



SMS FOR AERODROMES – BLOCK 2

Surveillance 2.0

RDIMS# 14611846



Canada



Introduction

Surveillance 2.0 is a brand-new twist on surveillance. As part of this modernized approach, TCCA inspects a wider range of the aviation industry and uses data to hone in on the risks in a more strategic way that will lead to a greater use of artificial intelligence and truly empowers our inspectors to make risk-based operational decisions.

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TCCA has undergone a significant transformation over the last decade.

The introduction of Safety Management Systems (SMS) to the aviation safety regulatory framework has ushered in a new approach to manage safety risks which led to an evolution in how Transport Canada Civil Aviation (TCCA) is overseeing the industry.

Surveillance 2.0 is a brand-new twist on surveillance. As part of this modernized approach, TCCA inspects a wider range of the aviation industry and **uses data to hone in on the risks in a more strategic way that will lead to a greater use of artificial intelligence and truly empowers our inspectors to make risk-based operational decisions.**

There is an upcoming requirement for States to implement a State Safety Program and *Surveillance 2.0* and the use of data is a stepping stone to meet those requirements.

This new method strengthens the ability to look comprehensively and formally at overlapping concerns within an organization, mitigate risk and increase safety. It also strengthens enforcement efforts.



Outline

Where we started

- Risk based planning was introduced in 2008 with the inception of SMS

Risk based planning overview

- Risk indicator level
- Impact value
- Surveillance interval and instrument

Lessons learned and next steps

- Surveillance 2.0
- Targeted Inspections

With the introduction of SMS in 2008, came new surveillance tools and the concept of Risk Based planning

We will briefly touch on the adoption of RBS in Canada , then describe our current RBS planning strategy. I will then share what we have learned from 10 years of practice and explain our strategy to update our program accordingly



Surveillance and SMS

| Pre - SMS | Post - SMS Implementation |
|--|--|
| <ul style="list-style-type: none">• Fixed surveillance interval for all certificates• Audit and inspections aimed at verifying regulatory compliance• Certificate level approach to surveillance | <ul style="list-style-type: none">• Risk based surveillance plan• Focus on ongoing compliance• Enterprise approach to surveillance |

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With the introduction of SMS in 2008, came new surveillance tools and the concept of Risk Based planning.

The objective of the surveillance system also evolved with the introduction of SMS, it was no longer sufficient to ensure our service providers were compliant with the regulations, it became evident that our role was also to evaluate their capacity to remain compliant overtime.

What I really mean here is: “can they remain compliant weather or not we are onsite watching over their shoulder!”

So the question changed from: “are the regulatory requirement being met?” to “How are those requirements being met?”

The Enterprise approach to surveillance was also a significant evolution in our surveillance practices. Enterprise approach means that we send multidisciplinary team of inspectors to virtually every surveillance activities. Every certificates held by an enterprise are inspected during a planned surveillance activity.

Key Concepts:

Inspection Instruments:

- **Process Inspection (PI):** focuses on regulatory compliance of end products and the associated processes within an enterprise
- **Program Validation Inspection (PVI):** focuses on a SMS component or an enterprise's control system
- **Assessment:** All the SMS components are inspected simultaneously

Regions:

- Transport Canada Civil Aviation (TCCA) is organized in **5 regions and 2 operational Branches:**
Atlantic, Québec, Ontario, Prairies and Northern, Pacific, National Aircraft Certification & National Operations

Before I go further in the presentation , I would like to explain a few key characteristics of our surveillance system that are likely to have an equivalent but a different nomenclature and / or characteristics in your own programs.

We used 3 different surveillance instrument: In order of complexity form the Smallest to the largest, they were:

PI, which focus on the end products and the process the enterprise used to create those products and services. A Process inspection or PI can be accomplished in a matter of hours by a team of one or two inspectors for the more simple ones and can take up to 2-3 days with a team of 4 inspectors in the more complex environments. PIs are nimble and have minimal administrative burden.

PVI, The focus of the PVI is on the enterprise's systems. A typical PVI will require a multidiscipline team of 4 Inspectors and will require 10 days of to complete from start to finish (2-3 days pre-site, 3-5 days on site and 1-2 days post site)

An assessment is simply the sum of all possible PVI an organization can be subject to. At a larger airline, an SMS assessment can require a team of 20 inspectors and keep them busy for 2 weeks pre-site and 2 weeks on site. Multiple sites would be visited and management

and support staff would also be involved.

All surveillance activities have 3 stages:

Pre-site activities, during which available safety information and compliance records are reviewed

Onsite verification, during which sampling plan is executed, compliance is verified, interviews are conducted

Post site activities, during which findings of non-compliances are confirmed

TCCA work force is divided in 5 regions and 2 operational branch plus headquarters. When I am referring to “the regions” I really mean one of the 5 regions or operational branch.

SURVEILLANCE PLANNING

The Risk Indicator Level of an enterprise is generated automatically based on two components:

- The Risk Indicator Numbers
- Impact Value



It is used to set the surveillance interval and select the inspection instrument

Risk indicators Numbers are based on

- **Results of previous surveillance activities;**
- **Availability of safety information;** CADORS (Civil Aviation Daily Occurrence Reporting System), accident/incident reports, Surface Difficulty Reports, routine communication with the enterprise;
- **The presence of a Safety Management System**
- **The 77 risk questions**

The 77 questions are organized in themes:

- Labor Difficulties
- Management Practices
- Quality Assurance
- Change in scope (Product line and Facility)
- Changes in Contracting for goods and/or service
- Turn over in personnel
- Change in Key personnel
- Safety Record
- Regulatory Record
- Seasonal or Specialized operations/Activities

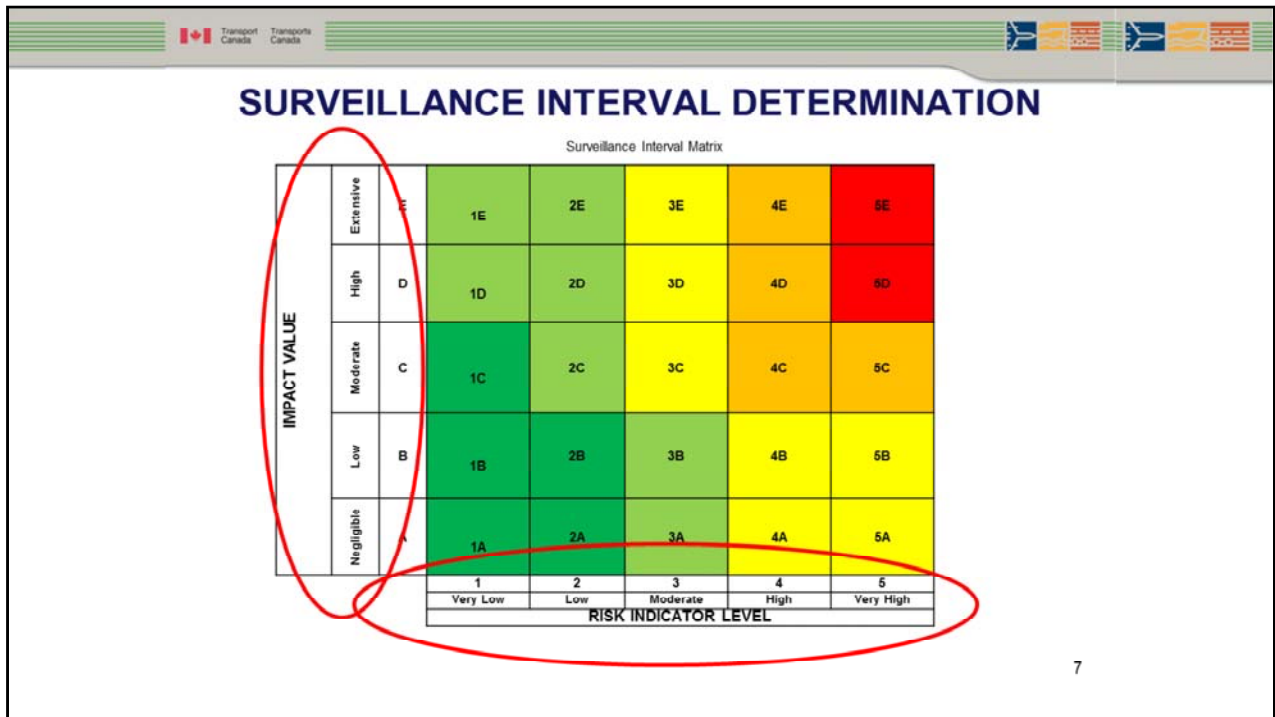
Example of questions would be:

-Has the scope or product line been affected as a result of asset acquisitions

-Has there been an incident that has implications about the overall safety management of the certificate holder?

Impact value is a relative value determined using:

- Number of certificates in different categories;
- Number of employees;
- Number of domestic bases;
- Number of aircraft ;
- Number of aircraft types;
- Type of operations; and
- International operations



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This is the Surveillance Interval Matrix or also known as the “Heat Map”.

Every aviation enterprise in this country has a place somewhere on this map.

Risk is defined as the likelihood of an event occurring versus the severity of that event. Here we have the “Risk Indicator Level”, in a value of 1 to 5 representing the likelihood and the “Impact Value”, in a value of A to E, representing the severity.

Therefore, the aviation enterprises in the green quadrants are deemed to be a low risk while the ones in the red quadrants are deemed to be a high risk.

Let’s then discuss the definition of each axis.

Talk about he Big Airline VS the Small Operator exampel

SURVEILLANCE FREQUENCY & INSTRUMENTS

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

*In 2016, we piloted more frequent use of the Process Inspection

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Surveillance Interval Matrix (SIM) value is also used to select the surveillance instrument to be used at specific interval within the 5 year plan.

Originally a Process inspection was designed to be used in support to an Assessment or Program Validation Inspection. In 2016, we Introduced planned Process inspections in lieu of Program validation Inspection. The objective was to replace 30% of the PVI – This initiative as a success More on this later

LESSONS LEARNED:

- One size fits all approach to Risk Indicator Level and Impact Values is not the most effective
- Lean and nibble instruments should be used for early detection of systemic problems
- Local intelligence and professional judgment must be at the center of the surveillance process
- It is possible to be data rich and information poor! Data has to be shared and analyzed
- Information technology Infrastructure has to be built on a flexible platform that will keep evolving with the risk based methodology

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As the result of:

-Auditor general audit recommendations, from 2008 and 2011

-Recommendations from our Transportation Safety Board

-Extensive consultations with our Inspectors

-A civil aviation wide transformation project and the Surveillance Program Evaluation and Update project

And in line with the continuous improvement culture present within our organization, here is a summary of the lessons we learned from 10 years of risk based surveillance.



Where we are now...

TCCA has launched an updated
Surveillance program

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Enhanced risk based surveillance model

Risk based surveillance is achieved when available surveillance resources are allocated based on a complete, accurate and up to date risk picture in order to best ensure aviation safety

Resource allocation is constantly revised between:

Planned VS Reactive Surveillance needs,

Sectors VS Enterprises within a specific sector

Dealing with known safety threats VS scanning the environment for emerging threats

Verifying regulatory compliance of Enterprises while constantly evaluating the effectiveness of the regulatory framework.

In order to achieve this we launched Surveillance 2.0

SURVEILLANCE 2.0

Effective as of April 1, 2018

- Using leaner more efficient tools to effectively determine compliance and risk
- Providing a balance between system and process level (e.g. ramp inspections) surveillance
- Continuing to use system level surveillance (PVIs and Assessments) only when supported by enterprise risk and compliance data
- Making extensive use of data to determine surveillance intervals and scope
- Providing TC with a proactive understanding of risk areas through targeted inspections

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•Lean=PI
•Keep the benefit of system level but only when needed
•More frequent inspections, no more bow wave
•Data used for Interval, instrument and scope
•Targeted Inspection = proactive surveillance of the Canadian aviation system

•effective April 1st, 2018.

•We can characterize the surveillance 2.0 updates as:

- Using leaner more efficient tools to effectively determine compliance and risk
 - Providing a balance between system and process level (e.g. ramp inspections) oversight
 - Continuing the use system level surveillance (program validation inspections and assessments) **only** when supported by enterprise risk and compliance data
 - Making extensive use of data to determine surveillance intervals
 - Providing Transport Canada with a proactive understanding of risk areas through targeted inspections
- Giving Tangible weight to Inspector Professional Opinion Capture occurrence of an Oversight event and professional opinion of inspector involved with respect to his/her interaction with the enterprise. This opinion hinges around the capability of the enterprise to maintain compliance over time.
 - Providing a Transparent methodology for allocating surveillance resources
 - Ensuring risk indicator questions are directly linked to tangible processes associated to a certificate held by an enterprise (when questions not answerable by data)
 - Capturing risk information from all aspect of Oversight (What I mean by that is establishing a direct link between our certification, service and surveillance programs)
 - Applying ICAO Annex 19 – State Safety Program concepts of a safety-data-driven surveillance program – targeting areas of greater concern or need.
 - Embed the concepts of identifying Safety Performance Indicators (SPIs) and associated target/alert levels into the surveillance planning process.

Under Surveillance 2.0,

-we have established Peer groups to compare enterprises with similar enterprises in the system

-we will:

- Establish surveillance frequency based on the enterprise safety performance within its peer group
- Use our lighter and more nimble surveillance instrument; the process inspection as the default instrument for all planned surveillance
- Our Operational groups will have the latitude to select heavier inspection instrument when supported by the available safety information.

Under Surveillance 2.0, the Frequency, the Scope, the Point of entry and the surveillance instrument will be selected based on the available safety information.

Finally:

Finding process is updated to better support data collection and analysis

With the introduction of System level surveillance, came the introduction of system level finding.

Currently, most findings are written against enterprise's systems:

- Operational Control System,
- Quality Assurance
- Safety Management System

Individual non- compliances are used as examples to support System level findings

This approach has enabled TCCA to make important safety gains: The service providers are aware of the importance to put in place Management systems capable of achieving ongoing compliance

BUT

System Level finding do not provide enough granularity to understand where the service providers are struggling to meet the regulatory requirements

Analysis of regulatory compliance data by activity sector is essential to risk based surveillance

Stand-alone findings are essential to this process

Surveillance 2.0 will re-introduce a balance between system level findings and Stand-alone findings

***NEW* - TARGETED INSPECTION**

A new surveillance instrument:

- An oversight approach that mixes compliance monitoring with collecting evaluative information to gain contextual knowledge
- A method of collecting data that supports evaluation questions and methodologies (e.g. Did that approach work?)
- A method of investigating safety hazards and how industry is managing them
- Input to sector risk profiles that feeds risk based planning
- Flexible, adaptable tool that can be tailored to the specific risks and needs

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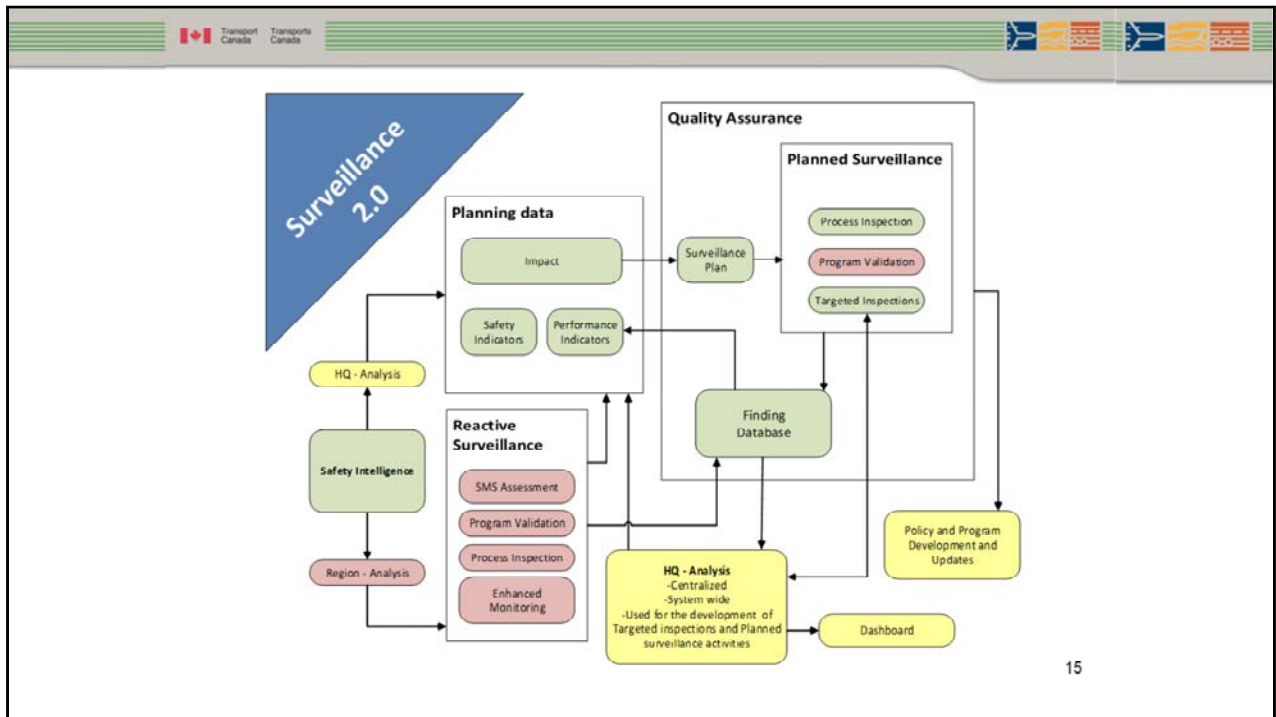
Targeted inspections are an oversight approach that mixes compliance monitoring with gathering evaluative information to gain contextual knowledge. They aim to determine operator compliance levels while also collecting data that helps TCCA understand how operators comply to certain rules and regulations, and, to understand what factors, elements, or conditions may be missing and/or contributing to an unacceptable result.

Standards Branch's Technical Programs, Evaluation and Coordination (TPEC) team includes a group of evaluators. Their tasked with evaluating how effective TCCA programs, regulations and guidance material are at reaching their intended outcomes. They also feed our understanding of the risk in sectors, which informs our program development and surveillance planning.

With an ever-increasing need to ensure our resources are used as effectively and efficiently as possible, TCCA must understand whether or not our efforts are having the desired effect and where the greatest risks are. We cannot really know how effective our programs or rules are unless we know how they are being interpreted and implemented by industry. Data collected from targeted inspections help us better understand this. Targeted inspections collect data to support evaluations.

Targeted inspections provide a method to investigate emerging or known safety hazards to support and inform our monitoring of safety hazards as well as informing our sector risk profiling.

Targeted inspections can be tailored to collect specific information in various formats. This will become more apparent as the program matures.



How this is all tied together

SUMMARY

- Surveillance 2.0 is effective April 1, 2018
- Performance indicators are currently being developed
- Oversight program data is being captured, analyzed and shared
- Targeted Inspections will enable TCCA to better understand industry compliance and the effectiveness of its regulatory framework
- TCCA is actively looking at IT infrastructure solutions to support future evolution of its oversight regime



Group Discussion

Q1. TCCA has implemented a lot of change with Surveillance 2.0 ICAO's Safety Management Manual outlines the importance of managing change through a formal process appropriately so as not to introduce hazards, which can be a by-product of change.

Can anyone share examples of changes their state has implemented where a hazard became a by-product of the change? How was it handled? What measures were put in place?

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Q2 When change is involved, the development of procedures to assess the impact of the changes are necessary. Safety Performance Indicators, known as 'SPI's allows for the planning to be tracked along with the implementation and/or effectiveness of the changes that are being made. What SPIs could you see being used in any of the above changes made by TCCA? Discuss.



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Conclusion

- Review of main points
- Final thoughts
- Next learning block

Review of main points

Questions from group or clarifications

Final thoughts

Next learning block after the break: