SMS Implementation Guide (ANSP)

Modification history

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0 INTRODUCTION

Safety Management System (SMS) requirements are listed in ICAO Annex 19. This guide is an aid to the implementation of an SMS by an air navigation service provider (ANSP).

For each requirement of Annex 19 this guide:
- recalls the requirement,
- defines means of implementation that allows the ANSP to be compliant with the requirement,
- provides questions for a self-assessment by ANSP prior to audit and supervisory actions by Civil Aviation Authority (CAA).

Examples are given to illustrate the implementation of the SMS; they are not models but a way to meet the requirement. Examples are shown in blue and italics.

It should never be forgotten that a SMS is built brick by brick, step by step, and that it only becomes mature several years after the start of its implementation.
ANSP must therefore plan the implementation of the SMS by setting “reasonable deadlines” for each of its building blocks.
An SMS can be defined as a systematic approach to safety management, including the necessary organizational structures, accountability, responsibilities, policies and procedures.

1 SAFETY POLICY AND OBJECTIVES
1.1 Management commitment

1.1 Requirement

1.1.1 The service provider shall define its safety policy in accordance with international and national requirements. The safety policy shall:
a) reflect organizational commitment regarding safety, including the promotion of a positive safety culture;
b) include a clear statement about the provision of the necessary resources for the implementation of the safety policy;
c) include safety reporting procedures;
d) clearly indicate which types of behaviours are unacceptable related to the service provider's aviation activities and include the circumstances under which disciplinary action would not apply;
e) be signed by the accountable executive of the organization;
f) be communicated, with visible endorsement, throughout the organization; and
g) be periodically reviewed to ensure it remains relevant and appropriate to the service provider.
1.1.2 Taking due account of its safety policy, the service provider shall define safety objectives. The safety objectives shall:
a) form the basis for safety performance monitoring and measurement as required by 3.1.2;
b) reflect the service provider's commitment to maintain or continuously improve the overall effectiveness of the SMS;
c) be communicated throughout the organization; and
d) be periodically reviewed to ensure they remain relevant and appropriate to the service provider.

1.1 Implementation by ANSP

Safety policy
The ANSP must:
- define a safety policy that contains a clear commitment signed by the highest level.
- ensure that safety is a priority issue for the ANSP;
- display as an objective the continuous improvement of safety;
- define a few priority areas for improvement on points identified as needing improvement;
- guarantee that the SMS and its procedures are documented, updated, and effectively applied;
- implement this policy via an annual action plan;
- clearly specify that any involuntary error will not be subject to a sanction and that any voluntary violation of the rules will be punished (just culture);
- have sufficient resources to implement this policy;
- periodically review this policy;
- disseminate this policy widely by all appropriate means (letter, SMS manual, posting in the premises, etc.);
- present and explain this policy to all agents;
- have sufficient resources to implement this policy;
- monitor the implementation of the annual action plan.

Sample safety policy

X is responsible for ensuring the flow of general air traffic in the airspace entrusted to it. As a priority, it must guarantee a satisfactory level of safety and ensure its constant improvement.
For this, some priority areas for improvement have been identified:
1) continuously guarantee the competence of personnel
2) consolidate the processing and analysis of safety events;
3) define a procedure for committing changes and start applying it.
4) introduce the notion of 'just culture'
5) establish the procedures necessary for the operation of the SMS
I instruct the SMS manager, under my authority, to develop the SMS in order to improve safety management and our safety performance. I am counting on the involvement of all agents to successfully implement our policy.

Signature:

When the SMS begins to operate, indicators with objectives can be defined for each area of improvement defined in the safety policy to measure and monitor the progress of actions.

Example:

Axis 2: Number of postponements (qualitative objective = increase)
Axis 3: Ratio = number of changes with safety study/number of changes (quantitative objective 100%, qualitative objective = increase until reaching 100%)
Axis 4: Number of postponements (qualitative objective = increase)

For indicators see §3.1

Action plan (set of actions)

The policy and in particular the areas for improvement are implemented through actions. Each action has several parameters: areas of improvement to which it is attached, wording of the action, in charge of the action and state of progress (**not started**, **in progress**, **completed**). The action plan must be followed periodically (see 3.3).

Examples of actions

Axis of improvement	*Action*	*In charge*	*State*
Consolidate the processing of safety events	*Encourage event reports (note on just culture, briefings).*	*Chief ATS et Chief CNS*	***Completed***
Consolidate the processing of safety events	*Define, set up and use the event database*	*Chief ATS et Chief CNS*	***Completed***
Consolidate the processing of safety events	*Implement feedback (workbooks in operational rooms for ATCO and ATSEP)*	*Chief ATS et Chief CNS*	***In progress***
Define a procedure for changes and apply it	*Set up a working group to define the change procedure*	*Safety manager*	***In progress***
Define a procedure for changes and apply it	*Plan training on the procedure*	*Safety manager*	***In progress***
Define a procedure for changes and apply it	*Carry out some safety studies by applying the procedure*	*Safety manager*	***Not started***
Follow-up of areas for improvement	*Set up a follow-up of the action plan*	*Safety manager*	***In progress***
Implementation of SMS structures	*Set up a specific working group*	*Safety manager*	***In progress***

Action plan should be monitored periodically (e.g., monthly) to identify difficulties. This monitoring must be carried out by the SMS manager in collaboration with the action managers and traced. (See 3.3).

Example : follow-up of actions

Areas of improvement	***Action***	***In charge***	***State***
Consolidate the processing of safety events	*Encourage event reports (note on just culture, briefings).*	*Chief ATS Chief CNS*	***Completed***
January 22	*Indicator on the number of monthly reports set up. Note on just culture in preparation. ATS: briefing scheduled for 15.01.22*		
February 22	*ATS: note on just culture disseminated, briefing carried out 15.01 22 CNS: just culture note disseminated, planned briefing 04.03.22*		
March 22	*CNS: briefing carried out 4 March 2022*		

1.1 SMS self-assessment

Non-exhaustive topics and list of questions

Has the safety policy been defined?
Is it signed by the director of the ANSP?
Does it include areas for improvement?
Does it contain a reference to “just culture”?
How was it distributed, to whom?
Is it associated with an action plan?
Who is responsible for implementing these actions? How were they informed?
Is the action plan followed? By whom, when how?

1 SAFETY POLICY AND OBJECTIVES
1.2 Safety accountability and responsibilities

1.2 Requirement

The service provider shall:
a) identify the accountable executive who, irrespective of other functions, is accountable on behalf of the organization for the implementation and maintenance of an effective SMS;
b) clearly define lines of safety accountability throughout the organization, including a direct accountability for safety on the part of senior management;
c) identify the responsibilities of all members of management, irrespective of other functions, as well as of employees, with respect to the safety performance of the organization;
d) document and communicate safety accountability, responsibilities and authorities throughout the organization; and
e) define the levels of management with authority to make decisions regarding safety risk tolerability.

1.2 Implementation by ANSP

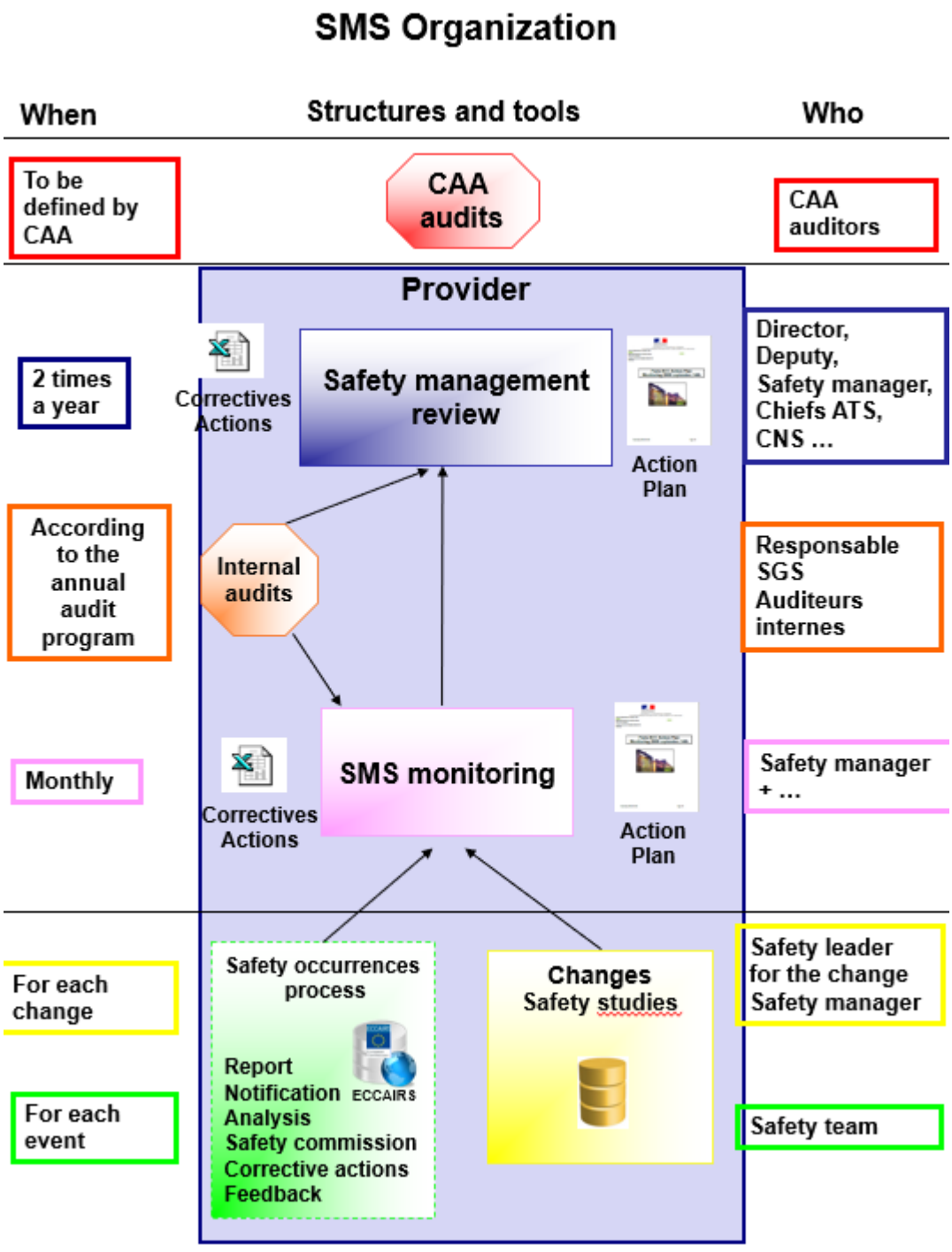
The chief of ANSP is accountable for safety and safety management performance of the ANSP.

For all existing functions responsibilities for safety and safety management must be defined. These responsibilities must appear in a document signed by the accountable manager (decision, job descriptions, SMS manual, etc.).

Responsibilities should be communicated to all agents, known by all agents, and enforced.

These responsibilities must take into account all the activities and structures of the SMS, for example: service provided by 1st line agents (ATCO, ATSEP, etc.), collection and processing of safety events, acceptability of risk during changes, monitoring of safety indicators, internal and external audits, participation in safety reviews and monitoring groups, training activities (implementation, monitoring, training plan) …

Example of SMS organization



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1.2 SMS self-assessment

Non-exhaustive topics and list of questions

Is the organization of the SMS defined? Where? Is it broadcast?
Has it been presented, explained?
Have responsibilities for safety and safety management been defined?
Has the document defining them been signed by the director of the ANSP?
Have the agents been informed of their responsibilities? How?

1 SAFETY POLICY AND OBJECTIVES
1.3 Appointment of key safety personnel

1.3 Requirement

The service provider shall appoint a safety manager who is responsible for the implementation and maintenance of the SMS.

1.3 Implementation by ANSP

A SMS manager is appointed to implement and manage the SMS. He acts under the direct authority of the chief of ANSP. It is independent of the operational hierarchy (ATS and CNS). He is a member of the management team to have a transversal vision of the activities of the organization and particularly of what can have an impact on safety and safety management.
The SMS manager of an ANSP has skills in:
- the operation of the ATS and CNS services,
- the processing of safety events,
- safety studies,
- audits,
- management systems,
- running a project.

He must also have oral and written communication skills.
He writes the SMS manual and the procedures in collaboration with the experts concerned.
When the SMS manager is appointed, a personalized training plan is established so that he can achieve the required skills.

1.3 SMS self-assessment

Non-exhaustive topics and list of questions

- Has an SMS manager been appointed?
- What is his role?
- Who does he report to?
- Does he have easy access to the director of the ANSP?
- What is his position in relation to the other executives?
- Who does he work with?
- What training did he follow?
- Does he have access to all the information he needs (indicators, safety events, changes, etc.)?
- Does it monitor the processing of safety events?
- Does it ensure the transmission of events to the CAA?
- Does it check the safety studies (methodology, risk reduction actions)?
- Does it provide follow-up functions (action plan, corrective actions, etc.)?
- Is he the writer of the SMS manual?
- Does it manage training relating to the SMS (internal auditors, safety studies, handling of events, etc.)?

1 SAFETY POLICY AND OBJECTIVES
1.4 Coordination of emergency response planning

1.4 Requirement

The service provider required to establish and maintain an emergency response plan for accidents and incidents in aircraft operations and other aviation emergencies shall ensure that the emergency response plan is properly coordinated with the emergency response plans of those organizations it must interface with during the provision of its products and services.

1.4 Implementation by ANSP

The ANSP defines one (or more) emergency plan to be activated in case of total or partial inability to provide ATS and CNS services.
The causes leading to the implementation of an emergency plan are weather phenomena (tropical cyclones, floods, earthquakes, tidal waves/tsunamis), technical breakdowns, pandemics, etc.
The emergency plan is simple and explicit to allow:
- either to continue to provide services in a degraded manner,
- or to stop providing the services, while maintaining an acceptable level of safety.

It must also define how to operate the return to normal.
It is coordinated:
- at the regional level with the adjacent ANSPs,
- locally with other service providers such as airport managers and air operators.

It seems necessary to consider several cases:
- Total impossibility of providing ATS and CNS services at ACC 1, 2, 3 ...
- Partial impossibility of providing ATS and CNS services at ACC 1,2, 3 ...
- Total impossibility of providing ATS and CNS services at airport x, y, z ...
- Partial impossibility of providing ATS and CNS services at airport x, y, z ...

A test of local emergency plans is carried out regularly.

1.4 SMS self-assessment

Non-exhaustive topics and list of questions

Have one or more emergency plan(s) been defined?
Do these plans cover ACC and airports?
Do these plans cover the ATS and CNS domains?
Are they coordinated with adjacent centers? With whom?
Have they been presented and explained?
Who triggers them? How?
Are they tested?

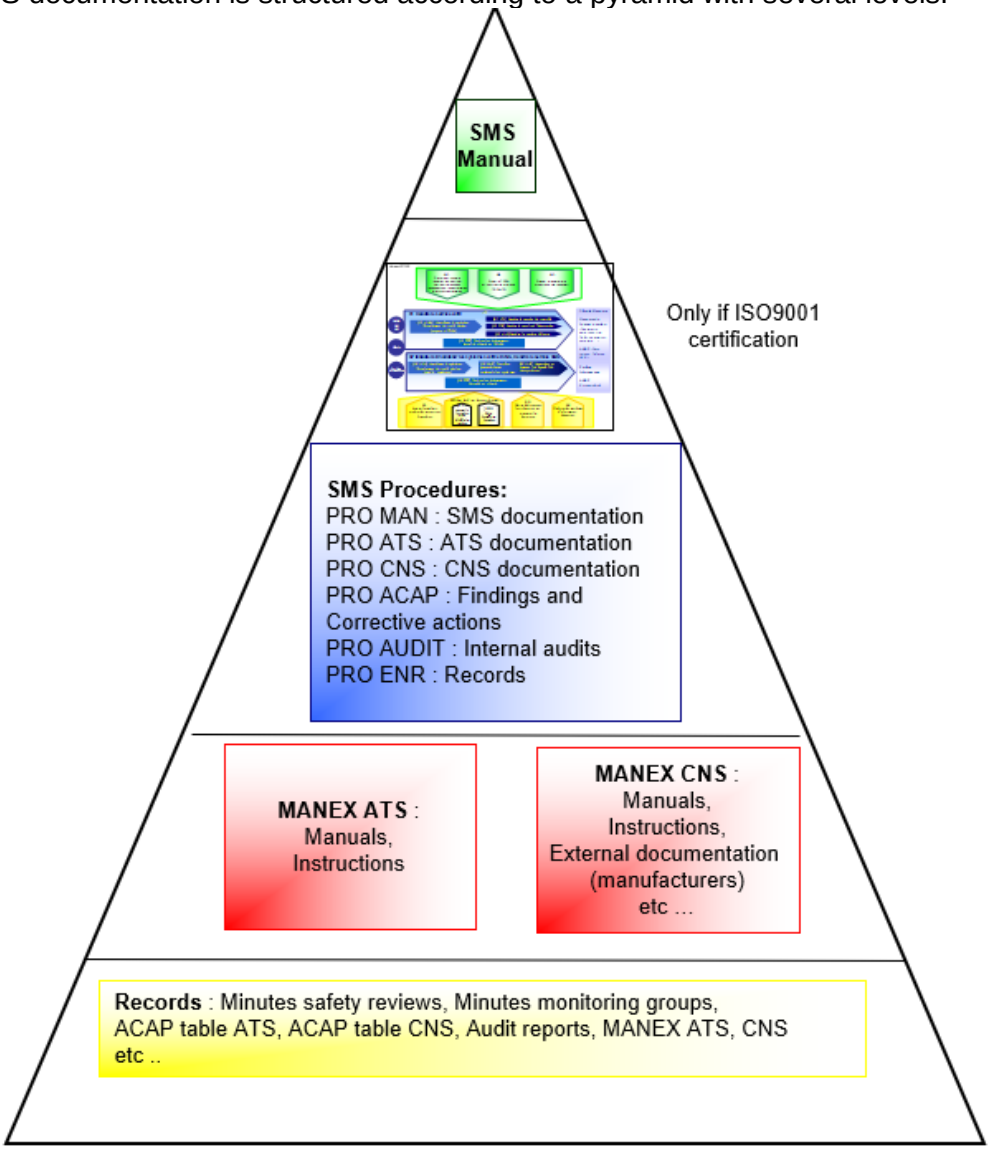
1 SAFETY POLICY AND OBJECTIVES
1.5 SMS documentation

1.5 Requirement

1.5.1 The service provider shall develop and maintain an SMS manual that describes its:
a) safety policy and objectives;
b) SMS requirements;
c) SMS processes and procedures; and
d) accountability, responsibilities and authorities for SMS processes and procedures.

1.5 Implementation by ANSP

The SMS documentation is structured according to a pyramid with several levels.



SMS Manual
The SMS manual must demonstrate how the ANSP meets the SMS requirements of Annex 19. It includes the following elements: the safety policy, the organization of the ANSP, the links to the processes and procedures impacting safety (processing of safety events, risk assessment and risk reduction means, safety performance monitoring with indicators and audits, documentation management, records, skills management, etc.).
The SMS manual defines a new layer of requirements which implies that everything written in this document must be done and can be demonstrated.
It must be as simple as possible and refer to existing documents (procedures, decisions, etc.) whenever possible. Do not paraphrase existing documents elsewhere.

Example SMS manual plan:
1 Area of applicability
2 Missions of the ANSP
3 Organization of the ANSP
4 Safety policy and objectives
  4.1 Management Commitment
  4.2 Accountability and Safety Responsibilities
  4.3 Appointment of key safety personnel
  4.4 Coordination of emergency response planning
  4.5 SMS Documentation
  4.6 Management of subcontractors and third party safety partners
5 Safety Risk Management
  5.1 Hazard identification
6 Safety Assurance
  6.1 Monitoring and measuring safety performance
  6.2 Change management
  6.3 Continual improvement of the SMS
7 Promoting safety
  7.1 Training and awareness
  7.2 Safety communication

Cartography (optional floor only if quality approach 9001)
This level only exists if an ISO 9001 quality approach is undertaken.

Procedures
Some procedures are mandatory: procedure for management of documentation, recording procedure, internal audit procedure, procedure for findings and corrective actions ...
These procedures are detailed throughout this guide when the requirements concern them.

Operational documents
The operational documents are:
- MANEX ATS, the operating modes necessary for the ATS service,
- MANEX CNS, the operating modes necessary for the CNS service.
If an ATS and CNS MANEX plan is drawn up by the CAA it must be complied with by the ANSP.

Recordings
A record is a document that proves the completion of an activity (report, record of decisions, etc.) or the result of an activity (indicator). This procedure gives the most exhaustive list possible of all SMS records with the following parameters: name, record manager, access (free or confidential), medium (paper or electronic), storage location.

Examples:

Name	***In charge***	***Access (Free or Restricted)***	***Support (paper or electronic)***	***Where (office or path on intra)***
SMS manual	*Safety manager*	*Free*	*Electronic*	*G:/SMS/manuels*
Audits reports	*Safety manager*	*Free*	*Electronic*	*G:/SMS/audits*
Safety event reports ATS	*Chief ATS*	*Restricted*	*Paper*	*Office XXX*
Safety event report CNS	*Chief CNS*	*Restricted*	*Paper*	*Office YYY*
MANEX ATS	*Chief ATS*	*Free*	*Electronic*	*G:/ATS/manex*
MANEX ATS	*Chief CNS*	*Free*	*Electronic*	*G:/CNS/manex*

Procedure for the management of the documentation

Before defining a procedure for the management of the documentation, it is necessary to identify the different families that exist, for example ATS and CNS.

Examples of families:

- SMS manual and associated procedures,
- ATS documentation,
- CNS documentation.

A procedure can be defined for each family (the context, the management are specific to each family). For each document of a family, the following elements should be specified: responsibilities (writing, checking, approving), history of modifications, validity of the document, reference version, etc.

Responsibilities

It specifies who writes, who verifies, who approves for each document of the documentary family.
The writer is the expert who writes the document.
The verifier ensures the consistency of the document with respect to all the documentation.
The approver is the authority that authorizes the application of the document.
It is possible that the writer and the reviewer are the same person or that the reviewer and the approver are the same person.

Validity

The document management procedure must specify how the validity of the document is ensured.
Some documents are systematically updated at specific times, others only when a new version is published; in the latter case, a periodic documentary review makes it possible to ensure the validity of the version.

Example :

Once a year, a working group meets to review the various documents and decide on an update. If the update is not deemed necessary, a visa must be inserted in the document to trace the documentary review.

Reference version

In the case of a paper version, several documents may be used in different places. It is necessary to define where the version that refers is located.

ATS and CNS operational documentation
The ATS and CNS operational documentation must be the subject of particular attention: it must be controlled and kept up to date.

Protocols and letters of agreement
Protocols and letters of agreement must be rigorously monitored: list of protocols and letters of agreement with the period of validity. These documents must be signed by all parties involved.

External Documentation
External documentation must be managed with a list that gives the current version for each document.

Example of external documentation: CNS system manufacturer documentation.

Name	*Version*	*Date*	*Place*
ILS manufacturer manual	*V3.1*	*22.04.2017*	
VOR manufacturer manual	*V2.3*	*05.09.2018*	
Radio system VCS manufacturer manual	*V1.1*	*28.10.2021*	

1.5 SMS self-assessment

Non-exhaustive topics and list of questions

SMS Manual
Does the SMS manual meet the requirements of Annex 19?
By whom was it written?
Is it signed by the director of the ANSP?
Was it widely distributed within the ANSP?

Procedures
- Have one or more document management procedures been defined?
- Do these procedures cover all SMS documentation (including ATS and CNS operational documentation)?
- Has a procedure relating to recordings been defined?
- Has a procedure relating to findings/corrective actions been defined?
- Has a procedure relating to the management of internal audits been defined?
- Have these procedures been disseminated and presented to the actors concerned?

ATS and CNS operational documentation
How is it ensured that documentation provided to front line workers is up to date?

2 SAFETY RISK MANAGEMENT
2.1 Hazard identification

2.1 Requirement

2.1.1 The service provider shall develop and maintain a process to identify hazards associated with its aviation
products or services.
2.1.2 Hazard identification shall be based on a combination of reactive and proactive methods.

2.1 Implementation by ANSP

PROCESSING OF SAFETY EVENTS
Process of safety events must contain at least the following steps:
- Report
- Notification
- Analysis: risk assessment (severity and frequency) and search causes
- Definition and implementation of corrective actions
- Feedback to ATCO or ATSEP
- Follow-up of corrective actions.

Safety events are handled by trained agents, mostly chosen from first-line players (ATCO for ATS and ATSEP for CNS).
A debriefing with the agents involved is done as quickly as possible so as not to lose any element of the context of the incident.

Report
Any known safety event is reported via an Incident Notification Form.

Notification
The procedure specifies the list of incidents that must be notified internally to the hierarchy and those that must be transmitted to the CAA.

Analysis.
- Severity and frequency.
- Causes

Analysis: severity and frequency
For each event, the risk is assessed according to severity and frequency classified according to the tables below (from DOC9859).

Severity for ATS events

Severity	Signification	Val
Catastrophic	Equipment destroyed, Multiple deaths	A
Hazardous	A large reduction in safety margins, physical distress or a workload such that the operators cannot be relied upon to perform their tasks accurately or completely Serious injury, Major equipment damage	B
Major	A significant reduction in safety margins, a reduction in the ability of the operators to cope with adverse operating conditions as a result of an increase in workload or as a result of conditions impairing their efficiency Serious incident, Injury to persons	C
Minor	Nuisance, Operating limitations, Use of emergency procedures, Minor incident	D
Negligible	Few consequences	E

Severity for CNS events

Severity	Value
Complete inability to provide safe ATM services	AA
Serious inability to provide safe ATM services	A
Partial inability to provide safe ATM services	B
Ability to provide secure but degraded ATM services	C
unknown	D
Negligible	E

Frequency *(in italics blue some examples of quantitative values)*

Frequency	Signification	Val
Frequent	Likely to occur many times (has occurred frequently) *1 time per day*	5
Occasional	Likely to occur sometimes (has occurred infrequentlynt) *1 time per month*	4
Remote	Unlikely to occur, but possible (has occurred rarely) *1 time per year*	3
Improbable	Very unlikely to occur (not known to have occurred) *1 time per 10 years*	2
Extremely improbable	Almost inconceivable that the event will occur *1 time per 100 years*	1

Analysis: Risk is the combination of severity and frequency. We can calculate its position in the matrix

Safety Risk		Severity				
Probability		Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	5	5A	5B	5C	5D	5E
Occasional	4	4A	4B	4C	4D	4E
Remote	3	3A	3B	3C	3D	3E
Improbable	2	2A	2B	2C	2D	2E
Extremely improbable	1	1A	1B	1C	1D	1E

Analysis: causes
The analysis of the causes makes it possible to highlight the most frequent to correct them as a priority.

Corrective actions
The objective of corrective action is to reduce the risk so that it is considered acceptable. Corrective actions are positioned on the causes of safety events. They are defined at the appropriate hierarchical level because they may require the implementation of resources.
Some corrective actions require a long time to be implemented, so they must be monitored periodically.
The follow-up of the corrective actions must be operated according to a periodicity to be defined according to the needs (for example every month). This follow-up can be carried out by the SMS manager in collaboration with the head of the ATS or CNS department.
Traceability between safety events, their causes and corrective actions must be demonstrated.

Feedback
The objective of feedback is to inform ATCO and/or ATSEP of the important events that have occurred and the precautions to be taken to prevent them from being reproduced.
Feedback support can be a binder in the operational room, an email sent to the agents concerned, a bulletin, etc. Feedback can be sent outside the ANSP.

Saving data
The ANSP specify how safety event data is recorded and backed up. (Database, Excel file, etc.).

Training
The agents responsible for analyzing safety events undergo appropriate training. It is desirable that they come from the core business (ATCO, ATSEP, etc.). A manual that specifies the procedure for processing safety events can be used as a support for this training.

Safety report.
A monthly and annual review of safety events should make it possible to identify major trends.

OTHERS
Other risks may exist, independent of known events.

Rosters
Any agent appearing on a duty roster must hold the qualifications and/or authorizations required to perform their duties

CNS: Minutes – logbooks
The minutes or logbooks must be correctly kept with a traceability, making link between breakdowns/malfunctions and the interventions carried out.

CNS: preventive maintenance
The preventive maintenance program is carried out. Its traceability must be demonstrated.

CNS: calibration of measuring devices
The measuring devices are calibrated. A list must be kept up to date with all measuring devices and the date of the next calibration.

2.1 SMS self-assessment

Non-exhaustive topics and list of questions

- Is there a procedure and/or a safety event processing manual for ATS and CNS?
- Does the procedure and/or processing manual comply with the requirements of Annex 19?
- Have the agents who deal with ATS, and CNS safety events been trained?
- Are all events processed (severity, frequency, causes, corrective actions, feedback)?
- Can the traceability of event processing be demonstrated?
- Are safety events stored and backed up?
- can the link between a safety event and the corrective actions be demonstrated?
- Who transmits safety events to the CAA? How? When?

3 SAFETY ASSURANCE
3.1 Safety performance monitoring and measurement

3.1 Requirement

3.1.1 The service provider shall develop and maintain the means to verify the safety performance of the organization and to validate the effectiveness of safety risk controls.
3.1.2 The service provider's safety performance shall be verified in reference to the safety performance indicators and safety performance targets of the SMS in support of the organization's safety objectives.

3.1 Implementation by ANSP

2 ways to monitor safety performance:
- indicators,
- audits (external and internal).

Indicators definition.
An indicator is defined with its source (source of data), its calculation method (case of a complex indicator), its manager (calculation and production), its periodicity (weekly, monthly, annual), its objective (target), its alert threshold (bad result from which it is necessary to react immediately).
The objective cannot be quantified as soon as the indicator is put into service because it is generally chosen based on the results of previous years. The objective can be quantitative or qualitative.
The alert threshold is a value that requires immediate corrective action when reached.
Some safety indicators (with target and alert threshold) must be validated by the CAA during the ANSP-CAA coordination meetings. These indicators are periodically sent to the CAA.

Examples

AIRPROX	***2017***	***2018***	***2019***	***2020***	***2021***	***2022***
Number	*12*	*11*	*14*	*15*	*12*	
Objective			*10*	*10*	*10*	*10*
Alarm threshold			*20*	*20*	*20*	*20*

For 2019 the target of 10 has been set, based on the results of the previous 2 years. The target value must be consistent (seeking to improve safety) and realistic.
The alert threshold was set at 20.
The 2 values were not modified in the following years because they were not reached.

Number of FNE	***2017***	***2018***	***2019***	***2020***	***2021***	***2022***
Number	*23*	*27*	*45*	*55*	*79*	

In this example the increase in the number of FNE must be considered as an improvement in the safety culture and the understanding of the need to postpone events.

CNS System	***2017***	***2018***	***2019***	***2020***		***2021***	***2022***
ILS : number of failures + duration in minutes (mn)	***5 1259 mn***	***3 2200 mn***	***4 3000 mn***	***3 200 mn***		***5 4200 mn***	
Availability of ILS (objective 98%)	*98%*	*97%*	*96%*	*99%*		*95%*	

You can have same table for VOR, radio system, radar system …

Monitoring of indicators.
The indicators are periodically monitored, and their results analyzed. The follow up can be different in ATS and CNS services**.**

Annual program of internal audits.
An annual program of internal audits is drawn up considering the planned external audits so as not to multiply the audits of the ANSP.
It is important to be careful and realistic and not to plan too many internal audits.
You must find a balance with experience.
It can be smart to target internal audits on weak points that you know and want to improve.

Example of annual internal audits program

Audit	Who	when
Management of ATS documentation	Safety manager Agent 1	**20.01.21**
Management of CNS documentation	Safety manager Agent 1	**25.02.21**
Annex 19	Civil aviation authority (CAA)	**08 au 11.03.21**
Processing of safety occurrences (ATS)	Agent 2 Agent 4	**10.05.21**
SMS manual and procedures	Agent 3 Agent 5	**05.09.21**
Safety studies* Delay in the writing of the procedure Audit not possible	Safety manager Agent 3	**10.12.21**

** When an audit is cancelled, you must explain why.*

Training of internal auditors.
Internal auditors undergo initial training and maintain their qualification as auditors by regularly carrying out internal audits. Define the minimum number of audits to be carried out each year in the internal audit procedure (1 or 2 are realistic values).

Findings/Corrective actions
The findings appearing in the external and/or internal audit reports are the subject of corrective actions according to the indications contained in the findings/corrective actions procedure.
The link between audit findings and corrective actions must be demonstrable (see corrective action format in 3.3.)

3.1 SMS self-assessment

Non-exhaustive topics and list of questions

Indicators
How are the indicators defined?
Have the characteristics of each indicator been defined (source, calculation method, person responsible, periodicity, objective, and alert threshold)? Where are they found?
Are the indicators monitored? By whom, when and how?
What do we do in the event of a poor result for an indicator?

Audits
Do we have a procedure for internal audits?
Do we have internal auditors?
Have they been trained? By whom?
Who monitors internal auditors?
Do we have an annual internal audit program?
How is it built? By whom?
Who validates it?
Is there a procedure to define how audit findings (internal and external) are handled?
Who decides on the corrective actions implemented after an audit report?
How do we follow them? Who?

3 SAFETY ASSURANCE
3.2 The management of change

3.2 Requirement

2.2 The service provider shall develop and maintain a process that ensures analysis, assessment and control of the safety risks associated with identified hazards.
3.2 The service provider shall develop and maintain a process to identify changes which may affect the level of safety risk associated with its aviation products or services and to identify and manage the safety risks that may arise from those changes.

3.2 Implementation by ANSP

Important Note
The safety study process described below relates to a mature SMS.
A safety study contains at least:
- the search for risks with an assessment of their severity and frequency,
- the definition of risk reduction means,
- internal coordination (ATS – CNS) and external coordination with other ACC and/or airports,
- transition phase (work during implementation),
- traceability of all actions.

Definition of a change
A change may concern the airspace (airspace structure, new route, new flight procedure, etc.) or the technical field (new system or modification of an existing system). A new way of working is also considered as a change.

Notification of the change to the CAA
The ANSP notifies the CAA of any planned change using the form provided for this purpose.

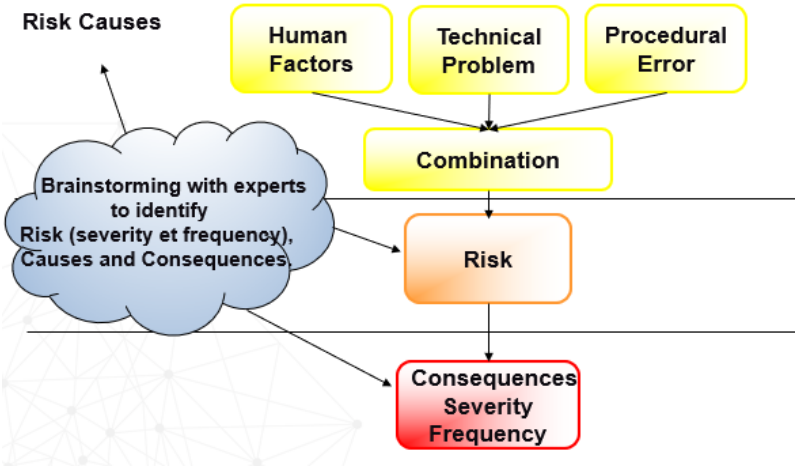
Change monitored by the CAA
If the CAA decides to follow a change, the ANSP carries out the safety study and exchanges regularly with the CAA in order to provide it with all the elements necessary for its decision-making.

Change not followed by the CAA
The ANSP carries out the safety study and implements the change without approval from the CAA.

Safety change-study procedure.
The ANSP must define the methodology used to carry out the safety study. The purpose of this study is to minimize the impact of the change on the level of safety (not to degrade it) and to demonstrate it.
This procedure must cover different phases:
- the search for risks with for each risk its severity and frequency,
- the definition of risk reduction means,
- internal (ATS and CNS) and external (with ACC and/or adjacent airports) coordination,
- the demonstration of the effective implementation of risk reduction means before the implementation of the change,
- the transition phase to go from the initial situation to the new situation (works).

The procedure must specify how the list of changes (past, in progress, planned) is managed and the exchange mechanism with the CAA.
The procedure must define the responsibilities relating to the ANSP-level approval of the safety study. The brainstorming leader is the drafter, the SMS manager the verifier and the department head concerned the approver.
The role of the SMS manager is to check whether the methodology has been respected, whether the risk reduction means are consistent and done before implementation of the change.

Realization of the safety study
The safety study is done with experts in the field concerned by the change (ATCO, ATSEP, engineers, technicians) and a leader who knows the methodology and leads the brainstorming. Brainstorming leaders are trained in safety studies methodology. Brainstorming makes it possible to identify risks with causes, consequences, means of risk reduction. The use of guides and templates makes it possible to formalize the results of the safety study.



Severity and frequency
Severity and frequency are determined using the tables below

Severity	Signification	Val
Catastrophic	Equipment destroyed, Multiple deaths	A
Hazardous	A large reduction in safety margins, physical distress or a workload such that the operators cannot be relied upon to perform their tasks accurately or completely Serious injury, Major equipment damage	B
Major	A significant reduction in safety margins, a reduction in the ability of the operators to cope with adverse operating conditions as a result of an increase in workload or as a result of conditions impairing their efficiency Serious incident, Injury to persons	C
Minor	Nuisance, Operating limitations, Use of emergency procedures, Minor incident	D
Negligible	Few consequences	

Frequency	Signification	Val
Frequent	Likely to occur many times (has occurred frequently) *1 time per day*	5
Occasional	Likely to occur sometimes (has occurred sometimes) *1 time per month*	4
Remote	Unlikely to occur, but possible (has occurred rarely) *1 time per year*	3
Improbable	Very unlikely to occur (not known to have occurred) *1 time per 10 years*	2
Extremely improbable	Almost inconceivable that the event will occur *1 time per 100 years*	1

Risk matrix

A matrix must be defined with different zones: intolerable (red), tolerable with risk reduction means (yellow) and acceptable (green).

Example of matrix

Frequency	Severity				
	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent 5	A5	B5	C5	D5	E5
Occasional 4	A4	B4	C4	D4	E4
Remote 3	A3	B3	C3	D3	E3
Improbable 2	A2	B2	C2	D2	E2
Extremely improbable 1	A1	B1	C1	D1	E1

1st Use of the Matrix

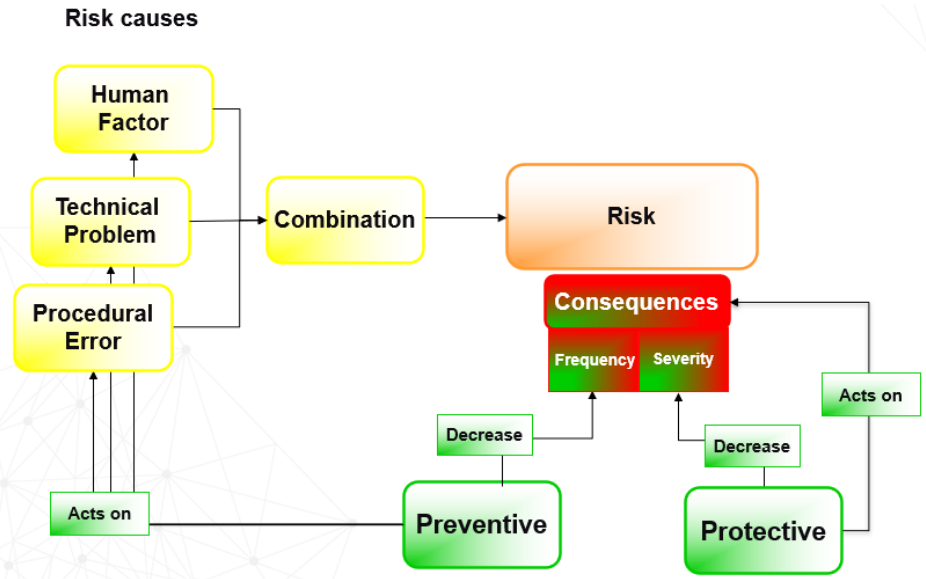
When the risks have been identified with their severity and frequency, they should be placed in the matrix.

***Example** : severity B frequency 3, R2 severity C frequency 3, 3 severity D, frequency 2*

Frequency	Severity				
	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent 5					
Occasional 4					
Remote		R1	R2		
Improbable 2				R3	
Extremely Improbable 1					

Risk reduction means

Means of risk reduction are defined in order to minimize the risk. There are 2 types of risk reduction means: preventive which reduce the frequency and protective which reduce the severity.



The preventive means are training, updating documentation, information placed on a control position or a technical system, etc. They tend to avoid the occurrence of the risk.
The protective means are linked to the nature of the change and the risks identified.
The temporary drop in air traffic is one of them.

2nd Use of the matrix

After the identification of risk reduction means, it is necessary, for each risk, to determine the new severity and the new frequency and to reposition the risks in the matrix.

***Example** : R1 severity C frequency 3, R2 severity C frequency 2, R3 severity D, frequency 2.*
R1 has benefited from a mean of reducing protective risks, its severity has gone from B to C
R2 has benefited from a mean of reducing protective risks, its frequency has gone from 3 to 2.
R3 has not benefited from risk reduction resources that could reduce the severity and frequency.

Frequency	Severity				
	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent 5					
Occasional 4					
Remote 3			R1		
Improbable 2			R2	R3	
Extremely Improbable 1					

Demonstration of the implementation of risk reduction means
The means of risk reduction must have been implemented before the implementation of the change.
Example :
Traceability of the training carried out (content, date, signature of ATCOs and/or APSEPs), Check of documentation update.

Commissioning of the change
The commissioning decision by the ANSP must be traced and based on the approval of the DSAC if applicable and on the reference of the safety study.

Archiving of the safety study
The safety studies are saved, they are a record of the SMS.

3.2 SMS self-assessment

Commissioning of the change
The commissioning decision by the ANSP must be traced and based on the approval of the DSAC (if exists) and on the reference of the safety study.

Archiving of the safety study
The safety studies are saved, they are records of the SMS.

Important Note
The full safety process should be practiced when the SMS is mature and for major changes.
Safety studies must include at least:
- the search for risks with an assessment of their severity and frequency,
- means of risk reduction,
- internal and external coordination,
- the transition phase (work during implementation),
- traceability of all actions.

3 SAFETY ASSURANCE
3.3 Continuous improvement of SMS

3.3 Requirement

The service provider shall monitor and assess its SMS processes to maintain or continuously improve the overall effectiveness of the SMS.

3.3 Implementation by ANSP

Continuous improvement can be illustrated by the Deming wheel, the Plan, Do, Check, Act cycle.

Corrective actions :
Corrective actions are implemented on the causes of safety events, on audit findings and when indicators achieve poor results. The management of corrective actions (creation and follow-up) is defined in a dedicated procedure which links between the findings (safety events, audit findings) and the corrective actions.

The traceability of the corrective actions must be ensured and be able to be demonstrated; they must be saved (for example in an Excel file).

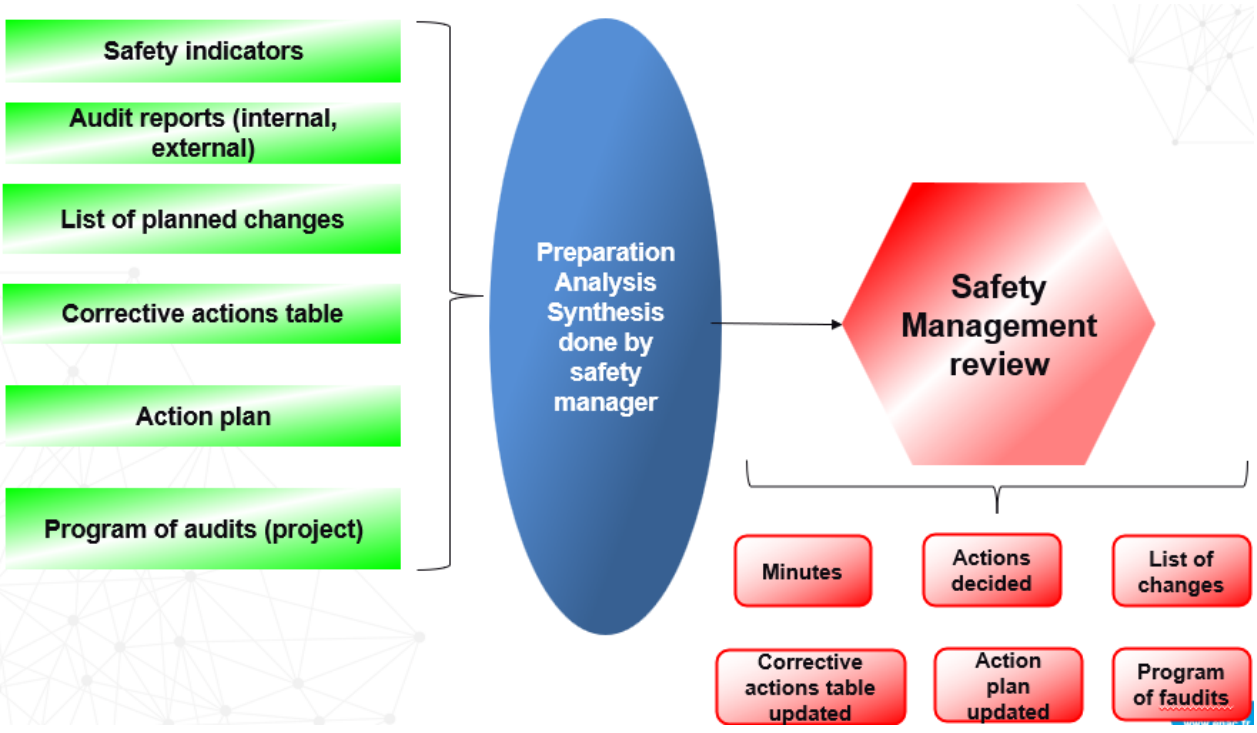
Examples of corrective actions

N° Ref	Origin	Finding	in charge	Date objective	Corrective actions	Effectiveness
002/20	*Audit CAA 01/20*	*ATS: corrective actions are defined too long after the safety events have been processed.*	*Chief ATS*	*~~03/20~~ 12/20*	*Periodicity of safety monitoring group is now 1 month (previously 2 months)*	*3 monitoring groups with periodicity of 1 month*

*State of a corrective action : **not started** **in progress** or **completed***
The target date initially set can be changed if the target cannot be reached. It is advisable to leave the initial date that we cross out and to set a new target.
The effectiveness criterion shows that the corrective action(s) have made it possible to correct the finding.

Safety management review

Twice a year, a safety management review evaluates safety performance and the safety management system. Its purpose is to take decisions of a strategic nature to improve the level of safety.
The safety review is chaired by the Director of the ANSP, its secretariat is provided by the SMS manager and the main executives participate in it.



Example of an agenda for a safety management review

ATS safety indicators
CNS safety indicators
Serious safety events (ATS and CNS)
Relations with other service providers.
Safety studies.
Update of the table of corrective actions.
Update of the action plan

SMS Monitoring
Periodic SMS monitoring should be put in place, the role of which is to:
- manage corrective actions (creation, follow-up, closure),
- monitoring the implementation of the action plan,
- examine the indicators,
- manage serious events.
- process audit findings.

SMS monitoring can be done by the SMS manager in coordination with the ATS and CNS department heads.
It must be traced.

3.3 SMS self-assessment

Non-exhaustive topics and list of questions

Corrective actions
- Has a procedure for findings/corrective actions been defined?
- Does this procedure specify: who decides, who implements, who monitors the corrective actions?
- Does this procedure explain the management in the event of non-compliance with a target date for corrective action?
- Has it been defined how the corrective actions are stored and saved?
- Can a link be made between the findings (causes of safety events, audit reports, etc.) and the corrective actions?

Management review
- Has the outline of the management reviews been defined (participants, agenda, frequency)? Where?
- Who chairs the reviews? Is he still present?
- Who provides the secretariat, including the preparation?
- Are the minutes distributed? Whose?

Follow-up actions
- Between the 2 annual management reviews, how is the monitoring of the SMS carried out?
- Where is this monitoring formalized?
- Who is in charge of this follow-up?
- Do we have traceability of the follow-up?
- Does this follow-up contain a review of the annual action plan, corrective actions, main incidents, - indicators, audit reports?

4 SAFETY PROMOTION
4.1 Training and education

4.1 Requirement

4.1.1 The service provider shall develop and maintain a safety training program that ensures that personnel are trained and competent to perform their SMS duties.
4.1.2 The scope of the safety training program shall be appropriate to each individual's involvement in the SMS.

4.1 Implementation by ANSP

The ANSP develops, maintains, and delivers a safety management training program. In order to have trained and competent personnel to operate the SMS, it is necessary to:
- identify the functions which have an impact on the SMS.
- define a training program for each function.
- carry out the training program.
- ensure that the skills acquired are maintained over the long term.

This training is done gradually.

Example of functions impacted by the SMS

Director of the ANSP, Main executives, SMS manager, Agents in charge of processing safety events, Agents in charge of safety studies, Internal auditors, ATCO, ATSEP.

Example : training program for SMS

Who	***Training***	***Who is doing training***
Director, main managers	*General concepts on management systems.* *Organization of the SMS.*	*External* *Safety manager*
Safety manager	*General concepts on management systems.* *Internal auditor training.* *Training on safety occurrences process* *Training on safety studies*	*External* *External* *External*
Agents in charge of safety occurrences process	*Training on procedure* *Training on tool*	*External and/or safety manager*
Agents in charge des of safety studies	*Training on procedure*	*External and/or safety manager*
Internal auditors	*Training on internal audit*	*External*
ATCO, ATSEP	*Sensibilization on SMS* *Safety occurrences report, just culture*	*Safety manager*
All the agents	*Sensibilization on SMS* *SMS Organization*	*Safety manager*

The SMS training program must be reviewed periodically in order to adapt it to needs (for example during a safety management review).

The SMS manager updates the training planned and carried out.

Example: follow up of internal auditors

Who	*Internal audits*	*What*
Safety manager	*20.01.21* *25.02.21*	*Management of ATS documentation* *Management of CNS documentation*
Agent 1	*20.01.21*	*Management of ATS documentation*
Agent 2	*10.05.21*	*Safety occurrences (ATS)*
Agent 3	*25.02.21*	*Management of CNS documentation*
Agent 4	*10.05.21*	*Safety occurrences (ATS)*
Agent 5	*05.09.21*	*SMS manual and procedures*
Agent 6	*05.09.21*	*SMS manual and procedures*

Example: follow up of agents in charge of safety studies

Who	*Etudes de sécurité*	*What*
Agent 1	*22.03.21*	*Preventive maintenance for ILS*
Agent 2		
Agent 3	*28.10.21*	*Preventive maintenance for VOR*
Agent 4		
Agent 5		
Agent 6		

4.1 SMS self-assessment

Non-exhaustive topics and list of questions

Management of training related to the SMS.
Have the functions that play an important role in the SMS been identified?
Has a training plan been defined for each function concerned?
Has this plan been validated? By whom?
Has it been implemented?
Can the traceability of these trainings be demonstrated?

Have all agents been made aware of the SMS?
Can we demonstrate the traceability of these sensitizations?

4 SAFETY PROMOTION
4.2 Safety communication

4.2 Requirement

The service provider shall develop and maintain a formal means for safety communication that:
a) ensures personnel are aware of the SMS to a degree commensurate with their positions;
b) conveys safety-critical information;
c) explains why particular actions are taken to improve safety; and
d) explains why safety procedures are introduced or changed.

4.2 Implementation by ANSP

SMS information
The ANSP provides all agents with information from the SMS: the SMS manual, procedures, safety review reports, audit reports, etc. Agents must be able to find this information easily.

Safety information
The ANSP ensures that the agents concerned are informed of the main safety problems encountered internally or originating from another organization.

Internal information:
In order to encourage the postponement of events, it is appropriate in return to inform the agents concerned (ATCO and/or ATSEP) of the actions taken (corrective actions and feedback) and to reply systematically to any request concerning safety.

External information
Safety information from other organizations, particularly at the regional level, can be made available to agents**.**

How to inform? Examples of information provision:
1) put the documents in PDF format and place them on a local server with access by hypertext links.
2) Send the information by email to the agents.
3) Inform the agents by e-mail that a new document is available, giving a reminder of where it is located.

4.2 SMS self-assessment

Non-exhaustive topics and list of questions

Is information relating to the SMS (SMS manual, procedures, management review report, audit reports, annual action plan, corrective actions, etc.) made available to all agents?
How and by whom?
Are the indicators published?
How and by whom?
Are ATCOs and ATSEPs informed of safety issues in other organizations? How and by whom?

5 EVALUATION OF OVERALL SMS PERFORMANCE

The evaluation of the overall performance of the SMS by the CAA is done on the basis of the results of the CAA audits by a college of ANS inspectors. This assessment aims to clarify areas for improvement by the PSNA and to be carefully monitored by the CAA.
CAA audits are built on the 4 pillars of SMS defined in Annex 19 appendix 2 and allow evaluations to be made for each requirement at 3 levels (low, partial, completed) as indicated in the table below, and according to the results self-assessments defined in this guide for each pillar.

Exigence RACH19	Niveau Faible	Niveau Partiel	Niveau Terminé
19.3.1 POLITIQUE ET OBJECTIFS SECURITE			
19.3.1.1 Engagement de la Direction			
19.3.1.2 Obligations de rendre compte et responsabilité en matière de sécurité			
19.3.1.3 Nomination du personnel clé chargé de la sécurité			
19.3.1.4 Coordination de la planification des interventions d'urgence			
19.3.1.5 Documentation relative au SGS			
19.3.2 GESTION DES RISQUES DE SECURITE			
19.3.2.1 Détermination des dangers et évaluation et atténuation des risques de sécurité			
19.3.3 ASSURANCE DE LA SECURITE			
19.3.3.1 Suivi et mesure de la performance de sécurité			
19.3.3.2 La gestion du changement			
19.3.3.3 Amélioration continue du SGS			
19.3.4 PROMOTION DE LA SECURITE			
19.3.4.1 Formation et sensibilisation			
19.3.4.2 Communication en matière de sécurité			

For a finer definition of the levels of the 4 pillars it is possible to assess the overall performance of the SMS (maturity of the SMS) by using criteria defined below:
- Criteria 1: Safety culture
- Criteria 2: Risk analysis
- Criteria 3: Management of the SMS/SMS
- Criteria 4: Corrective actions
- Criteria 5: Improvement and change
- Criteria 6: Interface management
- Criteria 7: Documentation
- Criteria 8: Training and communication

The overall performance level of the SMS is used to define the appropriate monitoring of the PSNA and to adapt the monitoring cycle defined by the CAA.

Detailed evaluation according to the criteria:

- Criteria 1: Safety culture
o The safety manager and the Director are involved in safety
o The principles of just culture are applied within the operator
o Staff know their safety responsibilities
o Safety managers are open to the outside world
o Managers and staff apply good safety practices

- Criteria 2: Risk analysis
o The reports are of quality and varied
o Analysts apply a robust risk assessment method
o The operator produces a consolidated analysis within a reasonable time frame
o Different data sources are analyzed to identify hazards
o Risk mapping exists and is updated
- Criteria 3: Management of the SMS
o Safety priorities are defined and known to all
o These priorities are adapted to the operator
o These priorities serve as a basis for decisions made within the framework of the SMS/SMS
o The safety Manager and the Director carry out regular monitoring of safety performance
o The safety manager and the Director carry out regular monitoring of compliance
- Criteria 4: Corrective action
o Corrective actions are decided to solve the problems identified
o The effectiveness of corrective actions is monitored
o The measures presented to the CAA are generally acceptable on the first try
o Internal compliance/quality monitoring is effective
o Compliance monitoring program includes regular inspections
- Criteria 5: Improvement and change
o A review of the performance of the SMS is carried out regularly
o Changes requiring a risk study are anticipated
o Risks induced by a change are identified
o Necessary mitigation actions are implemented to manage risks
o The residual risk is evaluated a posteriori in order to validate the hypotheses
- Criteria 6: Interface management
o The operator has reliable contacts with the interfacing organizations
o The operator obtains analyzes from third-party organizations
o Regular management points are organized with subcontractors
o Subcontractors take the necessary measures required by the operator
o Subcontractor risks and compliance are integrated into the SMS
- Criteria 7: Documentation
o The documentation is adapted to the operator
o Documentation is systematically up to date
o The documentation is easily accessible to everyone
o Staff know the procedures applicable to them
o Staff actually apply procedures in reality
- Criteria 8: Training and communication
o The safety information necessary for staff is distributed to them
o The messages broadcast are clear and addressed to the right people
o A variety of means of communication are used
o Correct understanding of the messages delivered is checked
o Staff are able to reproduce the main messages broadcast

The details of these criteria can be adapted, depending on the specificities of the domain. For small organizations, the detailed content of these criteria can be reduced, while retaining the 8 criteria.