20	CAA inspections - Line station inspection finding rate (Level 3 and 2 findings only, excluding observations) for the last 24 months	Any Level 3 finding, or more than three findings per inspection per line station	More than 0.5 findings per inspection per line station	Less than 0.5 findings per inspection per line station		1.39	
21	Hazard identification and risk assessment (HIRA) programme	Has no active and functional HIRA programme	Has a HIRA programme in place. Has completed or reviewed 1 to 3 risk assessment projects (for all operational employees) in the past 12 months	Has a HIRA programme in place, for all main operational areas		1.79	
22	Mandatory reporting incident rate (per 1000 flight hours (FH)) for the last 24 months	More than 0.4 incident per 1000 FH	Between 0.2 and 0.4 incidents per 1000 FH	Less than 0.2 incident per 1000 FH		1.39	
23	In-flight shutdown (IFSD) rate due to maintenance or	More than 0.08 incidents per 1000 FH	Between 0.04 and 0.08 incidents per 1000 FH	Less than 0.04 incidents per 1000 FH		1.39	

		RISK LEVEL/ PROFILE (AIR OPERATOR)					
Item	AIR OPERATOR risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
	operational problems every 1000 FH						
24	Average application rate of the fleet's minimum equipment list (MEL) per 1000 FH (over the last 24 months)	More than 30 MEL applications every 1000 FH	Between 10 and 30 MEL applications every 1000 FH	Less than 10 MEL applications every 1000 FH		1.39	
25	Application rate of exemptions granted by the CAA per aircraft	More than 1 exemption per year	Between 0.5 and 1 exemptions per year	Less than 0.5 exemptions per year		1.39	
26	Person presiding air operator's safety committee	There is no SMS committee, or it is presided by junior management	The SMS committee is chaired by the SMS/QMS deputy accountable manager or manager directly answering to the SMS accountable executive	The SMS committee is presided by the SMS accountable executive		1.39	
27	Compliance with safety objectives and targets	In the twelve (12) months prior to surveillance, any SPI exceeded one point above alert 3 standard deviation (SD), two consecutive points exceeded alert 2 SD, or 3 consecutive points exceeded alert 1 SD	In the twelve (12) months prior to surveillance, any SPI has exceeded one point above alert 1 SD	In the twelve (12) months prior to surveillance, no SPI has exceeded the alert levels		1.39	

		RISK LEVEL/ PROFILE (AIR OPERATOR)					
Item	AIR OPERATOR risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
28	Availability of environmental protection programme	Non-existent	Isolated participation, or isolated aviation environmental protection programme	Routine programme and regular participation in the aviation environmental protection programme		0.99	
29	Flight data analysis programme (FDAP) (only for LAR 121 operators)	Programme has not been implemented	Programme has been implemented, but mitigation measures are not being controlled	The programme has been properly implemented		1.39	
30	Monitoring of technical management of the fleet	Hires another air operator more than 10 times per month	Partial hiring of an external organisation	Internal management by the air operator		1.39	
31	Use of hired technical personnel	More than 15% of personnel hired (from another organisation) to carry out engineering and/or technical functions	5 to 15% of personnel hired (from another organisation) to carry out engineering and/or technical functions	<5% of hired personnel hired (from another organisation) to carry out engineering and/or technical functions		1.19	
32	Traffic inspection certification by pilot, technician or aircraft maintenance mechanic (AME)	The pilot certifies traffic inspection	A technician (with limited rating) certifies traffic inspection	Only a (rated) AME certifies traffic inspection		1.59	

		RISK LEVEL/ PROFILE (AIR OPERATOR)			Result	Weighting	Score
Item	AIR OPERATOR risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
33	Hazard reporting system	None implemented	Voluntary hazard reporting system implemented	Voluntary hazard reporting system implemented. In addition to a hazard identification procedure in conjunction with the incident investigation process		1.39	
34	Procedures for incident reporting and investigation and for corrective measures	There are no documented procedures for incident reporting and investigation or implementation of corrective measures	There are documented procedures for incidents reporting and investigation, and implementation of corrective measures	There are documented procedures for incident reporting and investigation, and implementation of corrective measures, accepted by the CAA		1.39	
35	Promotion and participation in industry safety information exchange, including among air operators	None	Limited participation	Positively involved in the promotion and participation		1.19	
36	Regulatory compliance rate based on the risk severity assessment for each guideline for the review of evidence from the checklists	≥ 0.47	$> 0.25 \leq 0.47$	≤ 0.25		1.59	

		RISK LEVEL/ PROFILE (AIR OPERATOR)					
Item	AIR OPERATOR risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting	Score
	used in the RBS of a air operator						
37	Level of effectiveness of the safety management system (SMS) processes in an air operator	≤ 184.5 points	> 184.5 ≤ 369 points	> 369 points		50.00	
TOTAL SCORE							

CHAPTER 3

EXAMPLE OF A RISK-BASED SURVEILLANCE (RBS) PLANNING METHODOLOGY FOR THE AREA OF AIRWORTHINESS (AIR)

1. Objective

This chapter provides guidelines and guidance to CAA inspectors with respect to the methodology for planning the RBS of approved maintenance organisations (AMO) that provide maintenance to aircraft and aircraft components. This methodology permits prioritising RBS activities for those AMOs exposed to a greater risk level and, therefore, guarantees a more efficient use of CAA resources.

2. Scope

This methodology is only based on data collected through questionnaires and CLs, under the proactive safety data collection method.

3. Introduction

3.1 The methodology for planning the RBS of each AMO uses the combination of the following two (2) values:

- c) risk indicator (IdR); and
- d) exposure indicator (IdE).

3.2 The IdR for an AMO is obtained from applying the organisation risk profile (ORP) with regard to the determination of its risk characteristic, according to risk factors predetermined by the CAA. IdR is the numerical expression of the ORP.

3.3 On the other hand, the IdE of an AMO is determined by the size and complexity of its operations. The IdE is the numerical expression of AMO exposure to risk.

3.4 The IdR and IdE combination is used to determine the type, size of the sample and frequency of the audits and inspections that should be conducted on each AMO within a specific period of time.

3.5 The inspector shall use the RBS planning Excel spreadsheet to record the necessary information to determine the IdR and IdE, and the tool will calculate surveillance intensity and the size of the sample to examine.

3.6 The criteria to modify both the frequency and the scope of each surveillance activity are described in the manual of the airworthiness inspector (MIA).

4 Classification of risk-based surveillance activities

4.1 All CAA RBS activities can be grouped into two (2) categories: scheduled and unscheduled, announced or unannounced, where scheduled activities are those conducted at given intervals established in the RBS plan and, the unscheduled, are those carried out in response to negative trends, performance outside the alert control criteria, uncertain or unforeseen events such as accidents, incidents, increased IdR, changes in the IdE, complaints, etc.

4.2 Regarding scheduled surveillance activities, the ACC will:

- a) determine an IdR and an IdE for each AMO, using the methodology outlined in paragraphs 5.5 and 5.6 in this chapter;

- b) establish and implement an RBS programme for the AMO sector, using the procedures established in the MIA and in this section;
- c) draft an RBS plan for each AMO, on the basis of the current RBS programme, using the procedures established in the MIA and in this section; and
- d) continuously calibrate the RBS plan of each AMO, based on their actual performance and on the frequency and scope modification criteria established in the MIA.

4.3 With regard to unscheduled RBS activities, the CAA will continuously monitor: the safety performance of each AMO, the RBS activity results, any undesirable trends, as well as any other sources of information, in order to determine whether it is necessary to conduct surveillance activities in addition to those inspections scheduled in the maintenance organisation's surveillance plan.

5 Determination of the type and frequency of inspections

5.1 The RBS plan that the CAA must develop for each AMO will contain the type of activities to be carried out, and the specific calendar for their implementation, as well as the scope of each activity, as applicable.

5.2 In the area of maintenance organisations, the CAA will inspect the following:

- a) the maintenance organisation manual (MOM);
- b) the failure, malfunction and defect reporting system;
- c) the competence and availability of AMO personnel involved in the tasks of maintenance, inspection, quality and safety management systems (SMS), and will also examine personnel interfaces;
- d) facilities used for maintenance and inspection of aircraft and aircraft components;
- e) equipment, tools and materials;
- f) maintenance data;
- g) the process for issuing maintenance conformity certificates to aircraft or aircraft components;
- h) maintenance record management;
- i) inspection, maintenance and quality systems; and
- j) safety management systems (SMS).

5.3 The CAA will draft an annual RBS plan for every AMO, in accordance with the procedure hereunder.

5.4 Identification of the service provider

The first step in the planning process is to identify the AMO for which the surveillance plan will be developed. While obvious, this is a very important step because each surveillance plan is unique to each organisation, given the size, risk profile and complexity combination. Surveillance criteria applicable to the AMO will also be established in accordance with the criteria set forth in the MIA.

5.5 Determination of the risk indicator (IdR)

5.5.1 The IdR of the AMO is obtained from the application of the ORP developed by the CAA, which will be processed by the group of airworthiness inspectors (AI) during the initial (baseline) surveillance of the AMO and then continuously when the CAA considers that the air operator has undergone changes that may modify its ORP.

5.5.2 The IdR is obtained from a combination of risk data collected by the CAA. This indicator is a representation of the probability that the risks are being adequately managed by the AMO. The methodology used to determine the IdR for an AMO is detailed in this paragraph and in Appendix A to this chapter.

5.5.3 The IdR is the numerical representation of the changes and/or circumstances associated with an AMO's potential for unsafe conditions or regulatory non-compliance. The IdR results from a profile developed from 50 weighted risk parameters and three (3) levels of risk depending on the specific situation of the air operator, which would correspond to an arithmetical value of 1 (most desirable), 2 (average) and 3 (least desirable) and which would be aggregated into a scoring system expressed in the following five (5) risk categories of the air operator according to the range of the score determined by the airworthiness inspectors during surveillance:

- 1: **very low** organisation risk profile
- 2: **low** organisation risk profile
- 3: **moderate** organisation risk profile
- 4: **high** organisation risk profile
- 5: **very high** organisation risk profile.

5.5.4 The first ORP is determined from the one shown in Appendix A of this chapter and is obtained through a weighted scoring system and can reach a result between one hundred (100) and three hundred (300) points when applying the risk factors. This value will be used in the calculation of the IdR by applying the criteria of Table 3-1.

Table 3-1 – AMO risk indicator (IdR)

ORP result	IdR value	Category of the organisation represented in risk profile (ORP)	Definition
> 0 < 140	1	Very low ORP	Very high probability that risk is being adequately managed
≥ 140 < 180	2	Low ORP	High probability that risk is being adequately managed
≥ 180 < 220	3	Moderate ORP	Moderate probability that risk is being adequately managed
≥ 220 < 260	4	High ORP	Low probability that risk is being adequately managed
≥ 260 ≤ 300	5	Very high ORP	Very low probability that risk is being adequately managed

5.5.5 The CAA must have a database to store all the results of surveillance activities, enabling it to determine at any time the score of the risk parameter related to regulatory compliance for each AMO. Likewise, a database will be available to identify which part of the requirement is presenting findings based on the established coding and its impact on the safety risk in terms of the associated hazard. For example, if the adequacy of staff competence, whose coding is 145-II-6-1, is being verified, and the requirement question has two orientations, each orientation will be identified as II-6-1-1 and II-6-1-2 and will belong to a predetermined related hazard taxonomy. This permits an objective determination of what part of the requirement question is the one in trouble, while allowing for control in any computer system used for trending.

5.5.6 The CAA shall use the result of this assessment in the decision-making process and to follow up on deficiencies identified in inspections and/or audits conducted under the State's risk-based safety oversight programme.

5.5.7 The IdR value obtained shall be transferred to Table 3-4 - RBS frequency matrix, to determine the frequency of surveillance.

5.6 Determination of the exposure indicator (IdE)

5.6.1 The exposure indicator (IdE) of an AMO is determined by the size and complexity of the activities carried out by the organisation. The IdE is the numerical representation of the AMO's exposure to risk and the likelihood that the consequences of those risks will materialise. This indicator is determined according to:

- a) the size of the organisation;
- b) number of employees;
- c) number of additional bases, if applicable;
- d) number of ratings; and
- e) number of limitations.

5.6.2 The IdE is also determined according to a scoring system. This value is the representation of the AMO's impact on the aviation system.

5.6.3 Using Table 3-2, the values described in the central rating column must be entered in the right-hand column.

Table 3-2 – AMO exposure indicator (IdE), scoring system

Criterion	Rating	Value
Size of the organisation	Large = 3 points Medium = 2 points Small = 1 point	3 2 1
Number of employees	More than 20 = 3 points 6 to 20 = 2 points Up to 5 = 1 point	
Number of additional bases	Additional national and international bases = 3 points Additional domestic bases = 2 points Main base only = 1 point	
Number of ratings	4 or more = 3 points Up to 3 = 2 points 1 = 1 point	
Number of limitations	<u>For aircraft:</u> 6 or more = 3 points Up to 5 = 2 points Up to 3 = 1 point <u>For components:</u> 16 or more = 3 points Up to 15 = 2 points Up to 10 = 1 point	
Total score:		

5.6.4 Once the assignment of values is finished, add the values in the right column and use Table 3-3 to obtain the exposure indicator.

Table 3-3 – Determination of the exposure indicator, in letters

Total score Table 3-2	Description	Letter
$\geq 5 < 7$	Very low impact on the aviation system. Very low exposure to hazards.	A
$\geq 7 < 9$	Low impact on the aviation system. Low exposure to hazards.	B
$\geq 9 < 11$	Moderate impact on the aviation system. Moderate exposure to hazards.	C
$\geq 11 < 13$	High impact on the aviation system. High exposure to hazards.	D
$\geq 13 \leq 15$	Very high impact on the aviation system. Very high exposure to hazards.	E

5.6.5 The letter obtained in Table 3-3 should be transferred to Table 3-4 – RBS frequency matrix.

5.7 Determination of frequency

5.7.1 The combination of IdR and IdE is used to determine the frequency and scope of surveillance that should be conducted on each AMO in a specific time period. It is also used to modify the frequency and scope of RBS in real time and on a continuous basis.

5.7.2 The frequency of surveillance applicable to each AMO is determined using the risk-based surveillance (RBS) planning Excel spreadsheet, on the basis of the IdR and IdE, and using Table 3-4 below. According to the result, the level of intensity may be rigorous (12 months), normal (24 months) or reduced (36 months), thus establishing the frequency of surveillance.

Table 3-4 – RBS frequency matrix

RBS frequency		Risk indicator (IdR)				
		Very high	High	Moderate	Low	Very low
Exposure indicator (IdE)		5	4	3	2	1
Very high	E	5E	4E	3E	2E	1E
High	D	5D	4D	3D	2D	1D
Moderate	C	5C	4C	3C	2C	1C
Low	B	5B	4B	3B	2B	1B

RBS frequency		Risk indicator (IdR)				
		Very high	High	Moderate	Low	Very low
Exposure indicator (IdE)		5	4	3	2	1
Very low	A	5A	4A	3A	2A	1A

	RBS intensity level		
	Rigorous	Normal	Reduced
RBS frequency	12 months	24 months	36 months

5.8 Determination of the scope of surveillance

Once the CAA has available, reliable and sufficient safety data and has the ability to determine the areas of greatest safety concern or need, through the processing and analysis of all safety information that unequivocally points to this situation and once undesirable trends have been identified, it will proceed to design inspections, audits and surveys focused on the areas where the consequences of risks are most likely to materialise. In view of this, the CAA shall require the implementation of appropriate measures, continuous improvement of safety performance, and early control of events that could potentially be catastrophic and cause damage and fatalities. Further guidance on determining and/or modifying the scope of RBS activities is provided in the MIA.

5.9 Determination of the sample

5.9.1 Using the risk-based surveillance (RBS) planning Excel worksheet, and considering that inspecting 100% of all activities, *e.g.*, records, maintenance data, etc., of an AMO is impractical and, in some cases, unnecessary, the sampling method will be applied to determine a sample size appropriate to the IdR and IdE of each organisation, and thus determine the appropriate number of each type of inspection as listed in Paragraph 5.2. Sampling is a scientific research tool to determine which part of a reality under study (population or universe) should be examined in order to make inferences about that population. Sampling consists of randomly selecting a representative part of the universe or population, inspecting it and deciding whether it meets certain specifications, in this case, compliance with the applicable requirements. This method will be applied to determine the sample of facilities, records, tools, personnel, etc., to be inspected based on the total number of these and the IdR and IdE levels of each service provider.

5.9.2 The inspector shall use the RBS planning Excel spreadsheet to record the information required to determine IdR and IdE, and the tool will calculate the frequency and scope of surveillance, as well as the size of the sample to be examined, using the International Organization for Standardization (ISO) sample model.

Tabla 3-5 – RBS frequency matrix

Combinations Table 3-6-4	of	3E, 4D, 4E, 5C, 5D, 5E	1D, 1E, 2C, 2D, 2E, 3B, 3C, 3D, 4A, 4B, 4C, 5A, 5B	1A, 1B, 1C, 2A, 2B, 3A
RBS frequency		Rigorous (12 months)	Normal (24 months)	Reduced (36 months)
Population		Sample		
2 to 8		3	2	2
9 to 15		5	3	2
16 to 25		8	5	3
26 to 50		13	8	5
51 to 90		20	13	5
91 to 150		32	20	8
151 to 280		50	32	13
281 to 500		80	50	20

5.9.3 If the result of entering the IdR and IdE of an AMO "X" in the surveillance intensity matrix is 5D, then a "rigorous" criterion will be applied to the frequency of inspections. To this end, the sample values included in the second column of Table 3-5 will be used. For example, if AMO "X" has a total of twenty (20) maintenance conformity certifiers (population), then eight (8) inspections of the competency of this staff (sample) will be included in the annual surveillance plan.

5.10 Development of the surveillance plan for each AMO

For the development of the surveillance plan, the following criteria will be applied according to the type of inspection:

5.10.1 **Main base inspection** – A base inspection, or base audit, is composed of nine (9) sub-inspections. This inspection/audit shall be completed, whenever possible, on a continuous basis, trying to avoid that the 9 sub-inspections are completed in a very long period of time. Base inspections/audits provide a very good indication of the level of regulatory compliance and safety performance of the AMO, as they address a number of factors.

5.10.2 Depending on the level of surveillance intensity obtained from the matrix, the frequency of base inspections/audits of an AMO may vary between 12, 24 or 36 months, according to the following table:

	RBS intensity level		
	Rigorous	Normal	Reduced
RBS frequency	12 months	24 months	36 months

5.10.3 **Inspections to additional bases.** – According to the size and complexity of the organisation, the number of additional bases to be inspected each year will be determined. Inspections will be distributed equally throughout the year. The distribution of additional domestic and international bases to be inspected shall be directly related to the total number of additional national and international bases of the service provider, as applicable. Whenever possible according to the size of the sample, priority shall be given to the additional base with the largest amount of workload and the additional base with the smallest workload. The additional bases inspected will vary from year to year to eventually cover 100%.

6. RBS tools using questionnaires and CLs only

6.1 The proposed Excel solution will reduce the time required by users to complete each phase of the process by providing consistent workflows. The proposed and installed system architecture is component-based and highly customisable to allow deployment of those components to build an exact fit solution.

6.2 The Excel solution architecture:

- a) provides one-time data entry to avoid duplication of effort, minimise entry errors, and improve workflow and operational process efficiency; and
- b) is based on simple implementation procedures.

6.3 The five (5) spreadsheets were developed in MS Excel 2016.

6.4 Detailed explanation of the spreadsheets that are part of the Excel tool for planning the RBS of AMOs

The State will be required to implement the five (5) spreadsheets detailed below:

- a) Spreadsheet for compiling the results of the CLs used in risk-based surveillance audits and inspections;
- b) Spreadsheet for compiling the results of the SMS effectiveness assessment tool;
- c) Central database spreadsheet containing the results of risk-based surveillance activities;
- d) Spreadsheet for planning the RBS and for changing the frequency and scope; and
- e) Safety performance indicators (SPI) diagram book with target and alert level settings for monitoring safety performance.

6.4.1 **Spreadsheet for compiling results of LCs used in risk-based surveillance audits and inspections**

6.4.1.1 This spreadsheet includes the CLs used in RBS inspections and shall process the results of regulatory requirement compliance statements expressed as:

- a) Satisfactory;
- b) Not satisfactory; or
- c) Not applicable.

6.4.1.2 In the same sense, this spreadsheet shall process the results of the status of implementation and IdRs that correspond to the review of the evidence or proof presented by the service provider, in order to comply with the guidelines for the examination of such evidence or proof. These results shall correspond to the following:

- a) Not applicable / IdR not applicable;
- b) Implemented / IdR not applicable;
- c) Not implemented / IdR negligible
- d) Not implemented / IdR minor
- e) Not implemented / IdR major
- f) Not implemented / IdR hazardous
- g) Not implemented / IdR catastrophic

6.4.1.3 Although there are five (5) categories for the evaluation of the status of implementation of each guideline in the requirement, the IdR for each guideline has been pre-defined in the CLs, based on an analysis of the severity of the consequence of the associated hazard.

6.4.1.4 The CL guidelines will be identified with a unique and predefined code using the hazard taxonomy to which they correspond in cases of non-compliance. With the identification and grouping by taxonomy it is expected to identify trends by failures, defects, malfunctions and incidents, as well as by types of service providers and by aviation sectors.

6.4.1.5 This spreadsheet includes a worksheet that shows the taxonomy of the hazards involved in the evidence review guidance so that users can refer to this taxonomy.

6.4.1.6 This tool will determine the ORP risk factor corresponding to the rate of regulatory compliance, based on the assessment of the severity of the risk of each LC evidence review guideline used in an AMOs RBS.

6.4.2 **Spreadsheet for compiling the results of the SMS effectiveness assessment tool**

6.4.2.1 This workbook has been developed in accordance with the SMS effectiveness assessment tool elaborated by the SRVSOP Technical Committee (CT) on the basis of the document published by the Safety Management International Collaboration Group (SM ICG).

6.4.2.2 With this tool, State inspectors will evaluate the components and elements within the SMS framework, distributed in forty-seven (47) compliance and performance indicators that permit determining the level of maturity of the SMS processes.

6.4.2.3 A weighted scoring system will be applied, which logically expresses the maturity of the SMS processes. For each indicator and as per its importance regarding SMS maturity, the following scores will be assigned: 0.5 low, 1 moderate, 1.5 high and 2 very high.

6.4.2.4 For the maturity levels expressed as present (P), satisfactory (S), operational (O) and effective (E), the arithmetical values 1, 2, 3 and 4 will be assigned, respectively. Once the level of maturity of each compliance and performance indicator is determined, the arithmetical values assigned will be added and multiplied by the weighting. Also, the result of each indicator will be totalled into the arithmetical sum, resulting in a total score.

6.4.2.5 Finally, the range in which the total score falls will express the situation corresponding to the risk parameter of the air operator's ORP related to the level of maturity of its SMS.

6.4.2.6 This tool will determine the risk factor of the ORP corresponding to the level of effectiveness of the AMOs SMS processes.

6.4.3 **Central database spreadsheet containing the results of risk-based surveillance activities**

6.4.3.1 This spreadsheet contains the fields for the type of findings recorded, the description of the findings, unmet regulatory requirements, correction deadline, correction date, date of acceptance of corrective actions by the CAA, as well as the decisions, gradual compliance measures and follow-up carried out by the CAA.

6.4.3.2 This tool will determine the risk factor of the ORP corresponding to the rate of audit/inspection findings by the CAA for the air operator (level 2 and 3 only, observations are excluded) for the last 24 months.

6.4.4 **Spreadsheet for risk-based surveillance planning (RBS) and frequency and scope modification**

6.4.4.1 The purpose of this spreadsheet is to determine the frequency and scope of the surveillance activities conducted through safety audits, inspections or surveys. In addition, this book will permit modifying surveillance frequency and scope, upon considering the continuous performance of the AMO, as well as other safety sources and performances for said AMO.

6.4.4.2 The AMO's IdR shall be determined through application of the ORP, consisting in a specific number of risk parameters applicable to the AMO. In average, AIR will have fifty (50) risk parameters per AMO.

6.4.4.3 The risk parameters of the ORP will be weighted to establish the individual impact of each parameter on the overall calculation of the ORP. This weighting would be done initially by dividing 100 by the number of applicable parameters and then, depending on the average value of each parameter, changing it to a value greater than the average, if it is considered to have a greater individual impact on the risk profile of the air operator or, conversely, weighting it with a value less than the average if it is considered to have a lesser impact on the risk profile of the organisation.

6.4.4.4 Each risk parameter has three (3) levels, corresponding to the following:

- a) Level 3, least desirable in terms of ORP;
- b) Level 2, average; and
- c) Level 1, most desirable.

6.4.4.5 Each level selected is associated to an arithmetical value of 1 for Level 1, 2 for Level 2 and 3 for Level 3. Once the arithmetical value corresponding to the level of each risk parameter is determined, this value will be combined with the weighting assigned to each risk parameter, which will result in a score.

6.4.4.6 The score obtained for each risk parameter will be added, and the result will produce a number from 1 to 5, which will be associated with the range of the total score obtained, and will qualify the air operator's ORP. The ORP category of the service provider will correspond to the following:

- 1: **very low** organisation risk profile;
- 2: **low** organisation risk profile;
- 3: **moderate** organisation risk profile;
- 4: **high** organisation risk profile; and
- 5: **very high** organisation risk profile.

6.4.4.7 The IdE of the service provider must then be determined and calculated based on a five (5) variable scoring system for each organisation that will indicate the level of exposure of the

organization's activities, in terms of size and complexity, and their impact on the safety management of the State's aviation system. For each variable, three (3) possible scenarios are established with an arithmetical value score from 1 to 3, where 1 would be the score of the variable expressing minimum complexity, 2 significant complexity and 3 greater complexity. The result of each variable will be added up and the total will be placed in the range corresponding to the letters A to E. The exposure level will correspond to the following:

- A: Very low** impact on the aviation system;
- B: Low** impact on the aviation system;
- C: Moderate** impact on the aviation system;
- D: High** impact on the aviation system; and
- E: Very high** impact on the aviation system.

6.4.4.8 The RBS planning tool includes a monitoring frequency and scope modifier that will be a matrix where the IdR and IdE will be switched. If the result falls in the red region, surveillance frequency and scope will be rigorous; if it falls in the yellow region, surveillance frequency and scope will be normal; and if it falls in the green region, surveillance frequency and scope will be reduced. See Table 3-6.

Table 3-6 – RBS frequency determination matrix

RBS frequency		Risk indicator (IdR)				
		Very high	High	Moderate	Low	Very low
Exposure indicator (IdE)		5	4	3	2	1
Very high	E	5E	4E	3E	2E	1E
High	D	5D	4D	3D	2D	1D
Moderate	C	5C	4C	3C	2C	1C
Low	B	5B	4B	3B	2B	1B
Very low	A	5A	4A	3A	2A	1A

RBS frequency	RBS intensity level		
	Rigorous	Normal	Reduced
	12 months	24 months	36 months

6.4.4.9 **Appendix A** to this chapter shows the ORP of an AMO.

6.4.5 **SPI diagram book with target and alert level settings for monitoring safety performance**

With this tool, the ORP risk factor pertaining to compliance with safety and performance objectives and goals will be determined.

6.5 General search

General search includes retrieving records from the database, in accordance with search criteria specified by the user. The search can also cover other collections of information, such as on-screen data.

6.6 Advanced search

It may be necessary to add an advanced search to the system to make it as flexible as possible. The search module will be designed in such a manner that it isolates the specific details of the application's search. The search function has a series of limited data and, depending on its configuration, it can implement the required type of search without further intervention from the programmer. It should be possible to add other kinds of searches, related to other types of data, with relatively little effort.

6.7 Reports

There is a need to generate reports on the outcome of audits and inspections where the CLs have been used. The tool allows exporting the results in PDF format for easy use. In this regard, the tool will generate four (4) reports:

- a) Surveillance outcome report: type of findings recorded, deadline for correction, date of correction and date of acceptance of corrective actions by the CAA.
- b) Trend report of the results of the applied CLs: results of the number of satisfactory, unsatisfactory or non-applicable questions. Also, results grouped by hazard taxonomy, by guidance, ratio of guidance not implemented to risk in terms of severity of the associated hazard, percentage of effective implementation of applicable regulatory requirements or regulations, among others.
- c) Reports of RBS planning in terms of frequency and scope of surveillance tasks.
- d) Information on the resulting trends will be presented in graphs and in pre-established State data tables.

7. Records

7.1 The CAA shall retain and maintain the records associated with RBS planning, as evidence of the determination of the frequency, scope and sample of surveillance activities, as well as the analyses of available safety information on the basis of which the frequency and scope of the surveillance plan was modified.

7.2 Following is a list, which should not be regarded as rigorous, of the records to be kept and the recommended retention periods:

- a) The ORP and its corresponding IdR, initially applied to establish the baseline of the RBS. Also, all the spreadsheets used in the determination of this baseline ORP. It is recommended that they be kept for at least five (5) years;
- b) The analysis of the available safety information used in the modification of the frequency and scope of the RBS applied in the RBS cycle. It is recommended that it be kept for at least two (2) years.

APPENDIX A TO CHAPTER 3 – RISK PROFILE OF THE ORGANISATION (SURVEILLANCE)

9. The organisation risk profile (ORP) will be applied when establishing the RBS baseline for AMOs.
10. In the right column, write the 3, 2 or 1 risk level value, depending on what better describes the current situation of the service provider, in accordance with each of the questions.
11. If there is insufficient data to establish the risk factor situation, if the reply provided by the air operator or the data are not credible or cannot be verified, or if the topic addressed in the question has not been developed by the air operator, assign a value of 3.
12. The risk factors of the ORP are weighted in order to establish the individual impact of each factor on the global calculation of the ORP. This weightage is done by dividing 100 by the number of applicable factors and then, based on the average value of each factor, replace with a value above the average if it is felt that they have greater individual impact on the organisation risk factor, or with a value lower than average if it is felt that it has less impact on the organisation risk factor (see weighing column).
13. There are three (3) levels for each risk factor, as follows:
 - Level 3, least desirable, in terms of the organisation risk profile;
 - Level 2, average; and
 - Level 1, most desirable.
14. Each level selected is associated to an arithmetical value of 1 for Level 1, 2 for Level 2 and 3 for Level 3. Once the arithmetical value corresponding to the risk factor level is determined, this value will be combined with the weighting assigned to each risk factor, which will result in a score.
15. The score obtained for each risk factor will be added, and the result will produce a number from 1 to 5, which will be associated with the range of the total score obtained, and will qualify the service provider ORP. The ORP category of the service provider will correspond to the following:
 - (1): very low organisation risk profile;
 - (2): low organisation risk profile;
 - (3): moderate organisation risk profile;
 - (4): high organisation risk profile;
 - (5): very high organisation risk profile;
16. Once the profile is completed, add the values in the right column in order to obtain the ORP value, as per Table 1-A-1 In Appendix A to Chapter 3.

Table 1-A-1 – Approved maintenance organisation (AMO) risk profile questionnaire

		RISK PROFILE (AMO)					
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)	Result	Weighting (Weight)	Score
1	Feedback to measure overall acceptance by the organisation	Perceived as an undesirable AMO – from the point of view of the employee or customer.	Perceived as an average AMO – from the point of view of the customer or employee.	Perceived as a desirable AMO – from the point of view of the customer or employee.	1 → 2 → 3 →	0.82	1.76 3.52 5.28
2	AMO financial status	More losses than profits	Cover their costs most of the time	Consistently profitable		0.82	
3	AMO experience (years of operation)	< 5 years	5 to 10 years	> 10 years		1.02	
4	AMO safety culture	Individual employees and the AMO in general show lack of interest or have a negative attitude or behaviour regarding safety and quality issues.	Individual employees or the AMO in general do not manifest any consistent positive or negative attitude or behaviour regarding safety and quality issues.	Individual employees and the organisation show a positive and healthy attitude and behaviour regarding safety and quality issues.		1.02	
5	Experience and qualifications of the accountable manager (as of the date of evaluation)	Has < 3 years of aviation experience AND no technical qualifications	Has > 3 years of aviation experience OR technical qualifications	Has > 3 years of aviation experience AND technical qualifications in aviation		0.92	
6	Accountable manager – Safety / quality functions	There are no safety / quality functions in the TORs of the accountable manager	The TORs of the accountable manager make little or indistinct mention of safety / quality functions	The final responsibility for safety and quality is clearly stated in the TORs of the		0.92	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
				accountable manager			
7	Experience and qualifications of the executive accountable for safety (SM)	Has < 5 years experience in aviation safety / quality OR no technical qualifications in aviation	Has > 5 years experience in civil aviation safety / quality AND technical qualifications in aviation	Has > 15 year experience in civil aviation safety / quality AND technical qualifications in aviation		0.92	
8	Experience and qualification of the executive accountable for quality (QM)	Has <5 years experience in civil aviation quality control/quality assurance (QC/QA) OR no technical qualifications in aviation	Has >5 years experience in quality control/quality assurance (QC/QA) AND technical qualifications in aviation	Has >15 years experience in civil aviation quality control/quality assurance (QC/QA) AND technical qualifications in civil aviation		0.82	
9	Multitasking of safety/quality management (SM/QM) personnel	The safety manager (SM) or quality manager (QM) holds other executive position(s) within or outside the organisation	The TORs of the safety manager (SM) or quality manager (QM) include other functions not directly related to safety/quality. For example: information technology (IT), administration, training, etc.	The safety manager (SM) or quality manager (QM) does not hold any other executive position(s) within or outside the organisation and his/her terms of reference (TORs) do not include other functions directly related to quality/safety		0.82	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
10	Safety responsibility structure	The safety management function / office / safety accountable executive is responsible for, or subordinate to, some operational functions	The safety management function / office / safety accountable executive is accountable to senior management, and is independent of all operational functions	The safety management function / office / safety accountable executive has direct responsibility and reports to the accountable manager		0.82	
11	Quality accountability structure	The quality management/office/ manager is responsible for, or subject to, some functions not related to quality/safety	The quality management/office/ manager is accountable to top management and is independent of all operational functions	The quality management/office/ manager is directly accountable and reports to the accountable manager		0.82	
12	Ratio of internal safety and quality control personnel to all technical operational personnel	1: > 20	1:15 to 20	1: < 15		1.02	
13	Combined turnover of the accountable manager, safety accountable executive and quality accountable executive during the last 36 months	3 or more	2	1 or none		1.22	
14	Equipment and tools	Analogue	Analogue / Digital	Digital		1.12	
15	Multiplicity of aircraft rated for maintenance	> 4 types of aircraft	3 to 4 types of aircraft	< 3 types of aircraft		1.22	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
16	Rate of jobs rejected per 100 certifications issued	> 3	< 3 > 1	1 or less		1.02	
17	Attitude of management towards safety and compliance	The accountable manager is inactive or does not actively promote the development of an efficient safety culture within the organisation. No evidence of a positive safety culture in management or in individuals within the organisation. Individual responsibilities are not recognised and there does not appear to be any grasp of the 'big picture'. There is no operational 'risk assessment' mechanism.	The accountable manager is proactive in safety matters and there are safety procedures in place. The safety culture is widely understood, but there are minor individual lapses. Operational 'risk assessment' does take place.	Excellent attitude towards all aspects of safety within the organisation. The safety culture is well embedded and obvious (such as safety teams across organisational lines). Just culture is actively promoted.		1.02	
18	AMO audit/inspection by CAA – Overall performance rating	Year 2019: <75%	Year 2019: 76% to 90%	Year 2019: >90%		1.22	
19	Attitude towards risk-taking	Risk management is not considered at all. Risk-taking is	The concept of risk management is	All risks are eliminated, mitigated or insured by well-		1.22	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
		allowed without controls and/or no effort is made to monitor or assess risk.	understood but not well implemented.	understood mechanisms apparent at all levels of the organisation.			
20	Active hazard identification and risk assessment (HIRA) programme	No active HIRA programme in place	There is a HIRA programme in place. 1 to 3 risk assessment projects (for every 100 operational staff) have been completed in the last 12 months	A HIRA programme is in place for all areas		1.22	
21	Organisation's attitude towards the CAA	Will not accept free regulatory access to facilities, personnel. Audits are deliberately avoided. Information is deliberately withheld and not made available. Argumentative, deceitful and aggressive.	Accepts CAA access, but periodically questions timing or site. Audits conducted as expected, but does not willingly volunteer all the information. Open but engages in "gamesmanship".	Collaborates with CAA in projects and gives access to its facilities at any time. Volunteers information freely and without prompting. Cooperative and helpful. Accepting of comments and recommendations.		0.82	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
22	Challenges to rules	Deliberately breaches regulatory requirements. Commonly encourages an attitude of perceived licence to bend the rules. 'Problem' rules are deliberately flouted and actively campaigned against for economic advantage.	Meets minimum regulatory requirements. Questions rules from a self interest or industry perspective.	Exceeds regulatory requirements. Readily accepts interpretations. Actively participates and cooperates in formal processes to improve regulatory requirements.		1.22	
23	Safety, risk and quality management systems	There is little or no evidence of a sensible quality management system being in place. No evidence of any form of quality system or proactive management/ planning system evident. Safety management is ignored in favour of commercial priorities. No evidence of SMS. Risks are deliberately ignored. No training in risk management is provided and discussion about the subject is	A basic management system is in place and it may contain a quality assurance system. There are aspects/facets of the organisation's operations that have not been considered. Process and problem ownership is defined but some deficiency noted. A proactive planning system is in place. Some deficiencies in the planning or management system noted. Risks are evaluated but not always dealt with in a	A comprehensive documented quality management system is in place. The operator /management has clear visibility of issues confronting them and the quality system in place is designed to sensibly anticipate and/or cope with them. No deficiencies in the QMS were observed during the most recent CAA assessment. SMS best practices are evident. Risks are effectively evaluated		1.22	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
		discouraged. Communication regarding safety, risk and quality matters does not take place unless forced to by external reasons.	systematic formal manner. A general awareness of risk management is evident through informal processes. Lines of communication are defined.	and mitigated or eliminated. Continuous review and improvement. Training in risk management is provided to all relevant staff. Vertical, horizontal and matrix (project-oriented) free communications exist among all levels and units.			
24	Rate of application of internal technical deviations as a result of issues caused by maintenance provided by the AMO	> 3 concessions per year	1 to 3 concessions per year	No concession per year		1.02	
25	Rate of application of exemptions (exceptions, deviations, and extensions must also be considered) granted by the CAA to work outside of the main base	> 3 concessions per year	1 to 3 concessions per year	No concessions per year		1.02	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
26	SMS chair in the organisation/safety committee	SMS/safety committee is inexistent or chaired by low-level manager	SMS/safety committee is chaired by assistant accountable manager or SMS/QMS manager under direct responsibility of the SMS accountable executive	SMS/safety committee is chaired by the SMS accountable executive		1.02	
27	Full surveillance of the AMO by the CAA – Number and level of findings (in the last 24 months)	Any Level 3 finding, or more than three Level 2 findings for the period under evaluation per audit / inspection.	No more than three Level 2 findings for the period under evaluation per audit / inspection	No Level 3 or Level 2 finding for the period under evaluation per audit / inspection		1.22	
28	Surveillance of AMO additional bases by the CAA – Number and level of findings (in the last 24 months)	Any Level 3 finding or more than three Level 2 findings for the period under evaluation.	From 4 to 5 findings with a weighting of 1 per audit/inspection for each additional base	Zero to 3 findings with a weighting of 1 per audit/inspection for each additional base		1.22	
29	Fatigue management and alertness (daytime and nighttime roster).	Fatigue in staff is apparent. Activities beyond work shifts are overlooked. The roster by work shift ignores the fatigue management system. Performance allowances and bonuses encourage excessive service hours. It is very	Fatigue management system in place, but feedback indicators are not always applied. Rosters have minimum delivery time or briefings. Staffing is at its lowest level to allow for proper rest. Might become apparent if it builds up. Overall knowledge of	The organisation seeks and actively reviews fatigue feedback indicators. Off-service activity is monitored and incorporated into the system. Rosters are well designed and excel fatigue management principles. Staffing is		1.02	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
		difficult to take the corresponding rest period (days off or vacation) due to insufficient resources, and the accumulation of rest periods is excessive (days off or vacation). No fatigue management training provided and discussion of the issue is discouraged.	fatigue management is apparent through informal processes.	well beyond the minimum levels to allow for proper rest and leaving when necessary. Training in fatigue management principles provided to all relevant staff.			
30	Scope of quality assurance (QA) investigation processes and MEDA	Only applicable to internal quality assurance (QA) investigation processes for mandatory incidents	Internal quality assurance (QA) investigation processes for all reported incidents	Internal quality assurance (QA) investigation processes for all reported incidents + MEDA processes (or equivalent)		1.02	
31	Availability of the environmental protection programme	Inexistent	Isolated participation / Aviation environmental protection programme	Routine programme and regular participation in the aviation environmental protection programme		0.82	
32	Turnover of managers/supervisory personnel	All experienced staff have held their position <12 months	One experienced person has held	All experienced staff have held their position >24 months.		1.02	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
			his/her position <12 months.				
33	Technical management control	Hires another AMO more than 10 times per month	Partially hires an external organisation	Internal management does not require another AMO to perform contracts		1.02	
34	Use of hired technical staff	>15% of staff hired (from another organisation) for AMO functions	5 to 15% of staff hired (from another organisation) for AMO functions	<5% of staff hired (from another organisation) for AMO functions		1.22	
35	Industrial relations (AMO and labour union)	Employee and AMO representatives rarely meet before an industrial action is taken. Solutions are often externally imposed.	Employee and company representatives have a working relationship. Industrial problems occasionally result in limited actions.	Excellent work relationship characterised by full trust of employee representatives in the company and vice versa. Industrial problems are prevented before they occur.		0.82	
36	Staff morale	Morale is very low. Few staff have a good word to say about the organisation.	Morale is average. Most staff have good or "neutral" attitudes, only a very few have a negative attitude.	Morale is very good. Staff are positive and "optimistic" about this organisation.		0.82	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
37	Training programme	The organisation is not able to show that any training is effective. Ineffective training is not recognised.	The organisation is able to show that most of its training is effective. Where training is ineffective it is usually recognised as such and managed.	The organisation can show that all training is effective.		1.22	
38	Hazard reporting system	None implemented	Voluntary hazard reporting system implemented.	Voluntary hazard reporting system implemented. In addition to a hazard identification procedure concurrent with the incident investigation process.		1.22	
39	Incident reporting and investigation and procedures for corrective measures	There is no incident reporting or investigation, and there are no corrective measure procedures documented	Incident reporting and investigation or corrective measure procedures documented	Incident reporting and investigation, or corrective measure procedures documented and accepted by the CAA		1.22	
40	Promotion of, and participation in, the exchange of industry safety information, even among service providers	None	Limited participation	Positively involved in promotion and participation		0.82	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
41	Condition of facilities and equipment	Facility is inadequate for the operation. It poses a significant and obvious hazard to safety in some way; for example, cleanliness, lack of protection from the elements, lack of foreign object debris control, lack of signage, and lack of required safety equipment such as fire extinguishers.	Facility is adequate for the operation. Basically, it is well maintained and tidy. However, there are minor/occasional discrepancies/hazards noted.	Standards applied and maintained are considered to be well above minimum industry requirements.		1.02	
42	Tools / equipment / materials	Essential tools / equipment / materials are not provided or their condition is such that their use could pose a safety hazard. Control systems are significantly deficient.	Tools / equipment / materials are adequate, suitable for the job and well maintained. An adequate control system is in place, but some discrepancies are observed and corrected.	The assets used and maintained are considered to be way above the minimum industry standards.		1.02	
43	Management structure	A person holds more than 2 positions	One person holds 2 positions, all others hold 1.	Each person holds only 1 position.		0.82	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
44	Capability of senior persons	Senior persons do not seem to be capable of performing their jobs properly.	Most senior persons are effective at their jobs, but a small number would benefit from additional experience or training.	All senior persons are highly effective at their jobs.		0.82	
45	Record of documented actions, including consideration of actions (conditions, suspensions)	Has had certificate or licence suspension in the previous 12 months.	Has had documented action, less than suspension of certificate or licence, carried out in the last 5 years, but not current	No documented action has been considered within the last 10 years and no documented action has been considered as taken.		0.82	
46	Management of technical records and technical storage areas	Fully outsources the management of technical records and technical storage areas	Partially outsources the management of technical records and technical storage areas	Internal management of technical records and technical storage areas		1.02	
47	Effectiveness of AMO safety management system (SMS) processes	≤184.5 points	>184.5 ≤369 points	>369 points		50.00	
48	Rate of regulatory compliance based on the assessment of risk severity of each guideline for the review of evidence in checklists used in an AMO risk-based surveillance (RBS)	≥ 1.52	> 0.53 < 1.52	≤ 0.53		1.42	

		RISK PROFILE (AMO)			Result	Weighting (Weight)	Score
Item	Organisation risk parameter	Level 3 (Least desirable)	Level 2 (Average)	Level 1 (Most desirable)			
49	Sharing of AMO safety performance management information with the CAA	Gives access to information only when so requested by the CAA	Prepares periodic safety performance information reports	Gives continuous access to safety performance information		0.82	
50	Attainment of safety objectives and goals	During the period of twelve (12) months prior to surveillance, any SPI has exceeded the alert 3 SD by one point or the alert 2 SD by two consecutive points or the alert 1 SD by 3 consecutive points	During the period of twelve (12) months prior to surveillance, any SPI has exceeded the alert 1 SD by one point	During the period of twelve (12) months prior to surveillance, no SPI has exceeded the alert levels		1.22	
Total score							

CHAPTER 4

EXAMPLE OF A METHODOLOGY FOR PLANNING RISK-BASED SURVEILLANCE IN THE AERODROMES (AGA) AREA

1. General

1.1. Annex 19, second edition (effective November 2019) defines “surveillance” as the State activities through which the State proactively verifies through inspections and audits that aviation licence, certificate, authorization or approval holders continue to meet the established requirements and function at the level of competency and safety required by the State.

1.2. That same Annex sets out that States shall implement documented surveillance processes, by defining and planning inspections, audits and monitoring activities on a continuous basis, to proactively assure that certificate holders continue to meet the established requirements. The surveillance of the service provider takes into consideration the safety performance as well as the size and complexity of its aviation products or services.

1.3. Likewise, according to Annex 19, States should establish procedures to prioritize inspections and audits towards those areas of greater safety concern or need, and should also periodically review the safety performance of an individual service provider.

1.4. According to Document 9981 (PANS-Aerodromes), second edition, continued oversight should be established by the State in order to ensure that compliance with regard to certification conditions and ongoing additional requirements is maintained in certified aerodromes.

1.5. The State should plan continued oversight actions in such a way as to ensure that each topic covered by the scope of certification is subject to surveillance. This includes verifying the effectiveness of the operator’s SMS, in addition to the implementation of corrective action plans approved by the State as a precondition for granting the certificate.

1.6. Document 9981 also provides for sample checks of the aerodrome’s compliance with certification requirements and specifications in order to ensure the SMS has identified all deviations, if any, and adequately managed them. This also provides an indication on the level of maturity of the SMS. Consequently, a periodic audit cycle should be developed which consists of:

- a) at least one audit of the SMS; and
- b) sample checks on specific subjects.

1.7. The **safety performance (IdR)** and **risk exposure (IdE) of the aerodrome** may be taken into account when planning continued surveillance actions.

1.8. Doc 9981 states that the number of audits of the SMS during the period should be determined taking into account the following criteria:

- a) the regulator’s confidence in the operator’s SMS. This confidence is evaluated using the results of the SMS audits and other oversight actions. For example, feedback on the operator’s occurrence reporting and management system might indicate that the analyses of the safety occurrences are not carried out as adequately as desired, or that a significant number of incidents have arisen on the aerodrome;
- b) other factors contributing to the level of risk at the aerodrome, for example, the complexity of the aerodrome, the aerodrome’s infrastructure or organization, the density of traffic, type of operations and other specific conditions.
- c) The criterion set forth in (a) represents the aerodrome’s **safety performance** and the criterion in (b) represents the aerodrome’s **risk exposure**.

2. Risk-based surveillance (RBS)

2.1 Document 9859 (Safety management manual – SMM) provides that when the State applies the risk surveillance philosophy and procedures, inspections/audits and activities for monitoring organisations/service providers will be prioritised based on the safety risk profile of providers.

2.2 According to that manual, risk-based surveillance consists in prioritising and allocating resources commensurate with the risk profile of each sector or each service provider, which is assessed by monitoring the continuously developing maturity of their safety assurance process and, in particular, their management of safety performance.

2.3 The suggested risk-based surveillance methodology for the aerodromes (AGA) area was developed by the SRVSOP Technical Committee to support SRVSOP member States in assessing the risk of organisations certified under LAR 139 (aerodrome certification) or other similar State regulation, in order to prioritise surveillance (risk-based surveillance) activities as part of the SSP.

2.4 In this proposed methodology, THE INTENSITY OF SURVEILLANCE OF AN AGA ORGANISATION is defined by two dimensions:

- a) **The safety performance of the organisation:** assessment of the safety attitude and culture of the organisation, its capacity to manage risk and its safety performance.
- b) **The risk exposure of the organisation:** criteria for assessing the impact of the organisation, in terms of its size and complexity, so that it may be positioned in relation to the other organisations that make up the AGA surveillance universe.

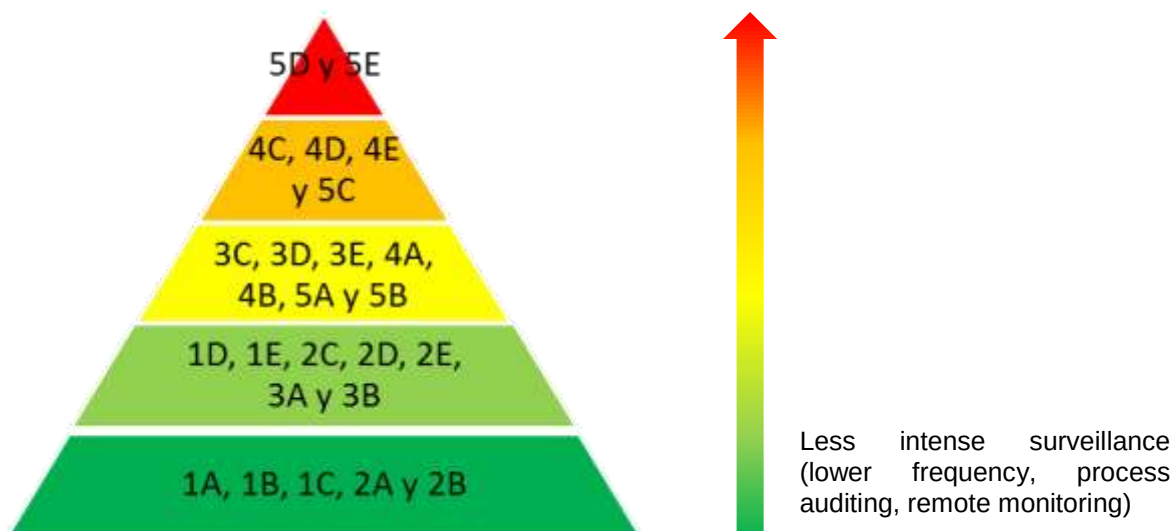
2.5 Once the IdR and the IdE have been defined, each organisation will occupy a place in the IdR X IdE table, where red quadrants indicate a higher surveillance intensity and green quadrants indicate a lower surveillance intensity). In the example below, 5 different colours are considered:

SURVEILLANCE INTENSITY

		Safety performance (IdR)				
		Very high	High	Intermediate	Low	Very low
Risk exposure (IdE)	Very high impact	1E	2E	3E	4E	5E
	High impact	1D	2D	3D	4D	5D
	Medium impact	1C	2C	3C	4C	5C
	Low impact	1B	2B	3B	4B	5B
	Very low impact	1A	2A	3A	4A	5A

2.6 The State is responsible for defining surveillance activities (type, frequency, etc.) to be performed based on the organisation's risk and the resources available for surveillance. In general, the risk assessment of AGA organisations should result in a pyramid-shaped distribution:

More intense surveillance
(higher frequency,
inspection of facilities, on-
site monitoring).



2.7 It is not a rule, but presumably there are more aerodromes along the base of the pyramid (where surveillance efforts are less), and fewer aerodromes on the top (where surveillance efforts are greater and thus use more State resources).

2.8 Depending on the number of aerodromes that the State must oversee and its resources, the frequency may be lower, or different frequencies may be defined for different types of surveillance activities/topics (inspection or audit; complete or partial; operations, maintenance, emergency response, SMS, etc.).

3. Determination of safety performance (IdR)

3.1 **Safety performance (IdR)** is an assessment of the organisation in terms of its attitude, capacity, and results with respect to safety management.

3.2 The IdR of each aerodrome operator is determined based on the following information:

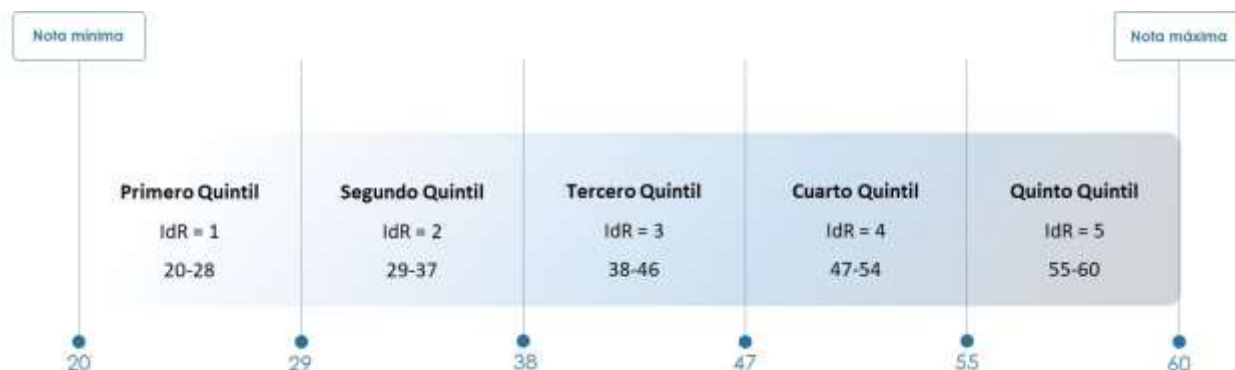
- a) the organisation risk profile (ORP);
- b) the level of regulatory compliance; and
- c) the level of SMS implementation.

3.3 The ORP is the assessment of the organisation (aerodrome operator) in terms of its safety culture and attitude, and the conditions that may lead to a higher level of risk. The determination of the ORP involves some subjectivity and must be done by somebody knowledgeable of the organisation (for example, the senior inspector or surveillance focal point).

3.4 The criteria suggested for determining the OPR were adapted from the criteria used by the CAA of New Zealand to assess the risk (risk indicators) of organisations certified under Part 139 (*Aerodrome Operator*) of its civil aviation regulations (more information may be found at <https://www.caa.govt.nz/surveillance/the-risk-indicators/>). The list of suggested criteria appears in Appendix A to Chapter 4. It is suggested that each criteria receive a score from 1 to 3, according to the situation of the aerodrome operator, where 1 represents the lowest risk and 3 the highest risk. The tool can also change the weighting of criteria to reflect what the CAA considers to be of greater importance to represent the risk profile of the operators.

3.5 After calculating the ORP, which is the sum of the values of all the criteria, the organisation receives a provisional score from 1 to 5 for its **safety performance (IdR)**, according to the quintile where

the value has fallen into, dividing the interval between the minimum score and the maximum score into 5 quintiles, as shown below:



3.6 Taking into account the suggested list of 20 criteria, and using a weight of 1 for each criterion, the minimum score would be 20 and the maximum score would be 60, and the quintile intervals would be those shown in the bottom of the figure above.

3.7 The provisional score calculated for the IdR, based on the ORP, is used to define the final IdR, as follows:

- a) Add one point to the initial IdR according to the operator's level of SMS implementation: Complete (0), Intermediate (1) or Initial (2). Thus, if the initial IdR is 3, an infant SMS (low level of maturity) would result in an IdR

3.8 The result of the ORP

- a) **First quintile:** If the organisation has a safety performance that is better than that of its peers, that is, maintains high levels of positive attitude, capacity and results with respect to safety management, which are part of the organisational culture.
- b) **Fifth quintile:** If the organisation has a safety performance that is worse than that of its peers, with negative attitudes and outcomes and limited safety management capacity.

4. Determination of risk exposure (IdE)

4.1. **Risk exposure (IdE)** is the assessment of the relative importance of the organisation in relation to the civil aviation system of the State. As an alternative, it can be used to create groups of organisations with similar characteristics in terms of size and criticality/complexity of their operations.

4.2. In the suggested methodology, the organisations receive a rating of "A" to "E" for **risk exposure**, where:

- (A) If the organisation is smaller or less complex (fewer operations/passengers, less critical operating conditions, aircraft that are smaller and/or require less infrastructure).
- (E) Bigger and more complex organisations (large number of operations/passengers, more critical operating conditions – weather, type of operation, or deviations/exemptions granted that affect operations).

4.3. The **IdE** exposure tends to be more objective. However, the assessment of a set of AGA organisations is relative; that is, the State, based on its reality, must define the parameters to be used to

define the rating of an aerodrome under each criterion. For example, a State may determine that aerodromes with more than 5 million passengers/year must have a rating of “E” (most critical) for the criterion related to the number of passengers/operations. Another State, based on its reality, may determine that an “E” rating is to be assigned to an aerodrome that operates more than 10 million passengers/year. Likewise, the State determines what volume of passengers and/or aircraft define ratings A, B, C, and D.

4.4. The important thing is that, for each criterion, parameters should be defined to permit the assessment of AGA organisations with ratings of “A” (smaller, less complex operations, less impact) to “E” (larger, more complex operations, higher impact).

5. Use of the methodology

5.1. In order to facilitate the use of the methodology, an Excel tool was developed to assist in the determination of the IdR and IdE for each aerodrome operator. A screenshot of the tool is shown in Appendix B to Chapter 4.

5.2. The **IdE** is assessed in the [purple table \(A3:W11\)](#), and the **IdR** is assessed in the [blue table \(A16:W36\)](#).

5.3. Column A shows the ranking of the criterion, and Column B describes the criterion. Criteria may be edited/adjusted as needed or based on improvements made to the tool after its use by inspectors/experts.

5.4. Column C (weight of the criterion) can be used for two functions:

- a) To define different relative weights for the criteria; for example, if a criterion must have greater impact on the result, to which end a weight value is defined for each criterion (initially, they all have a value of 1, that is, all criteria have the same weight); and/or
- b) To “disable” one or more criteria, if the State considers that a criterion is not that important or must not be used (accordingly, the value of the cell is omitted or gets “0” – zero).

5.5. It is assumed that the department/office responsible for AGA surveillance at the CAA will adjust the criteria and their respective weights, so that all AGA experts/inspectors may use the same ones.

5.6. Columns D to W are reserved for the assessment of the organisations. Each AGA organisation to be assessed is placed in one of these columns (the initial header of the column – ADR1, ADR2, etc. – is replaced by one that identifies the organisation – name, ICAO code or IATA aerodrome code).

5.7. There is space for 20 organisations (20 columns), but tables can be expanded to include more columns, if needed.

5.8. In order to determine the IdR and IdE of an AGA organisation, a rating of 1 to 3 must be assigned to each criterion or parameter used in the methodology. Based on the total result for IdE and ORP parameters, the template automatically calculates the provisional IdE and IdR.

5.9. In order to determine the final IdR, a rating of 0 to 2 must be assigned to the level of implementation of the operator’s SMS, filling in the corresponding cell in row D38:W38.

5.10. After assessing the organisation in terms of its IdR and IdE, row D13:W13 will show the surveillance intensity in the NL code format (where N is a number from 1 to 5 that represents the IdR and L is a letter A, B, C, D or E that represents the IdE).

5.11. Likewise, the cells will be formatted according to the colour code of the table in the interval C51:G55 on the same sheet (Note: colour formatting rules were included in the Excel conditional formatting tool, and do not change automatically when colours are changed in Table C51:G55).

6. Surveillance planning

6.1. Document 9981 (PANS - Aerodromes) specifies that, in addition to the scheduled activities for continued aerodrome safety surveillance, specific actions may be carried out by the State; for example, in relation to changes, analysis of occurrences, safety of aerodrome works, monitoring of corrective action plans, or in relation to the State safety plan. States may also have to address other issues regarding aerodrome safety, depending on aerodrome organisation, such as obstacle control or oversight of ground handlers.

6.2. Accordingly, surveillance is carried out by means of on-site activities (audits, inspections), but also through remote actions at the office, such as monitoring of information provided by the operator, requests of information/documents to remotely verify regulatory compliance and deadlines, and monitoring of indicators, such as traffic volume, occurrences, events, etc.

6.3. The PANS-AGA also stipulates that a surveillance plan must be defined by the State, for each certified aerodrome and communicated to the aerodrome operator. This plan must ensure that:

- a) for aerodromes where an SMS is not fully functional:
 - i. each topic within the scope of certification appears at least once and is subject to specified surveillance actions; and
 - ii. the SMS is audited as necessary.
- b) for the aerodromes with a fully functional SMS:
 - i. the SMS is audited at least once; and
 - ii. other surveillance actions on selected subjects are conducted as necessary.

6.4. The PANS-AGA also specifies that the plan and programme should be updated annually to reflect the surveillance actions that were actually carried out, including observations on certain actions that were not implemented as planned.

6.5. In addition to the aforementioned actions, which are planned and communicated to the operator, the State may also carry out unannounced inspections.

6.6. The aerodrome surveillance plan should include the monitoring of corrective action plans resulting from initial certification, continued oversight audits or technical inspections, until all items have been resolved, to ensure that mitigating actions are carried out according to the agreed standard and timetable. This monitoring can be performed during audits and inspections, but also remotely.

6.7. When the corrective action plan of an aerodrome does not guarantee that appropriate corrective action will be taken within acceptable timelines, the State, following coordination between the State and the operator, may decide that increased surveillance of this operator is necessary. The scope of increased surveillance may cover specific subjects or be all-encompassing.

6.8. All of the aforementioned surveillance tools and actions require resources, mainly the time of inspectors and support personnel, but also financial resources when visits to aerodromes are involved.

6.9. The objective of risk-based surveillance is to allow the State to better channel its resources towards the most critical providers and types of hazards.

6.10. The surveillance of each aerodrome operator must be planned based on the surveillance capacity of the State (number of inspectors of each AGA specialty, available financial resources, ease of access to aerodromes, etc.). The table below provides an example of the definition of types of action based on surveillance intensity.

Surveillance intensity	SMS audit	Technical inspections	Unannounced inspections	Increased surveillance
5D and 5E	Min 1/year, monitor stages	Yes	Yes	Yes
4C, 4D, 4E and 5C	Min 1/year, monitor stages	Yes	Yes	No
3C, 3D, 3E, 4A, 4B, 5A and 5B	Min 1/year	Yes	No	No
1D, 1E, 2C, 2D, 2E, 3A and 3B	Min 1/year	No	No	No
1A, 1B, 1C, 2A and 2B	Min 1 every 2 years	No	No	No

APPENDIX A TO CHAPTER 4 – EXAMPLE OF THE ORGANISATION RISK PROFILE (ORP) SURVEILLANCE QUESTIONNAIRE FOR AERODROME OPERATORS

1. The organisation risk profile (ORP) questionnaire in this appendix will be applied during the aerodrome operator surveillance process. Determination of the ORP should take place at least on every surveillance planning cycle or whenever there are factors that could change the results, such as:

- a. Change of aerodrome operator
- b. Perception of significant increase/reduction in the number of safety events
- c. Occurrence of accidents or serious incidents at the aerodrome
- d. Change of key aerodrome staff

2. On the right column, write the value of the level of risk (3, 2 or 1), depending on what better describes the current situation of the operator according to each question. The assessment of the level of each criterion has a significant subjective component, reason why it should be done by an inspector who is familiar with the operator and can compare it with other operators. Assessment parameters for Levels 1 and 3 are provided, and must be used preferably; Level 2 must be used only when Levels 1 or 3 cannot be assigned to the operator for a given criterion.

3. Once the questionnaire has been completed, add the values on the right column to obtain the ORP value.

		Level of risk			
	Risk parameter of the organisation	Level 3 (least desirable)	Level 2 (average)	Level 1 (most desirable)	Result (level)
1	Safety level of relevant service providers (air navigation, ground support)	Service providers operating at the aerodrome have a low safety level.		Service providers operating at the aerodrome have a high safety level.	
2	Attitude to safety and compliance by management	Top management is inactive or does not promote a positive safety culture. No evidence of a safety culture within the organisation. Individual responsibilities are not recognised. There are no risk assessment mechanisms.		Excellent attitude by all the staff. Safety culture and just culture are in place and are promoted throughout the organisation.	
3	Attitude towards risk-taking	Risk management is not considered at all. Risk-taking allowed without controls and no effort is made to monitor or assess risk.		All risks are eliminated, mitigated or insured by well-understood methodologies that are implemented throughout the organisation.	
4	Aerodrome operator's attitude to the civil aviation authority	Invites the CAA to participate in improvement projects. Volunteers information freely and without prompting. Accepting of comments and recommendations. Cooperative and helpful.		Will not accept free regulatory access to facilities, personnel. Audits/inspections are avoided. Information is deliberately withheld and not made available. Aggressive and obstructive towards CAA.	
5	Challenges to rules	Exceeds regulatory requirements. Readily accepts interpretations. Actively participates and cooperates in processes to improve regulatory requirements.		Deliberately breaches regulatory requirements. Commonly has an attitude of perceived licence to bend the rules. Problem rules are criticised and flouted for economic advantage.	
6	Financial status that may affect safety	Difficult financial situation that may affect daily operations		Normal financial situation that does not affect daily operations	
7	Quality, risk and safety management systems	Safety management is ignored in favour of commercial priorities. No evidence of SMS. Risks are deliberately ignored. No training in risk management is provided. Communication regarding safety, risk and quality matters does not take place unless forced to by external reasons.		A quality management system is in place. SMS best practices implemented. Risks are assessed and mitigated or eliminated. Risk management training provided to all top management. Vertical, horizontal and matrix free communications exist among all levels and units.	
8	Operator experience	Operator obtained aerodrome certificate within the last 12 months		Operator obtained aerodrome certificate more than 3 years ago	
9	Changes in the operator's organisation, scope or size	Changes were recently made (within the last 6 months) to operations that significantly changed the aerodrome risk profile, or works or construction currently underway that affect runway operations.		No changes to operations in the last 24 months (critical aircraft, type of operation, major changes to infrastructure or procedures related to aircraft operations) that changed the aerodrome risk profile and NO works or construction affecting operations are foreseen.	
10	Turnover of key team/personnel	Some key personnel have held their position less than 12 months.		All key personnel have held their position more than 24 months.	
11	Training programme	The operator cannot show an effective training programme, and does not recognise or address this ineffectiveness.		The operator has a training programme and can show that it has been fully implemented and is effective	

		Level of risk			
	Risk parameter of the organisation	Level 3 (least desirable)	Level 2 (average)	Level 1 (most desirable)	Result (level)
12	Capacity of key staff	Key staff seem incapable of fulfilling their duties		Key staff is adequate and effective in fulfilling their duties	
13	Level of commitment to the organisation by key personnel	All key personnel work part-time at the aerodrome.		All key personnel work full-time at the aerodrome.	
14	Staff morale	Morale is very low. Personnel have no good word to say about the organisation.		Morale is high. Personnel are positive about the organisation.	
15	Condition of facilities and equipment	Infrastructure is mostly inadequate for aerodrome operations, and there are critical maintenance issues.		Infrastructure is more than adequate in terms of LAR 154 parameters or equivalent (layout, signage, green areas, drainage, fences, etc.). Conditions are maintained beyond acceptable level	
16	Safety trends	Increased number of events and cases of regulatory non-compliance during the last surveillance cycle.		Significant improvement in the number of events and in the number of cases of regulatory non-compliance during the last surveillance cycle.	
17	Record of sanctions (including fines, operational restrictions and certificate suspensions)	Major sanctions applied in the last 12 months		No history of major sanctions applied in the last 3 years.	
18	Level of regulatory compliance	The aerodrome is within the 10% of aerodromes with the largest number of findings, with many critical findings.		No findings during the last inspection/audit, or all findings were corrected in a short period of time after the inspection/audit.	
19	Management structure	All key functions are performed by one single person		No accumulation of functions in key staff	
20	Infrastructure maintenance condition	Aerodrome infrastructure and facilities are not maintained in good condition.		All aerodrome infrastructure and facilities receive high level of maintenance.	

APPENDIX B TO CHAPTER 4 – ORGANISATION RISK ASSESSMENT TOOLS

			Organización(ones) evaluadas [repetir las mismas en la tabla abajo de evaluación del Rendimiento]																			
#criterio	Criterios para evaluación de la EXPOSICIÓN A RIESGO (IdE) de la Organización	Peso del criterio	ADR1	ADR2	ADR3	ADR4	ADR5	ADR6	ADR7	ADR8	ADR9	ADR10	ADR11	ADR12	ADR13	ADR14	ADR15	ADR16	ADR17	ADR18	ADR19	ADR20
1	Cantidad de pasajeros/aeronaves procesados	1	1	2	3																	
2	Tipo de servicio aéreo procesado	1	1	1	3																	
3	Operaciones internacionales/nacionales	1	1	1	3																	
4	Tipo de operación (VFR D, VFR D/N, NP, P)	1	1	1	3																	
5	Tipo de avión (jet; turbohélice; turbofan)	1	1	3	3																	
6	Condición típica de operación (VMC, IMC)	1	1	3	3																	
7	Autorizaciones de operaciones especiales (baja visibilidad, CAT II/III, aviones más grandes, etc)	1	1	1	3																	
8	Procedimientos especiales (desviaciones/exenciones)	1	1	3	3																	
	Resultado numerico de la exposición		1	3	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Determinación de la exposición al riesgo (IdE)		A	C	E	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	INTENSIDAD DE LA VIGILANCIA AGA		3A	5C	5E	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A
	Determinación del Rendimiento (IdR)		3	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
#criterio	Criterios para evaluación del RENDIMIENTO en SO (IdR) de la Organización	Peso del criterio	ADR1	ADR2	ADR3	ADR4	ADR5	ADR6	ADR7	ADR8	ADR9	ADR10	ADR11	ADR12	ADR13	ADR14	ADR15	ADR16	ADR17	ADR18	ADR19	ADR20
1	Nivel de seguridad de los proveedores de servicios relevantes (navegación aérea, apoyo de tierra)	1	1	3	2																	
2	Actitud de la dirección en lo que se refiere a la seguridad operacional y cumplimientos de requisitos	1	1	3	2																	
3	Actitud en lo que se refiere a la aceptación del riesgo	1	1	3	3																	
4	Actitud del operador de aeródromo hacia la autoridad de aviación civil	1	1	3	3																	
5	Actitud frente a la reglamentación	1	1	3	3																	
6	Situación financiera que pueda afectar la seguridad operacional	1	1	3	3																	
7	Sistemas de gestión de la calidad, de los riesgos y de la seguridad operacional	1	1	3	2																	
8	Experiencia del operador	1	1	3	2																	
9	Cambios en la organización, alcance o tamaño del operador	1	1	3	3																	
10	Rotación del equipo/personal clave	1	1	3	3																	
11	Programa de entrenamiento	1	1	3	3																	
12	Capacidad del personal clave	1	1	3	3																	
13	Nivel de dedicación del personal clave a la organización	1	1	3	3																	
14	Moral del equipo	1	1	3	2																	
15	Condiciones de las facilidades y equipamientos	1	1	3	2																	
16	Tendencias de la seguridad operacional	1	1	3	2																	
17	Histórico de sanciones (incluyendo multas, restricciones operacionales y suspensión de certificado)	1	1	3	3																	
18	Nivel de cumplimiento de los reglamentos	1	1	3	3																	
19	Estructura de la dirección	1	1	3	3																	
20	Condición de mantenimiento de la infraestructura	1	1	3	3																	
	IdR provisional		1	5	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Nivel de implementación del SMS del operador		2	3	1																	
	IdR final		3	5	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1