Finnish Aviation Safety Programme
Annex 2 Finland’s Safety Objectives and Safety Performance Indicators
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Introduction

Starting points and objectives
The purpose of safety analysis and risk assessment is to monitor the overall situation in the system in conjunction with operators and stakeholders, and to improve the traffic system’s safety by collecting and analysing essential safety data. This provides a basis for decision-making regarding the risk-based focusing of oversight and regulatory measures and safety communications. Awareness of the big picture in the transport system is also required, for traffic policy purposes and strategy plans of various time spans.

Safety Performance Indicators constitute a key tool in analysing large quantities of data, helping to identify safety threats. These indicators often reflect changes in the number of events. Analysing the events themselves and their causes uncovers key safety threats and unfavourable trends, and helps in finding measures to prevent or mitigate them. The effectiveness of Safety Performance Indicators is evaluated on an annual basis.

Finland’s safety objectives and Safety Performance Indicators were defined based on the principles of the European Aviation Safety Programme (EASP). Safety Performance
Indicators (SPIs) are grouped into three levels or tiers. The European Aviation Safety Programme describes the tiers and the reasoning behind the classification as follows:

First tier SPIs refer to the number of accidents and serious incidents. This is mainly intended for the general public and describes the final result of the safety level visible to the public. The same first tier SPIs are monitored in Finland, at EU level and globally.

Second tier SPIs measure the functionality of the system and focus on certain crucial issues identified as the most common or serious accident types, including at international level, and which therefore require monitoring and safety enhancement measures. These incident types have been defined in accordance with international definitions (e.g. those of the ICAO).

Third tier SPIs were developed by reflecting on the causal factors of second tier incident types. After identifying causal factors, the incident types and indicators expressing these factors were determined. By monitoring the third tier SPIs, defining the relevant safety performance targets for national operators and following up on how these targets are achieved, we seek to prevent second tier incidents. At the same time, the follow-up of third tier SPIs assists in measuring the functionality of the targets defined.

Third tier SPIs may be contributing factors in more than one type of second tier incident.

The titles of third tier SPIs given are followed by a reference in parentheses to the second tier SPI considered to be the closest related.

This document constitutes Annex 2 to the Finnish Aviation Safety Programme, listing the aviation SPIs monitored in Finland, with definitions, data sources, measurement principles and proportioning principles. Safety performance targets for each SPI are also given. Safety performance targets have been defined for training organisations, air operators, maintenance organisations, aircraft design and manufacturing organisations, air traffic service providers and airport operators. Actions taken by the Finnish Transport Safety Agency to attain the safety performance targets of first tier and second tier SPIs are described in the Finnish National Aviation Safety Plan.

For several third tier SPIs, the safety performance target is defined as follows: “2014: Safety performance target: Conduct a risk assessment of one’s own operations, identify the actions required, implement actions and monitor their effects. Reduce the number of incidents caused by one’s own operations.” Although some incident types will probably never be completely eliminated, the aim to reduce their number is based on the underlying principle of continuously developing and improving actors’ own operations.

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First tier safety performance indicators (SPIs)

1.1 Accidents

Definition
Number of aviation accidents.

EU Regulation 996/2010: An accident is an occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

a) a person is fatally or seriously injured as a result of:
   - being in the aircraft, or
   - direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or
   - direct exposure to jet blast,

   except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

b) the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft, and would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes) or minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike, (including holes in the radome); or

c) the aircraft is missing or is completely inaccessible.

Serious injury means an injury which is sustained by a person in an accident and which involves one of the following:

a) hospitalisation for more than 48 hours, commencing within 7 days from the date the injury was received,
b) a fracture of any bone (except simple fractures of fingers, toes, or nose),
c) lacerations which cause severe haemorrhage, nerve, muscle or tendon damage,
d) injury to any internal organ,
e) second or third degree burns, or any burns affecting more than 5% of the body surface,
f) verified exposure to infectious substances or harmful radiation.

**Data sources**
Principal data sources are Air Safety Reports.

**Measurement**
Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the number of hours flown.

**Safety performance target**
2014: Commercial air transport: no accidents

General and sport aviation: decreasing number of accidents
1.2 Serious incidents

Definition

Serious incidents in aviation.

EU Regulation 996/2010: A serious incident means an incident involving circumstances indicating that there was a high probability of an accident and is associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down.

A list of examples of serious incidents is set out in the Annex to EU Regulation 996/2010.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the number of hours flown.

Safety performance target

2014: Commercial air transport: downward trend in the rate of serious incidents in proportion to traffic volume (five-year average)

General and sport aviation: decreasing number of serious incidents

1.3 Fatalities

Definition

Persons who incurred a fatal injury in an aviation accident.
EU Regulation 996/2010: A *fatal injury* means an injury which is sustained by a person in an accident and which results in his or her death within 30 days of the accident.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the number of hours flown.

**Safety performance target**

2014: Commercial air transport: no fatalities

General and sport aviation: no more than three fatalities (four-year average)
2 Second tier safety performance indicators (SPIs)

2.1 Runway excursions (RE)

Definition

A runway excursion is an uncontrolled exit by an aircraft from a runway during takeoff or landing. This may be unintentional or intentional, for instance as the result of an evasive manoeuvre.

"A veer off or overrun off the runway surface." (ICAO)

Types of runway excursion (source: Eurocontrol Skybrary):

- A departing aircraft fails to become airborne or successfully reject the take off before reaching the end of the designated runway.
- A landing aircraft is unable to stop before the end of the designated runway is reached.
- An aircraft taking off, rejecting take off or landing departs from the side of the designated runway.

The Runway Excursion category includes also two types of occurrences which do not fit the ICAO ADREP definition for a runway excursion, however considered appropriate for inclusion due to the commonality of a number of causal and contributory factors and/or mitigation approaches:

- An aircraft attempting a landing touches down in the undershoot area of the designated landing runway within the aerodrome perimeter.
- A runway or taxiway other than the designated one is used for a take off or a landing.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: RE.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target
2014: Safety performance target: Conduct a risk assessment of own operations, identify any actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.
2.2 Runway incursions (RI-VAP)

Definition

A runway incursion is any situation where an aircraft, vehicle or person is present on the runway or its protected area, without clearance or otherwise incorrectly. This includes low approaches executed without clearance or otherwise incorrectly.

"Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft." (ICAO)

Trafi follows the interpretation guideline for types of runway incursion given in the Eurocontrol Annual Safety Template.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: RI-VAP.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

2.3 Mid-air collisions and near misses (MAC)

Definition

A mid-air collision is a situation where airborne aircraft come into contact with one another. "An AIRPROX [aircraft proximity, near miss] is a situation in which, in the opinion of a pilot or air traffic services personnel, the distance between aircraft as well as
their relative positions and speed have been such that the safety of the aircraft involved may have been compromised.

An aircraft proximity is classified as follows:

- **A - Risk of collision.** The risk classification of an aircraft proximity in which serious risk of collision has existed.
- **B - Safety not assured.** The risk classification of an aircraft proximity in which the safety of the aircraft may have been compromised.
- **C - No risk of collision.** The risk classification of an aircraft proximity in which no risk of collision has existed.
- **D - Risk not determined.** The risk classification of an aircraft proximity in which insufficient information was available to determine the risk involved, or inconclusive or conflicting evidence precluded such determination. (ICAO)"

This includes all cases of separation minima infringement between airborne aircraft, and all TCAS RA cases.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: MAC.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

**2.4 Controlled flight into terrain and similar situations (CFIT)**

**Definition**

Controlled flight into (or towards) terrain occurs when an airworthy aircraft under the complete control of the pilot is inadvertently flown (or nearly flown) into terrain, water or an obstacle.
This includes all cases of separation minima infringement between airborne aircraft and obstacles.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: CFIT.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

### 2.5 Loss of control in flight (LOC-I)

**Definition**

Loss of control in flight means a situation where the pilot loses control of an airborne aircraft, resulting in a significant deviation from the aircraft’s intended flight path. Such a loss of control may be temporary or total. It may be caused by human error, mechanical fault or external factors.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: LOC-I.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**
2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

2.6 Ground collisions – collisions while taxiing to or from a runway in use (GCOL)

Definition

A ground collision while taxiing to or from a runway in use is a situation where an aircraft comes into contact with another aircraft, a vehicle, a person, an animal, a structure, a building or any other obstacle while moving under its own power in any part of the airport other than the active runway, excluding power pushback.

The crew must be on board, the beacon must be on, and the aircraft must be in motion and in flight configuration. Collisions caused by runway incursions or ground handling are excluded from this category.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: GCOL.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.
3 Third tier safety performance indicators (SPIs)

3.1 Unstable approaches (RE)

Definition

An unstable approach is any situation where the approach of an aircraft is not stable as per the criteria in the Flight Operations Manual (OM-A).

If an unstable approach is continued, in the worst case scenario it may result in a runway excursion.

Typically, an approach is considered stable if it fulfils the following criteria (source: Eurocontrol Skybrary):

- The aircraft is on the correct flight path;
- Only small changes in heading/pitch are necessary to maintain the correct flight path;
- The airspeed is not more than VREF + 20kts indicated speed and not less than VREF;
- The aircraft is in the correct landing configuration;
- Sink rate is no greater than 1000 feet/minute; if an approach requires a sink rate greater than 1000 feet/minute a special briefing should be conducted;
- Power setting is appropriate for the aircraft configuration and is not below the minimum power for the approach as defined by the operating manual;
- All briefings and checklists have been conducted;
- Specific types of approach are stabilized if they also fulfil the following:
  - ILS approaches must be flown within one dot of the glide-slope and localizer;
  - a Category II or III approach must be flown within the expanded localizer band;
  - during a circling approach wings should be level on final when the aircraft reaches 300 feet above airport elevation; and,
- Unique approach conditions or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing.

Data sources

Principal data source is FDM data. Also Air Safety Reports.

Measurement

Abbreviation: UA.
Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Runway excursions.
3.2 Landing gear and reverse thrust malfunctions (RE)

Definition

Cases involving a malfunction in the landing gear or engine reverse thrust mechanism of an aircraft. Includes tire bursts but excludes landing gear position indicator instrument failure. A landing gear or reverse thrust malfunction may lead to a runway excursion.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: LG + REV.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Runway excursions.

3.3 Deficiencies in runway condition and related information (RE)

Definition

Cases where information was not provided on the condition of the runway or the information provided was incorrect (for instance: SNOWTAM, MOTNE or ATIS information was incorrect, and ATC did not provide the correct information). This category excludes notifications of runway slipperiness and cases where incorrect information was provided on areas of the airport other than the runway.

If correct information on the runway condition is not provided, the flight crew cannot take the appropriate precautions or decide to abort their approach. Operating on a slippery runway may result in a runway excursion.

Data sources
Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: RWY CON.

Monitor the overall number of cases. Consider the number of cases in proportion to the overall number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Runway excursions.*

### 3.4 Downwind landings and takeoffs (RE)

**Definition**

Cases where any wind component given by ATC (tailwind/crosswind/headwind) exceeded the defined maximum and the aircraft nevertheless proceeded with landing or takeoff.

Landing or takeoff performed when a wind component exceeds its maximum may lead to a runway excursion.

**Data sources**

Principal data sources are Air Safety Reports. FDM data may be used as background data, as applicable.

**Measurement**

Abbreviation: WIND.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Runway excursions.*
3.5 Abnormal runway contact (RE)

Definition

Cases involving any takeoff or landing where the aircraft makes abnormal contact with the runway or other landing area. Examples include hard/heavy landings, long/fast landings, off-centre landings, crabbed landings, nose wheel first touchdown, tail strikes and wing tip/nacelle strikes.

Gear-up landings are also recorded here. However, if the landing gear is up due to a technical malfunction, the incident is also recorded in the Landing gear & reverse thrust malfunction category. This category excludes cases where the landing gear fails during takeoff or landing, except if the landing gear failure was caused by abnormal runway contact.

An abnormal runway contact may lead to a runway excursion.

Data sources

Principal data sources are Air Safety Reports. FDM data may be used as background data as applicable.

Measurement

Abbreviation: ARC.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Runway excursions.
3.6 High-speed rejected takeoff (RE)

**Definition**

Cases where a rejected takeoff was executed after the speed callout that, as per standard operating procedure (SOP), indicates the transition from the low-speed regime to the high-speed regime of the takeoff roll. This is typically given at a speed of 80 to 100 knots.

A high-speed rejected takeoff may lead to a runway excursion if it proves impossible to stop the aircraft on the length of runway remaining.

**Data sources**

Principal data sources are Air Safety Reports, and also FDM data.

**Measurement**

Abbreviation: RTO.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Runway excursions.*
3.7 Runway incursions by aircraft (RI-VAP)

Definition

Cases where an aircraft movement (e.g. action contrary to ATC clearance) causes a runway incursion. Low approaches without clearance are included in this category.

In the classification of runway incursions, it is important to investigate who was principally responsible for the occurrence so that the actions of the appropriate party can be addressed.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: RI AC.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Investigate runway incursions on a case-by-case basis to determine whether the event was caused directly by aircraft operations or whether ATC actions directly or indirectly contributed to the event.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Runway incursions.

3.8 Runway incursions with direct/indirect ATC contribution (RI-VAP)

Definition

Cases where action by air traffic control (air traffic management, ATM) directly or indirectly causes a runway incursion. This includes cases of readback/hearback error, where an air traffic controller fails to correct an incorrect acknowledgement, cases where
an air traffic controller uses inappropriate phraseology, and cases where a clearance issued was not in compliance with regulations.

In the classification of runway incursions, it is important to investigate who was principally responsible for the occurrence, so that the actions of the appropriate party may be addressed.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

**Abbreviation:** RI ATCO.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Investigate runway incursions on a case-by-case basis to determine whether the event was caused directly by aircraft operations, or whether ATC actions directly or indirectly contributed to the event.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Runway incursions.*

### 3.9 Runway incursions by vehicle or person (RI-VAP)

**Definition**

Cases where a runway incursion was caused by a ground vehicle or a person.

In the classification of runway incursions, it is important to investigate who was principally responsible for the occurrence, so that the actions of the appropriate party may be addressed.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**
Abbreviation: RI OTHER.

Monitor the overall number of cases and consider that number in proportion to the number of operations in ATS units.

Investigate runway incursions on a case-by-case basis to determine whether the event was caused directly by aircraft operations, or whether ATC actions directly or indirectly contributed to the event.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Runway incursions.*

### 3.10 Runway incursions with direct/indirect ATC contribution at Helsinki-Vantaa Airport (RI-VAP)

**Definition**

According to Finland’s performance plan pursuant to EU Regulation 691/2010, special attention will be paid to runway incursions with direct/indirect ATC contribution at Helsinki-Vantaa Airport.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: No abbreviation defined.

Monitor the overall number of cases. Consider the number of cases in proportion to the number of operations at Helsinki-Vantaa Airport.

Investigate runway incursions on a case-by-case basis to determine whether the event was caused directly by aircraft operations, or whether ATC actions directly or indirectly contributed to the event.

**Safety performance target**

2014: Safety performance target: Decreasing trend in the annual number of runway incursions over a five-year average, measured as the event rate per 100,000 operations.
Related second tier SPI: Runway incursions.
3.11 Separation minima infringements caused by aircraft (MAC)

Definition

Cases where an aircraft movement (e.g. action contrary to ATC clearance) caused an infringement of a separation minimum between aircraft, between aircraft and terrain, or between aircraft and controlled airspace.

A defined loss of separation between airborne aircraft occurs whenever specified separation minima in controlled airspace are breached. Minimum separation standards for airspace are specified by ATS authorities, based on ICAO standards. A loss of separation between aircraft which are responsible for their own separation by visual lookout is not subject to definition. (Eurocontrol Skybrary)

Cases involving infringement of separation minima to controlled airspace (P, D, R, TSA, etc.) or of wake turbulence separation in the air and on the runway are included. Infringements of runway separation are excluded from this category; they are included under runway incursions.

Loss of separation increases the risk of a collision or near miss. The more serious and frequent the cases of loss of separation are, the higher the overall risk.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: SMI.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units. Investigate losses of separation on a case-by-case basis to determine whether the event was caused directly by aircraft operations, or whether ATC actions directly or indirectly contributed to the event.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Mid-air collisions and near misses.
3.12  Separation minima infringements with direct/indirect ATC contribution (MAC)

Definition

Cases where action by ATC caused an infringement of a separation minimum between aircraft, between aircraft and terrain, or between aircraft and controlled airspace.

A defined loss of separation between airborne aircraft occurs whenever specified separation minima in controlled airspace are breached. Minimum separation standards for airspace are specified by ATS authorities, based on ICAO standards. A loss of separation between aircraft which are responsible for their own separation by visual lookout is not subject to definition. (Eurocontrol Skybrary)

Cases involving infringement of separation minima for controlled airspace (P, D, R, TSA, etc.) or of wake turbulence separation in the air and on the runway are included. Infringements of runway separation are excluded from this category; they are included under runway incursions.

Loss of separation increases the risk of a collision or near miss. The more serious and frequent the cases of loss of separation are, the higher the overall risk.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: SMI ATCO.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Investigate losses of separation on a case-by-case basis, to determine whether the event was caused directly by aircraft operations or whether ATC actions directly or indirectly contributed to the event.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.
3.13 Separation minima infringements with direct/indirect ATC contribution involving a civilian IFR aircraft (MAC)

Definition

According to Finland’s performance plan pursuant to EU Regulation 691/2010, separate monitoring is dedicated to separation minima infringements caused directly or indirectly by the actions of air traffic control (air traffic management, ATM) between airborne aircraft and involving a civilian IFR aircraft.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: No separate abbreviation.

Monitor the overall number of cases. Consider the number of cases in proportion to hours flown by civilian IFR aircraft in the Finland FIR.

Investigate losses of separation on a case-by-case basis to determine whether the event was caused directly by aircraft operations, or whether ATC actions directly or indirectly contributed to the event.

Safety performance target

2014: Safety performance target: Decreasing trend in the annual number of losses of separation over a five-year average, measured as the incident rate per 100,000 operations.

3.14 Airspace infringements (MAC)

Definition

Cases where an aircraft entered controlled or restricted airspace (TSA, D, P, R) or an ADIZ without appropriate clearance or permission.

Airspace infringement occurs when an aircraft enters notified airspace without previously requesting and obtaining clearance from the controlling authority of that airspace, or
enters the airspace under conditions that were not contained in the clearance.
(Eurocontrol Skybrary)

This category includes cases where an aircraft exited a training area into controlled airspace or into another training area.

This category further includes failure of coordination between ATS bodies, resulting in an aircraft entering controlled airspace without the receiving ATS being aware of it.

An incursion into controlled airspace may lead to a near miss, as ATC will not be aware of the unauthorised traffic and cannot take it into account when directing authorised traffic. Similarly, an incursion into restricted airspace may place an aircraft in serious danger, for instance over firing ranges.

Data sources
Principal data sources are Air Safety Reports.

Measurement

Abbreviation: AI.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Mid-air collisions and near misses.

3.15 Level busts of more than 300 or 200 feet (MAC)

Definition

Cases where an aircraft deviated up or down, from the altitude for which it has been cleared, by more than 300 feet, or in RVSM airspace by more than 200 feet.

A Level Bust or Altitude Deviation occurs when an aircraft fails to fly at the level to which it has been cleared, regardless of whether actual loss of separation from other aircraft or the ground results. (Eurocontrol Skybrary)
Cases where the ATS gave the aircraft clearance for an incorrect altitude are excluded.

A level bust may lead to loss of separation with another aircraft and thereby to a near miss.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: LB.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Mid-air collisions and near misses.

3.16 Incorrect response to TCAS-RA (MAC)

Definition

Cases where the aircraft crew reacted incorrectly to a TCAS-RA, a Traffic Collision Avoidance System resolution advisory, i.e. an instruction to take evasive action. The crew failed to comply with the instructions given by the system.

The TCAS is a system that allows the radar transponders in aircraft to ‘talk’ to one another. If the distance between any two aircraft is less than the parameters set in the system, the TCAS in those aircraft will issue their crews with instructions to pull up or descend. This system represents the final failsafe for preventing mid-air collisions. If the instructions given by the system are ignored, the aircraft is in great danger of a mid-air collision or near miss.

Data sources
Principal data sources are Air Safety Reports, and also FDM data.

**Measurement**

Abbreviation: TCAS IGN.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Mid-air collisions and near misses.*
3.17  Lateral deviations from cleared flight path (MAC)

Definition

Cases where an aircraft deviated laterally from its cleared flight path: lateral deviations from ATC clearance, following the wrong SID/STAR, deviating from the assigned SID/STAR or track by more than the maximum defined for the track in question, etc.

A lateral deviation from the flight path may lead to loss of separation or airspace infringement and thereby to a near miss.

Data sources

Principal data sources are Air Safety Reports, and also FDM data.

Measurement

Abbreviation: NAV ERROR.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Mid-air collisions and near misses.
3.18 Incorrect altimeter pressure settings (CFIT)

Definition

Cases where an incorrect setting was entered in the altimeter of an aircraft. Includes cases where the change of altimeter setting from QNH to standard pressure or vice versa was forgotten, or where an incorrect altimeter setting was made.

An incorrect altimeter pressure setting may lead to a deviation from the cleared altitude or, in the worst case scenario, if the pressure setting is higher than the current pressure on the ground, may cause the aircraft to descend too low and collide with terrain. Aircraft engaged in commercial aviation have an additional radio altimeter that indicates the altitude based on radio wave returns at low altitudes (less than 2,500) and is independent of any incorrect setting in the pressure altimeter. However, many aircraft do not have a radio altimeter, and an incorrect altimeter setting is a considerable risk factor for them.

Data sources

Principal data sources are Air Safety Reports, and also FDM data.

Measurement

Abbreviation: QNH.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Controlled flight into terrain and similar situations.
3.19 **Ground Proximity Warning System (GPWS) terrain warnings (CFIT)**

**Definition**

Cases where a ‘terrain’ alert was issued by the Ground Proximity Warning System (GPWS) or Enhanced Ground Proximity Warning System (EGPWS). The GPWS is a system based on radio altimeter data. It alerts the crew if the aircraft is in danger of colliding with terrain or an obstacle. The EGPWS also includes terrain profile data and relies on GPS, and is thus able to warn the crew about terrain other than that directly beneath the aircraft.

If the GPWS is activated and issues a ‘terrain’ alert, the aircraft is already dangerously low, and controlled flight into terrain is imminent unless action is taken.

**Data sources**

Principal data sources are Air Safety Reports, and also FDM data.

**Measurement**

Abbreviation: GPWS.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Controlled flight into terrain and similar situations.*
3.20 Errors and omissions in aeronautical charts (CFIT)

Definition

Cases where aeronautical chart data in aircraft databases was incorrect, involving outdated information, incorrect or outdated SID/STAR/waypoint information, or errors and omissions in AIS publication charts, e.g. permanent obstacles not marked on the chart, or erroneous altitude or location information.

Errors in chart data may lead to an aircraft crew ignoring or not paying sufficient attention to an obstacle or terrain, which may lead to a near miss or collision. Errors in SID/STAR/waypoint data in aircraft databases may lead to a lateral or vertical deviation from a cleared flight path and thereby to loss of separation and near misses.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: CHART.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Controlled flight into terrain and similar situations; and Mid-air collisions and near misses.
3.21 Laser interference (LOC-I)

Definition

Cases where laser interference was perpetrated in Finland or where laser interference perpetrated against a Finnish aircraft abroad was reported.

Aiming a laser at an aircraft, especially during approach and landing, may blind the flight crew and lead to a loss of control during a critical phase of flight, potentially causing an accident.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: LASER.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Increase awareness among own personnel of laser interference and train them how to respond to such cases. Report all cases of laser interference.

Related second tier SPI: Loss of control in flight.

3.22 Low speed and high speed cases (LOC-I)

Definition

Cases where the airspeed of an airborne aircraft was above the situation-specific maximum or below the situation-specific minimum during any phase of flight. Includes stick shaker cases.
Flying below a determined minimum airspeed may lead to a stall, which constitutes a dangerous incident on larger aircraft in particular. Exceeding the maximum airspeed may lead to loss of control of the aircraft.

**Data sources**

Principal data sources are Air Safety Reports, and also FDM data.

**Measurement**

Abbreviation: SPEED.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Loss of control in flight.*

### 3.23 Wake turbulence incidents (LOC-I)

**Definition**

Cases where an aircraft encountered the wake turbulence of another aircraft and this precipitated an incident. This category excludes loss of wake vortex separation, unless it precipitates an incident.

A wake vortex or wake turbulence is turbulence in the air caused by a passing aircraft. Heavier aircraft create larger wake vortices. A situation in which a lighter aircraft encounters such a wake vortex, especially on approach or takeoff, is highly dangerous, as the lighter aircraft may flip over. The impact of wake turbulence is mitigated by maintaining sufficient separation between aircraft of different weight categories. However, reliably predicting the movements of wake turbulence is impossible.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**
Abbreviation: WAKE.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Loss of control in flight.*
3.24 Fire or smoke on aircraft (LOC-I)

Definition
All cases where fire or smoke was detected on an aircraft.

Fire on board an aircraft is an extremely dangerous situation that may rapidly lead to the loss of the aircraft.

Data sources
Principal data sources are Air Safety Reports.

Measurement
Abbreviation: FIRE.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

Safety performance target
2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Loss of control in flight.

3.25 Deicing and anti-icing errors (LOC-I)

Definition
Cases where deicing or anti-icing was not performed, was performed incorrectly or was performed using the wrong mixture or amount, or where the aircraft departed after the holdover time had elapsed. This category includes cases where deicing fluid residue caused problems, the aircraft’s own deicing systems could not cope with icing in flight, or the aircraft had no deicing system and encountered icing conditions; this category excludes malfunctions in the deicing system.
Ice forming on the wings and other surfaces of an aircraft crucially affects the aircraft’s aerodynamic properties. In order to remove ice and prevent ice from forming, deicing agent is sprayed onto the surfaces of the aircraft. Many aircraft also have on-board deicing systems that are used to remove accumulated ice in flight.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: ICE.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Loss of control in flight; Runway excursions.*

### 3.26 Aircraft weight and balance errors (LOC-I)

**Definition**

All cases involving shortcomings, errors and occurrences related to the weight or balance of an aircraft, e.g. loading errors and load sheet errors.

Errors or shortcomings in the loading of an aircraft or how the loading is recorded may lead to the aircraft being imbalanced in flight, which in certain situations may lead to loss of control.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: LOAD.
Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Loss of control in flight.*
3.27 Control system failures (LOC-I)

Definition

Cases involving one or more failures in the control system of an aircraft, including flight control surface failure, autoflight system failure and control indicator failure (e.g. airspeed and attitude data), etc.

Control system failure affects the controllability of the aircraft and the situational awareness of the flight crew, and hence may lead to loss of control or a runway excursion.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: FCONT.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Loss of control in flight; Runway excursions.

3.28 Ground handling damage (LOC-I)

Definition

Cases involving damage to an aircraft on the ground, e.g. cases where a vehicle collides with the aircraft during ground handling (catering, de-icing, towing, loading). This
includes cases where the aircraft is in motion, except where the aircraft is in motion immediately preceding takeoff or immediately after landing.

Damage to the aircraft may contribute to loss of control in flight if the damage is not detected in time. Also, repairing damage causes delays and costs.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: GH.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: There is no directly related second tier SPI, but this may be a contributing factor to loss of control in flight.*

### 3.29 Pushback or taxi interference (GCOL)

**Definition**

Cases involving interference with the pushback or taxiing of an aircraft, including interference with power pushback.

Commercial aircraft in particular are commonly parked so that they need to be pushed back in order to taxi. In this manoeuvre, a ground vehicle passing behind the aircraft may cause a collision. Ground vehicles may also pose a hazard to taxiing aircraft.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: PB.
Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Ground collisions – collisions while taxiing to or from a runway in use.*
3.30 Insufficient supervision at apron (GCOL)

Definition

Cases where, due to insufficient or an entire lack of supervision on the apron, passengers gained access to areas where they should not be (e.g. passing under the wing or retrieving their luggage from the hold of the aircraft), rather than proceeding directly to the aircraft from the bus.

Numerous hazards are posed to individual passengers in the vicinity of an aircraft, such as static electricity and rotating propellers. Passengers may also cause damage to the aircraft. Passengers must therefore be supervised on the apron.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: APRON.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: Ground collisions – collisions while taxiing to or from a runway in use.

3.31 Foreign Object Debris (FOD) in the manoeuvring area and apron, and damage caused (GCOL)

Definition
Foreign Object Debris (FOD) includes any and all objects and materials observed anywhere at the airport, in places where they should not be and where they could cause damage to equipment or persons. FOD includes but is not limited to loose items, tools and machinery, loose pieces of pavement, catering equipment, building materials, stones, sand, baggage and animals. This category includes cases where the required FOD inspection was not carried out at all.

FOD may be sucked into an aircraft engine, or an aircraft or part thereof may collide with FOD, causing damage. FOD may also be propelled by the aircraft engine exhaust and damage persons, vehicles or other equipment.

**Data sources**

Principal data sources are Air Safety Reports and occurrence reports received from ground handling companies.

**Measurement**

Abbreviation: FOD.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Ground collisions – collisions while taxiing to or from a runway in use.*
3.32  Air navigation service technical systems and functions

3.32.1  Weather observation errors

Definition

Cases where weather observations (e.g. cloud, wind or visibility data) differed from the actual weather.

At several airports, weather observations are made using automated weather observing systems (AWOS), which has caused considerable debate. Reports concerning these systems are included in these SPIs, for the purpose of monitoring the situation.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: WX.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI.

3.32.2  Air navigation services communications system malfunctions or disruptions (MAC)

Definition
Cases where air navigation services communications systems (e.g. phone, FPL, OLDI, Eurocat coordination) experienced an ATM-specific occurrence with Eurocontrol ESARR 2 severity classification C (Ability to provide safe but degraded ATM service) or above. The severity of the incident may be assessed using the Risk Analysis Tool developed by Eurocontrol.

Air navigation services involve several technical systems used for providing these services. Most systems have a backup system used to provide the service, in case a principal system malfunctions or fails, and in such cases the malfunction or failure is not necessarily visible to aircraft. In some cases, however, there is no backup system in case of malfunction or failure, the backup system is insufficient, or the malfunction or failure has affected service provision and reduced safety, or has led to significant delays. This category is included in SPI monitoring, for keeping track of such situations.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: COM.

Monitor the number of cases, both overall and itemised by ATS unit. Consider the number of cases in proportion to the overall number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI. System errors may be contributing factors, for instance in mid-air near misses.

3.32.3 Air navigation services navigation system malfunctions or disruptions (MAC)

Definition

Cases where air navigation services navigation systems (e.g. ILS, VOR, DME) experienced an ATM-specific occurrence with Eurocontrol ESARR 2 severity classification
C (Ability to provide safe but degraded ATM service) or above. The severity of the incident may be assessed using the Risk Analysis Tool developed by Eurocontrol.

Air navigation services involve several technical systems used for providing these services. Most systems have a backup system used to provide the service in case a principal system malfunctions or fails, and in these cases the malfunction or failure is not necessarily visible to the aircraft. In some cases, however, there is no backup system in case of malfunction or failure, or the backup system is insufficient, or the malfunction or failure has affected service provision and reduced safety, or has led to significant delays. This category is included in the SPI monitoring for keeping track of such situations.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: NAV.

Monitor the number of cases, both overall and itemised by ATS unit. Consider the number of cases in proportion to the overall number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI. System errors may be contributing factors, for instance in mid-air near misses.

3.32.4 Air navigation services surveillance system malfunctions or disruptions (MAC)

Definition

Cases where air navigation services surveillance systems (e.g. Eurocat, radar) experienced an ATM-specific occurrence with Eurocontrol ESARR 2 severity classification C (Ability to provide safe but degraded ATM service) or above. The severity of the incident may be assessed using the Risk Analysis Tool developed by Eurocontrol.
Air navigation services involve several technical systems used for providing these services. Most systems have a backup system used to provide the service in case a principal system malfunctions or fails, and in these cases the malfunction or failure is not necessarily visible to the aircraft. In some cases, however, there is no backup system in case of malfunction or failure, the backup system is insufficient, or the malfunction or failure has affected service provision and reduced safety, or caused significant delays. This category is included in SPI monitoring, for keeping track of such situations.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: SUR.

Monitor the number of cases, both overall and itemised by ATS unit. Consider the number of cases in proportion to the overall number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI. System errors may be contributing factors, for instance in loss of separation, possibly leading to mid-air near misses.
3.33 Aerodrome technical systems and functions

3.33.1 Shortcomings in airport rescue services

Definition

Cases where shortcomings are noted in airport rescue services, e.g. shortage of personnel, equipment problems, malfunctions and failures of the alert system.

Airports must provide and equip an adequate rescue system for aircraft operating at the airport, including an organised rescue service and firefighting and rescue equipment. Shortcomings in rescue services may lead to rescue operations not being performed effectively in the case of an accident.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: PEPA.

Monitor the number of cases, both overall and itemised by ATS unit. Consider the number of cases in proportion to the overall number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI.
3.34 Aircraft technical systems and maintenance

3.34.1 Dual system failures (LOC-I)

Definition

Dual system failures/bleed, hydraulics, etc. Cases where more than one system in an aircraft failed.

In most cases, aircraft have at least double redundancy in their critical systems, so that in case of a failure at least one system remains in operation. If more than one system fails, the operation of the aircraft may be endangered.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: DUAL.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI; this has to do with aircraft technical systems and maintenance. Dual system failures may be contributory factors to loss of control.
3.34.2 Occurrences in Minimum Equipment List and technical log use (LOC-I)

Definition

Cases where faults in the Minimum Equipment List (MEL) were allowed to remain uncorrected for a long period (MEL item extensions, major faults), including cases where a company applied for an MEL item extension. This category also includes errors and shortcomings in the use of the technical log (flight crew entries).

Certain types of aircraft have a Minimum Equipment List (MEL) prescribing which systems, instruments and equipment must be in operating condition for the aircraft to be allowed to fly. An MEL may also prescribe restrictions on operations. Deviations from certain items on the MEL may be allowed if an exception (known as an MEL extension) is applied for. However, this is always an exceptional situation that should be rectified as soon as possible. Technical faults noted by the flight crew are entered by them into the technical log. If such an entry is incorrect or incomplete, repair of the fault may be delayed or ignored.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: MEL.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI. Shortages in the Minimum Equipment List and errors in fault entries in the technical log may be contributing factors to loss of control.
3.34.3 Occurrences in maintenance and airworthiness monitoring (LOC-I)

Definition

Cases involving shortcomings in the maintenance monitoring system (occurrence concerning the Part-M airworthiness management organisation), e.g.

- airworthiness data is incomplete, incorrect or inconsistent
- AD monitoring shortcomings
- shortcomings or errors in certification
- problems related to part scavenging
- issues in assembly, machinery, devices (including errors in trial runs, shortcomings in traceability, life-limited parts, premature scrapping)
- errors in management of hold item lists
- errors in management/supervision of modifications
- errors or shortcomings in the monitoring/timing of normal maintenance procedures (Tasks, EOs, etc.)
- shortcomings or incorrect entries in the Tech Log (by the technical personnel)
- shortcomings or errors in the maintenance instructions

Maintenance of aircraft is specifically regulated and provided for; this must be carried out precisely according to instructions and current procedures, and maintenance operations must be systematically administered. Insufficient or incorrect maintenance supervision may lead to aircraft not being airworthy.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: MC.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

Safety performance target
2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

**Related second tier SPI:** There is no directly related second tier SPI. Shortcomings and errors in maintenance instructions and maintenance operations may be contributing factors to loss of control.

### 3.34.4 Occurrences in maintenance operations (LOC-I)

**Definition**

Cases where a maintenance procedure was incomplete or incorrectly carried out and did not fulfil its intended purpose (occurrence concerning the Part-145 maintenance organisation), e.g.

- shortcomings in installations or checks (no check performed, hatch screws missing)
- incorrectly installed item, switch left in wrong position, maintenance left C/B tripped
- item not removed/installed, landing gear pins, protective covers
- (cases often involving incomplete finishing up by maintenance personnel)
- incorrect installation/performance (gasket damaged or installed incorrectly, cross-wiring, item not installed (pipe fitting, checking, etc.; incomplete adjustment + testing)
- wrong part number, wrong type of material
- incorrect installation (unaccepted welding, wiring extension, wiring repair, incorrect structural repair)
- action not performed (landing gear oil missing, lubrication not carried out, Task, AD, SB partly or completely not done)
- item left in wrong state (C/B or switches as per the MEL in wrong position, tyre left pressurised when sent to maintenance rotation)
- bad maintenance culture (procedures), fluid leaks not cleaned up
- deviation from maintenance procedure (SB instructions not followed in detail, corners cut in Task procedures)
- item not removed (protective plug or tape, etc.)

The maintenance of aircraft is specifically regulated and provided for; this must be carried out precisely according to instructions and current procedures, and maintenance operations must be systematically administered. Insufficient or incorrect maintenance supervision may lead to aircraft not being airworthy.

**Data sources**

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www.trafi.fi
Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: IM.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI:* There is no directly related second tier SPI. Shortcomings and errors in maintenance instructions and maintenance operations may be contributing factors to loss of control.
3.34.5   **Serious technical problems in aircraft (LOC-I)**

**Definition**

Cases where a technical fault caused a flight to be aborted, an emergency to be declared or an aircraft to be grounded (the latter for instance if a structural flaw is discovered). Examples include decompression, critical system or device failures, engine failures (on a single-engine aircraft), loss of engine power or flameout (on multi-engine aircraft), unexpected structural flaws, ruptures and corrosion.

Serious technical problems in an aircraft may cause a serious incident or an accident if not reacted to in time. Engine failure, especially on a single-engine aircraft, will immediately precipitate a serious incident.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: TECHNICAL.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to the hours and sectors flown.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Serious technical problems may lead to loss of control or directly cause an accident.*
3.34.6 Transponder faults and failures (MAC)

**Definition**

Cases where the data returned by the transponder system are missing or incorrect, for instance if the transponder on an aircraft does not respond to interrogations or fails, or if the incorrect code has been entered in the transponder.

In a case of transponder failure, the aircraft will not be visible on the ATC secondary radar system, and the TCAS on other aircraft will not be able to locate the aircraft for the purpose of calculating potential conflicts.

**Data sources**

Principal data sources are Air Safety Reports.

**Measurement**

Abbreviation: TRANS.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

**Safety performance target**

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

*Related second tier SPI: Mid-air collisions and near misses.*
3.35 Emerging threats

3.35.1 Human error and other disruptions in taxi or lineup, leading to wrong configuration, wrong weight, wrong FMS data or wrong location upon takeoff

Definition

Any and all cases involving human error and other disruptions in taxi or lineup, leading to takeoff with the wrong configuration, wrong weight or wrong FMS data, or from the wrong location.

Taxi and takeoff are phases of flight where it is crucial for the flight crew to operate exactly according to specified procedures. This is ensured with checklists that the crew use to complete these procedures. In most cases, these flight phases also involve several other actions (instructions given by ATC, etc.), which may lead to deviations from normal procedures, causing failure to check a particular system and thereby posing a risk.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: PHUF.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI. Human error during this phase of flight may be a contributory factor to a runway incursion or runway excursion.
3.35.2 Fatigue during flight operations and air navigation services

Definition

Any and all cases involving fatigue and other decreased working capacity.

Flight operations and air navigation services are both functions in whose case personnel must be alert in order to ensure safety. Performing tasks while fatigued easily leads to mistakes, and mistakes made during critical phases of flight could precipitate an incident. When finances are tight, there may be pressure to extend work shifts or shorten rest periods; it is therefore important to monitor the incidence of fatigue reports.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: FAT.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI. Fatigue may be a contributing factor in loss of control or a near miss.

3.35.3 Refuelling incidents and occurrences

Definition

Cases involving incidents and occurrences resulting from deviations from refuelling instructions and regulations.
Aircraft are frequently refuelled with large quantities of highly flammable fuel. There may be hot surfaces or static electricity in the vicinity of the aircraft, posing a risk of fuel ignition. A fire in the vicinity of an aircraft and fuel tanks is dangerous, not only to the aircraft being refuelled but to the entire airport. Refuelling operations are therefore closely regulated.

Data sources

Principal data sources are Air Safety Reports.

Measurement

Abbreviation: FUELING.

Monitor the number of cases, both overall and itemised by commercial air transport, general aviation and sport aviation. Consider the number of cases in proportion to hours flown, sectors flown and number of operations in ATS units.

Safety performance target

2014: Safety performance target: Conduct a risk assessment of own operations, identify actions required, implement actions and monitor their effects. Reduce the number of cases caused by own operations.

Related second tier SPI: There is no directly related second tier SPI. Refuelling incidents may lead to an accident (fire).
3.36 Legislation and supervision

3.36.1 Use of the Risk Analysis Tool

Definition
Monitoring of the application rate of the Risk Analysis Tool developed by Eurocontrol.

The Eurocontrol Risk Analysis Tool may be used to assess the severity and recurrence of Air Safety Reports. According to EU Regulation 691/2010, the severity classification of the Risk Analysis Tool shall be applied to allow harmonised reporting of severity assessment of Separation Minima Infringement, Runway Incursions and ATM Specific Technical Events at all Air Traffic Control Centres and airports with more than 150,000 commercial air transport movements per year. In Finland, this applies to Helsinki-Vantaa Airport and Area Control Centre Finland (EFIN).

Data sources
Principal data sources are Air Safety Reports.

Measurement
Abbreviation: No abbreviation defined.

Application of the Risk Analysis Tool is the responsibility of Trafi Analysis and Finavia. Trafi compiles data on the Risk Analysis Tool application rate and reports to the European Commission on a bi-annual basis.

Safety performance target
2014: Safety performance target: No target defined at this time.

Related second tier SPI: There is no directly related second tier SPI. Application of the Risk Analysis Tool harmonises severity classification across Europe and helps identify cases where incidents are of a severity that requires action by the authorities.
3.37 Safety management

3.37.1 Functioning of safety management system

Definition

Measurement of the functioning of the Safety Management System of Air Traffic Service providers.

Every organisation offering Air Traffic Services is required to have a Safety Management System (SMS). According to EU Regulation 691/2010, the effectiveness of safety management must be measured according to a specific formula, using data obtained through a survey.

Data sources

ATM Safety Framework Maturity Survey.

Measurement

Abbreviation: No abbreviation defined.

Trafi and Finavia are responsible for conducting the Survey.

Safety performance target

2014: Safety performance target: No target defined at this time.

Measurement

ATM Safety Framework Maturity Survey.

Related second tier SPI: There is no directly related second tier SPI. A functioning Safety Management System is an essential component in a safe Air Traffic Service organisation.
3.38 Just Culture

3.38.1 Minimum level of unit used to assess Just Culture

Definition

Reporting on Just Culture.

‘Just Culture’ refers to an organisational practice intended to create a workplace environment where employees feel they can report any safety issues they observe, without fear of penalisation or recrimination, as long as they comply with established regulations. Creating a Just Culture is crucial to early awareness of safety issues, so that they can be addressed.

Data sources

ATM Safety Framework Maturity Survey.

Measurement

Abbreviation: No abbreviation defined.

Trafi and Finavia are responsible for conducting the Survey.

Safety performance target

2014: Safety performance target: No target defined at this time.

Related second tier SPI: There is no directly related second tier SPI. Achieving a good Just Culture is important, so that Air Safety Reports can be freely filed and sufficient and timely data on air safety issues obtained.