



ICAO Doc 10159: Safety Intelligence Manual

First Edition (2025) – A landmark guide transforming how aviation organizations collect, analyze, and act on safety data to support risk-based decision making.

The Manual

What is ICAO Doc 10159?

Purpose

The Safety Intelligence Manual provides practical guidance on collecting, processing, validating, and analyzing safety data – and sharing safety information between organizations.

Relationship to Doc 9859

Doc 10159 does **not** replace the Safety Management Manual (**Doc 9859**). Instead, it expands the detailed guidance on safety data, analysis, and intelligence that previously formed part of the **SMM** – establishing an effective Safety Data Collection and Processing System (**SDCPS**).

Why ICAO Introduced Safety Intelligence

Historically, aviation organizations focused on investigating accidents, recording incidents, monitoring hazards, and producing reports. But **possessing large amounts of safety data does not necessarily improve safety.**

→ What are the most significant risks?



→ Which hazards are increasing?

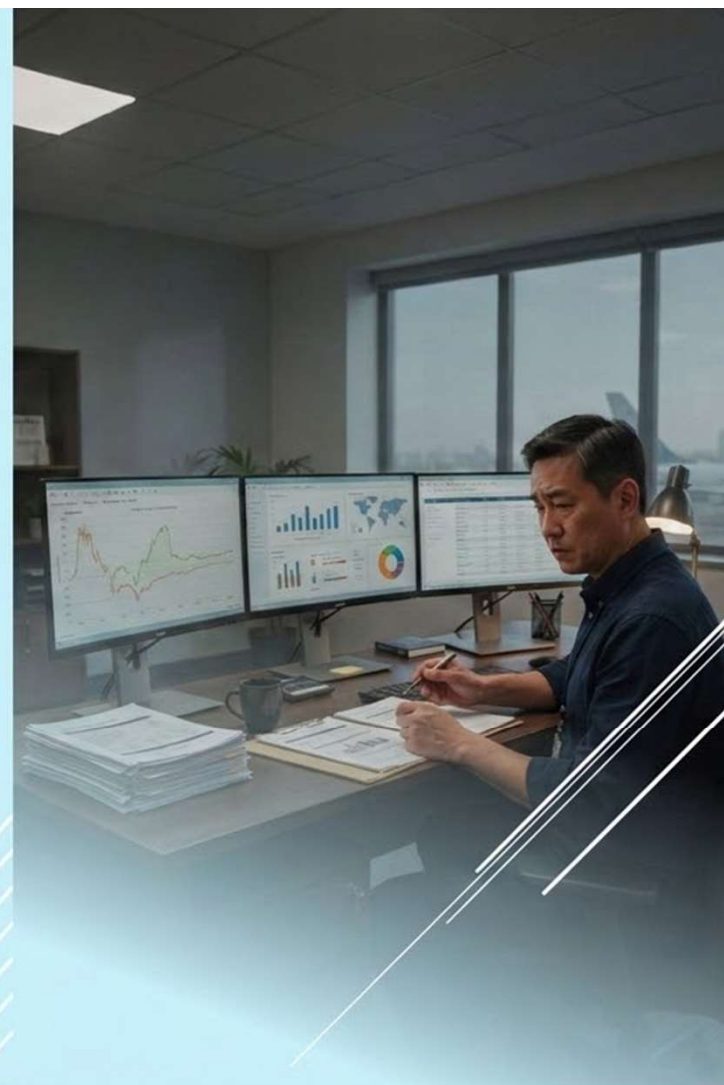


→ Where should resources be allocated?



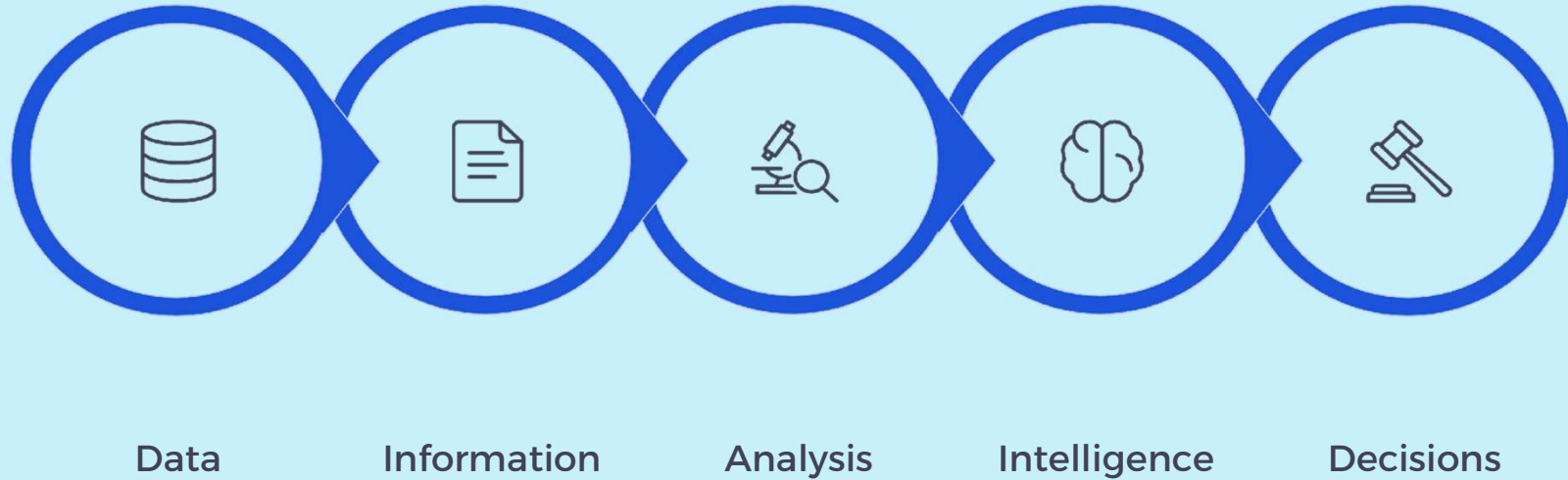
→ What emerging threats are not yet visible through traditional indicators?

The answer to all of these questions is **Safety Intelligence.**



Defining Safety Intelligence

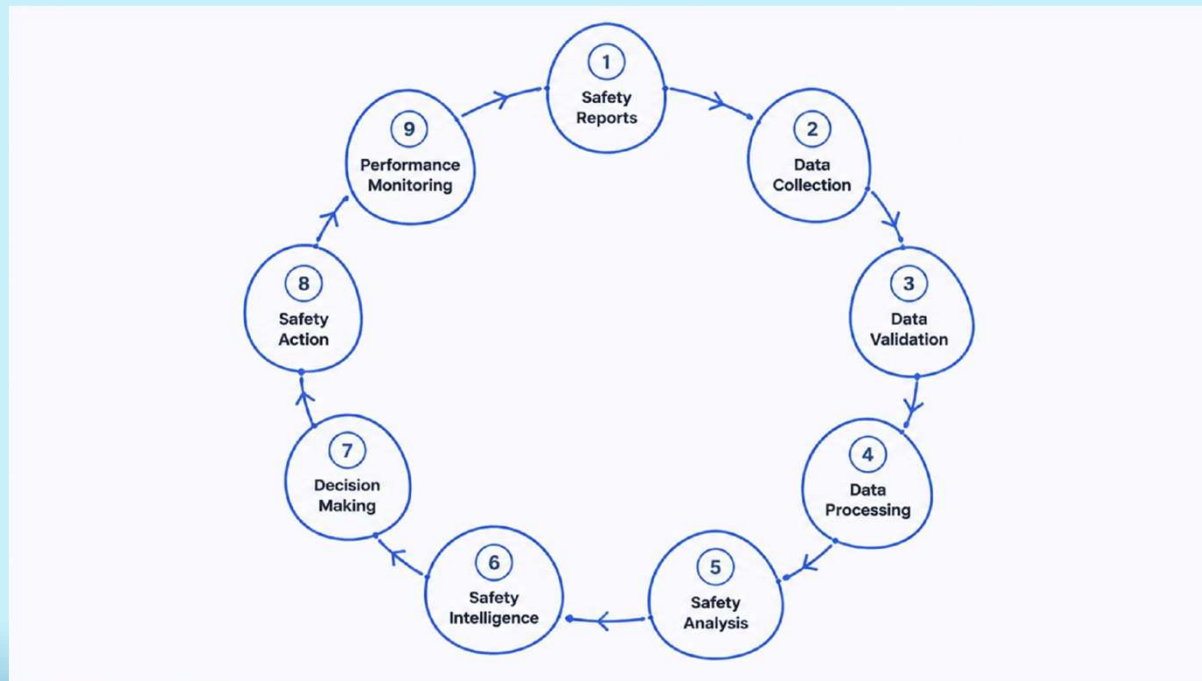
Safety Intelligence is the transformation of safety data and safety information into meaningful knowledge that supports informed safety decisions.



This pipeline is the core concept of Doc 10159 — moving beyond raw data collection toward actionable knowledge that drives real safety improvements.

The Safety Intelligence Cycle

Doc 10159 describes safety intelligence as a **continuous cycle** – fundamentally different from simply maintaining a reporting database.



Each stage feeds the next, ensuring that safety actions are monitored and feed back into the system for ongoing improvement.

Data vs. Information vs. Intelligence

1

Safety Data

Raw observations – bird strikes, FOQA exceedances, maintenance defects. *"There were 25 unstable approaches."*
Alone, this has little value.

2

Safety Information

Data that has been organized into context. *"25 unstable approaches occurred during winter, mainly at Airport X."* A trend begins to emerge.

3

Safety Intelligence

Information analyzed to support decisions. Unstable approaches increased **42%**, linked to tailwind ops, a specific STAR, and late ATC vectoring – enabling management to act.

Intelligence in Action: A Real Example

When analysis reveals that unstable approaches increased by **42%** – mostly during tailwind operations, associated with one specific STAR, and linked to late ATC vectoring – management gains the power to act decisively:

Revise SOPs

Update procedures for the affected approach profile

Coordinate with ATC

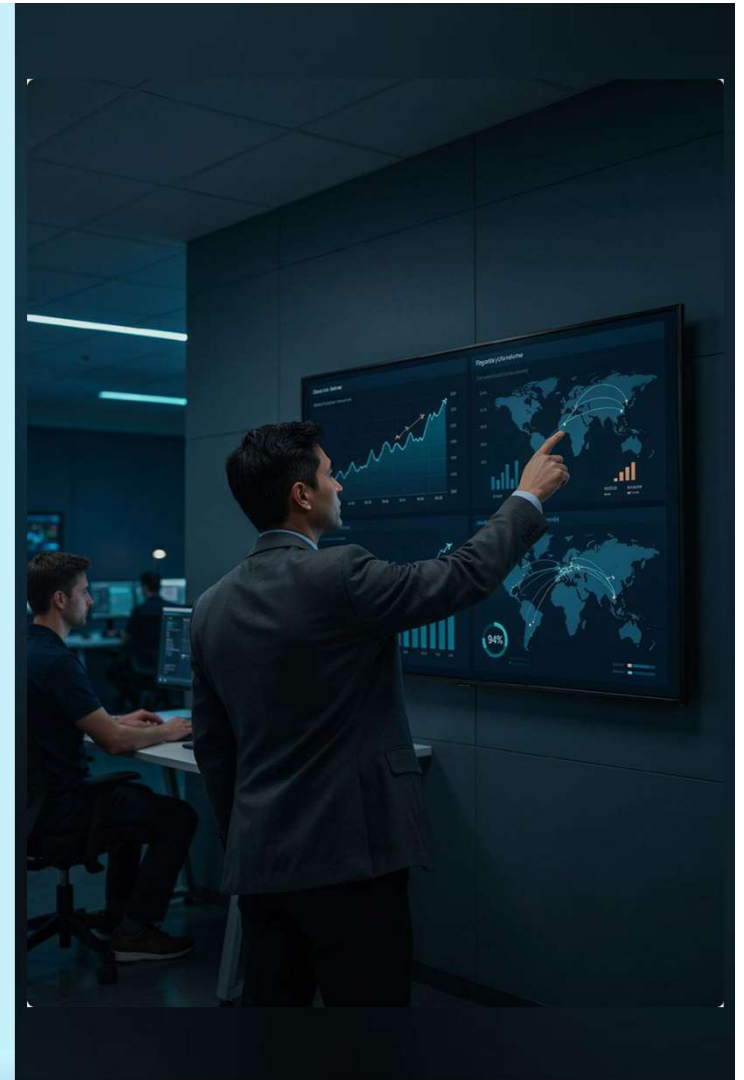
Address late vectoring contributing to instability

Issue Crew Guidance

Targeted briefings for affected routes and conditions

Increase Monitoring

Heightened surveillance of runway excursion risk



Main Objectives of Doc 10159



Evidence-Based Decisions

Support management with data-driven safety decisions rather than intuition alone.



Early Risk Detection

Detect emerging risks before they escalate into incidents or accidents.



Proactive SMS

Improve predictive safety management and reduce operational risk.



Collaboration

Enhance information sharing and resource allocation across organizations.

Structure of Doc 10159

The manual is organized around the complete safety intelligence process across **8 chapters**:

Chapter	Subject
1	Safety Intelligence concepts and strategy
2	Safety Data and Safety Information
3	Safety Data Processing
4	Safety Data Collection and Processing System (SDCPS)
5	Governance and Management of Safety Data
6	Safety Data and Information Analysis
7	Using Analysis Results for Decision Making
8	Sharing and Exchange of Safety Information and Safety Intelligence

The Safety Data Collection and Processing System (SDCPS)

One of the major additions introduced alongside Annex 19, the SDCPS is **much more than an occurrence reporting system**. It integrates data from diverse sources into a single analytical environment.

Flight Data Monitoring

FDM / FOQA

Occurrence Reporting

Mandatory & voluntary

Air Traffic Services

ATS data feeds

Maintenance & Cabin

Defects & safety reports

Audits & Surveys

LOSA, MEDA, REPA

External Sources

Investigations, met data, databases

Safety Intelligence Supports All Four SMS Components

Unlike organizations that treat safety analysis as a separate activity, ICAO positions Safety Intelligence as the **foundation** for all four SMS pillars:



Safety Policy & Objectives



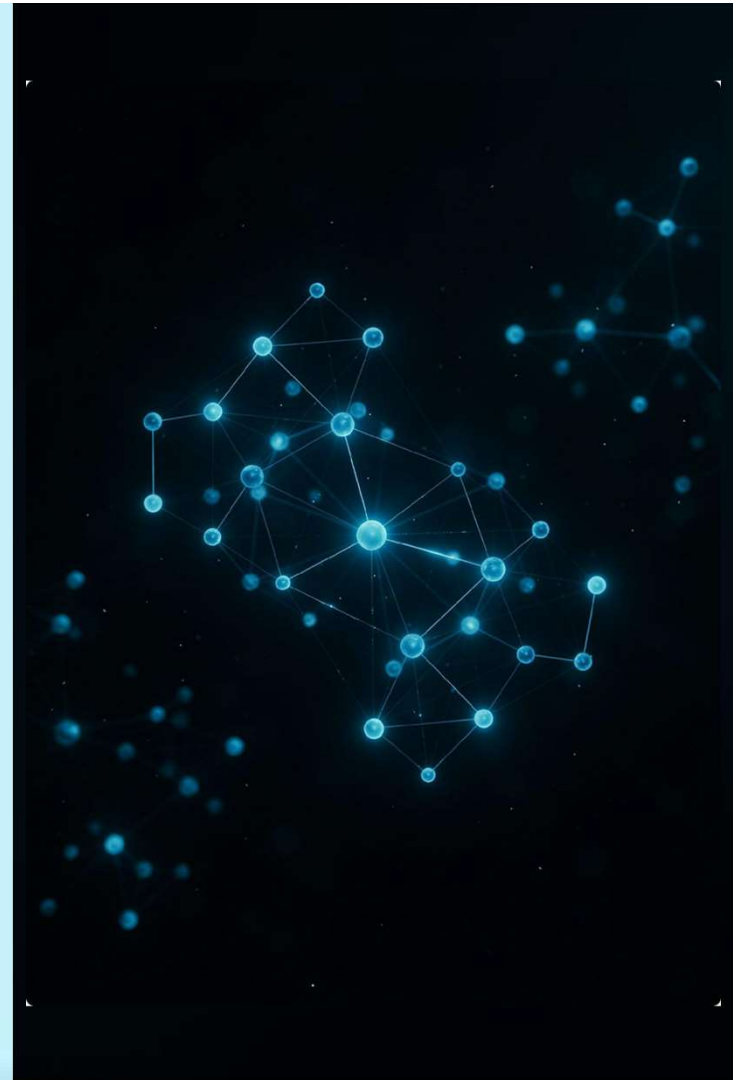
Safety Risk Management



Safety Assurance



Safety Promotion



Relationship with ICAO Annex 19

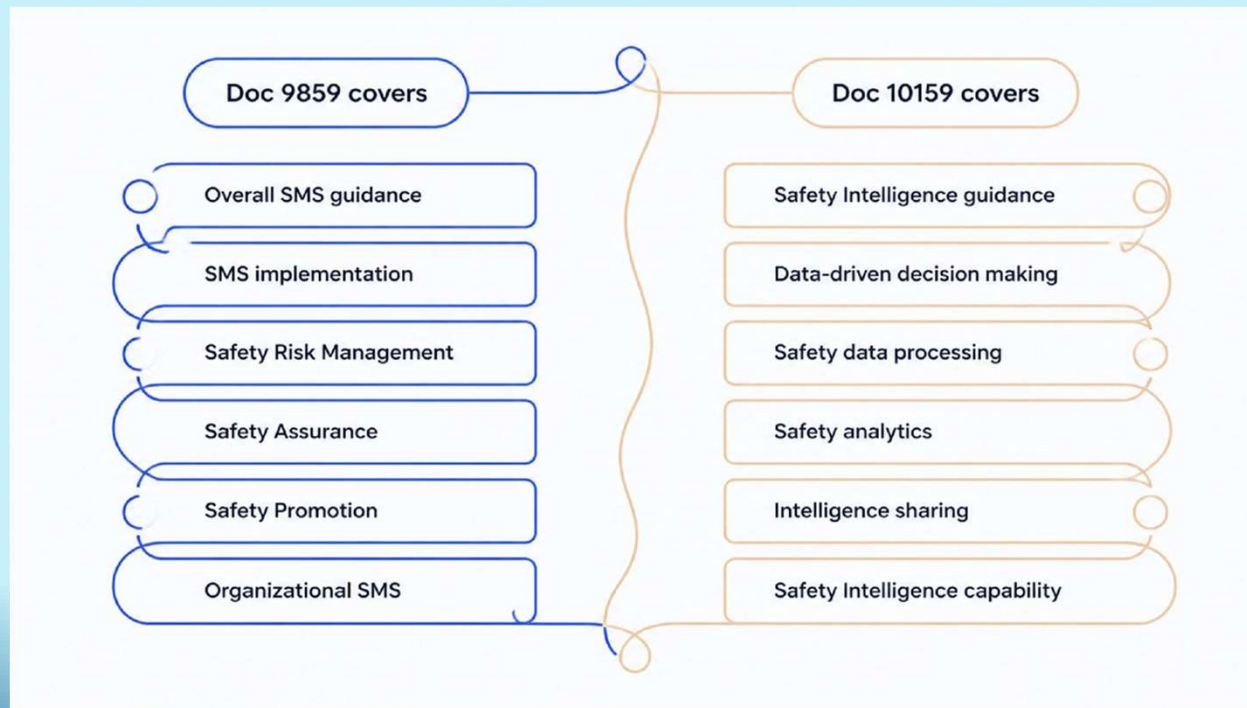
The latest amendments to Annex 19 place **greater emphasis on developing safety intelligence**. States are recommended to establish strategies for developing safety intelligence to support safety management and decision-making.

Service providers are expected to strengthen their safety data collection, processing, analysis, and sharing capabilities through effective SMS implementation.



Doc 9859 vs. Doc 10159

Together, these two documents provide a **complete framework** for modern safety management. Think of them as complementary, not competing:



A Complete Safety Management Framework

Doc 9859 – The SMS Foundation

Provides the overarching framework for Safety Management Systems – policy, risk management, assurance, and promotion at the organizational level.

Doc 10159 – The Intelligence Engine

Adds the analytical capability that transforms raw safety data into actionable intelligence – enabling smarter, faster, evidence-based decisions across the entire organization.

- Used together, Doc 9859 and Doc 10159 represent ICAO's most comprehensive guidance yet for proactive, data-driven aviation safety management.

Key Takeaways

1 Safety Intelligence is a structured capability

Moving from raw data to decisions through a continuous, disciplined cycle.

2 SDCPS integrates all safety data sources

Creating a single analytical environment far beyond traditional reporting systems.

3 Doc 10159 complements Doc 9859

Together they form a complete, modern framework for evidence-based safety management.

4 Intelligence underpins all SMS components

Safety Intelligence is the foundation – not an add-on – for effective SMS implementation.

