ANNEX 9.2

Belgian Aviation Safety Programme

Safety Performance Indicators

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Safety Performance Indicators (SPIs)

Introduction

According to ICAO doc. 9859[5], a Safety Performance Indicator (SPI) is a databased safety parameter used for monitoring and addressing safety performance. Safety Performance Indicators are a key tool for identifying safety risks and determining trends. They help in defining measures to prevent or mitigate those risks.
SPIs are evaluated on an annual basis to determine their effectiveness and applicability.

EASA defines three levels for SPIs[2][3][4]:

- **Tier 1:** High Level SPIs
  Accidents and serious incidents
  First tier SPIs aim to provide a general assessment of safety and inform the public or other stakeholders external to aviation about broad safety trends (accidents and incidents as defined by ICAO Annex 13[6]). Monitored by operation type.
- Tier 2: SPIs on Operational Issues
  Second tier SPIs help identify and monitor specific areas of the system which require safety measures, initiatives or actions. Monitored by occurrence type.
- Tier 3: SPIs on Tier2
  The aim of **third tier SPIs** is to provide information on the effectiveness of specific safety measures, initiatives or actions. These SPIs focus on causal factors of Tier 2 incidents.

Basically there are two types of SPIs:

- Activity or leading indicators are a measure of whether or not a control is actually in place. They are proactive, usually measuring performance against a level of tolerance for a particular event type. These indicators highlight the need for action when a tolerance level is exceeded.
- Outcome or lagging indicators measure events after they have occurred. When focusing on safety, the majority are undesirable events. These reactive indicators give an idea about the effectiveness of the controls in place.

This document focusses on defining the **first and second Tier SPIs** for the State of Belgium.
For **Tier 1** SPIs, only a definition is given; the data is provided by the Air Accident Investigation Unit (Belgium) (AAIU(Be)).
Tier 2 SPIs are measured by analyzing data from the ECCAIRS database.

In consultation with the concerned BCAA departments, 5 categories of second tier SPIs were defined:

- POR: for SPIs related to Aerodromes
- ANS: for SPIs related to Air Navigation Services
- OPS: for SPIs related to Aircraft Operations
- TEC: for SPIs related to Technical Issues
- GEN: for general SPIs

The link between the SPI and the corresponding action item in the EASp and/or BASp are indicated at the end of each SPI. Refer to Appendix 1 for a cross check matrix.

Each of the defined Tier 2 SPIs is closely monitored on a monthly base. For this purpose, an excel file was created per SPI containing all necessary data derived from the ECCAIRS database supplemented with alert levels.

The data is extracted from the ECCAIRS[10] database using the ECCAIRS 5 Data manager. This is a tool intended to export, exchange or transform occurrence data. With the Data Manager it is possible to extract desired data fields from the database into an excel format, based on ECCAIRS queries.

A next step in monitoring aviation safety shall be the introduction of Safety Performance Targets (SPTs) using statistical models. Much depends on the reporting culture and data quality.

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32	24/11/2015	01		70	24/11/2015	01	
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35	24/11/2015	01		73	24/11/2015	01	
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81	24/11/2015	01					

Overview updates

Not applicable in this first revision.

1. First tier Safety Performance Indicators

1.1 Definitions

In order to have a clear view, a number of definitions is necessary. The sources for these definitions are ICAO Annex 13[6]: Aircraft Accident and Incident Investigation, the ICAO Accident/Incident Data REPorting system (ADREP) Taxonomy[7], Regulation (EC) N° 216/2008[8] and Regulation (EU) N° 996/2010[9].
The ADREP system is operated and maintained by ICAO. The ADREP system receives, stores and provides States with occurrence data that will assist them in validating safety. In this context, the term 'occurrence' includes both accidents and incidents. The version of the ADREP system in current use is ADREP 2000.
The ADREP **Operation Type** taxonomy is a set of terms used by ICAO to categorize an occurrence by the type of flight which was conducted and to allow safety trend analysis on these categories.
The ADREP **Aircraft Category** taxonomy is a set of terms used by ICAO to classify aircraft according to specified basic characteristics, e.g. aeroplane, helicopter, glider, free balloon and to allow safety trend analysis on occurrences by this category.

Accident:

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 an 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, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as

small dents or puncture holes),or for 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.

Note 1.— For statistical uniformity only, an injury resulting in death within thirty days of the date of the accident is classified as a fatal injury by ICAO.

Note 2.— An aircraft is considered to be missing when the official search has been terminated and the wreckage has not been located.

Serious incident:

An incident involving circumstances indicating that that there was a high probability of an accident and 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 an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time as it comes to rest at the end of the flight and the primary propulsion system is shut down.

Note 1.— The difference between an accident and a serious incident lies only in the result.

Note 2.— Examples of serious incidents can be found in Attachment C of Annex 13 and in the Accident/Incident Reporting Manual (Doc 9156).

Commercial Air Transport (CAT):

Scheduled Commercial Air Transport

Air services:

- involving the transport of passengers, cargo or mail for remuneration or hire, and
- open to use by the general public, and
- operated according to a published timetable or with such a regular frequency that it constitutes an easily recognizable systematic series of flights which are open to direct booking by members of the public.

Non-Scheduled Commercial Air Transport

Charter flights and special flights performed for remuneration other than scheduled commercial flights.

Other Commercial Air Transport

Any other commercial air transport flights like air taxi, emergency medical services, ferry/positioning flights etc.

Non Commercial Air Transport:

General aviation (GA)

All civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire or aerial work.

Aerial work (AW)

An aircraft operation in which an aircraft is used commercially or non-commercially for specialized services such as agriculture, construction, photography, surveying, observation and patrol, search and rescue, aerial advertisement, etc.

State flight (SF)

An aircraft operation in which an aircraft is used for military, customs, police or other state internal services.

Business Aviation:

Business aviation is situated somewhere between CAT (e.g. charter, air ambulance, …) and GA (e.g. corporate operations, …). It can be linked to multiple categories of operations: Commercial Air transport (CAT); Non-Commercial operations with Complex aircraft (NCC); Non-Commercial operations with aircraft Other than complex (NCO), Special Operations (SPO).

Complex motor-powered aircraft:

(i) an aeroplane:

- with a maximum certificated take-off mass exceeding 5 700 kg, or
- certificated for a maximum passenger seating configuration of more than nineteen, or
- certificated for operation with a minimum crew of at least two pilots, or
- equipped with (a) turbojet engine(s) or more than one turboprop engine, or

(ii) a helicopter certificated:

- for a maximum take-off mass exceeding 3 175 kg, or
- for a maximum passenger seating configuration of more than nine, or
- for operation with a minimum crew of at least two pilots, or

(iii) a tilt rotor aircraft

fixed wing:

A fixed wing aircraft is a heavier than air aircraft with wings which remained in a fixed position under given conditions of flight. May include variable geometry aircraft.

Helicopter:

A helicopter is a heavier-than-air aircraft supported in flight chiefly by the reactions of the air on one or more power driven rotors on substantially vertical axes.

Rotorcraft:

Collecting noun for all rotor-driven aircraft, e.g. helicopters, autogyro's, gyrodynes, … These aircraft are heavier-than-air and lift is generated by multiple blades mounted on a rotating single mast (the rotor).

Balloon:

A non-power-driven lighter-than-air aircraft. For the purposes of ICAO Annex 1, this definition applies to free balloons.

Microlight:

May also be called "ultra-light" or "Ultra-light motorized" (ULM). The definitions vary from State to State.

One definition in ICAO documentation reads: an aircraft having a MTOM not exceeding 454 kg (1 000 lbs) which is not usually used for public transport purposes. More specifically, according to Annex II of Regulation(EC) N° 216/2008, a Microlight is an aeroplane, helicopter or powered parachute having no more than two seats, Vso (stall speed in landing configuration) not exceeding 35 knots (65 KM/h) CAS, and a maximum take-off mass of no more than:

- 300 kg for a landplane, single-seater; or
- 315 kg for a landplane, single-seater equipped with an airframe mounted total recovery parachute system
- 330 kg for an amphibian or floatplane, single-seater; or
- 495 kg for an amphibian or floatplane, two-seater, provided that a microlight capable of operating as both a floatplane and a landplane falls below both MTOM limits, as appropriate; or
- 450 kg for a landplane, two-seater; or
- 472,5 kg for a landplane, two-seater equipped with an airframe mounted total recovery parachute system

Foot-launched aircraft are excluded from this definition.

Glider:

Sailplane or Glider means a heavier-than-air aircraft that is supported in flight by the dynamic reaction of the air against its fixed lifting surfaces, the free flight of which does not depend on an engine.

1.2 Accidents and serious incidents

First tier SPIs aim to provide a general assessment of safety and inform the public or other stakeholders external to aviation about broad safety trends (accidents and incidents as defined by ICAO Annex 13[6]). They are monitored by operation type.

- **SPI-ASI-01 Commercial Air Transport**
  - **SPI-ASI-01a Fatal Accidents**
  - **SPI-ASI-01b Non-fatal Accidents**
  - **SPI-ASI-01c Serious incidents**
  - **SPI-ASI-01d Injuries**
- **SPI-ASI-02 Aerial Work**
  - **SPI-ASI-02a Fatal Accidents**
  - **SPI-ASI-02b Non-fatal Accidents**
  - **SPI-ASI-02c Serious incidents**
  - **SPI-ASI-02d Injuries**
- **SPI-ASI-03 General Aviation**
  - **SPI-ASI-03a Fatal Accidents**
  - **SPI-ASI-03b Non-fatal Accidents**
  - **SPI-ASI-03c Serious incidents**
  - **SPI-ASI-03d Injuries**

SPI-ASI-01 Commercial Air Transport (CAT)

This SPI focusses on all fatal accidents that involved aeroplanes with a mass greater than 5,700 kg conducting passenger and cargo operations, and that are operated by a Belgian operator or with an aircraft registered in Belgium. The data covers the annual number of accidents over a 4 year rolling period.

Includes: fixed-wing aeroplanes, business aviation and helicopters.

SPI-ASI-01a Fatal Accidents

SPI-ASI-01a focusses on fatal accidents that occurred in the domain of Commercial Air Transport.

SPI-ASI-01b Non-fatal Accidents

SPI-ASI-01b focusses on the accidents where no fatalities were reported and that occurred in the domain of Commercial Air Transport.

SPI-ASI-01c Serious Incidents

SPI-ASI-01c focusses on the number of incidents that were categorized as serious and that occurred in the domain of Commercial Air Transport.

SPI-ASI-01d Injuries

SPI-ASI-01c focusses on the number of fatalities, serious and minor injuries that occurred in the domain of Commercial Air Transport.

SPI-ASI-02 Aerial Work (AW)

This SPI covers all non-fatal accidents that occurred with aeroplanes involved in aerial work, for both fixed-wing and rotorcraft aeroplanes. The data covers the annual number of non-fatal accidents over a 4 year rolling period.

Includes: fixed-wing aeroplanes and helicopters.

SPI-ASI-02a Fatal Accidents

SPI-ASI-02a focusses on fatal accidents that occurred in the domain of Aerial Work.

SPI-ASI-02b Non-fatal Accidents

SPI-ASI-02b focusses on the accidents where no fatalities were reported and that occurred in the domain of Aerial Work.

SPI-ASI-02c Serious Incidents

SPI-ASI-02c focusses on the number of incidents that were categorized as serious and that occurred in the domain of Aerial Work.

SPI-ASI-02d Injuries

SPI-ASI-02d focusses on the number of fatalities, serious and minor injuries that occurred in the domain of Aerial Work.

SPI-ASI-03 General Aviation (GA)

This SPI covers all serious incidents that occurred during non-commercial activities with fixed wing aircraft, helicopters, balloons, gliders and ultra-light motorized (ULM) aeroplanes. The data covers the annual number of serious incidents over a 4 year rolling period.

Includes: fixed-wing aeroplanes, gliders, rotorcrafts, microlights and balloons.

SPI-ASI-03a Fatal Accidents

SPI-ASI-03a focusses on fatal accidents that occurred in the domain of General Aviation.

SPI-ASI-03b Non-fatal Accidents

SPI-ASI-03b focusses on non-fatal accidents that occurred in the domain of General Aviation.

SPI-ASI-03c Serious incidents

SPI-ASI-03c focusses on serious incidents that occurred in the domain of General Aviation.

SPI-ASI-03d Injuries

SPI-ASI-03d focusses on the number of fatalities, serious and minor injuries that occurred in the domain of General Aviation.

2. Second tier Safety Performance Indicators

Second tier SPIs help identify and monitor specific areas of the system which require safety measures, initiatives or actions. They are monitored by occurrence type.

As mentioned in the introduction, 5 categories of second tier SPIs were defined:

- 2.1 Aerodromes
- 2.2 Air Navigation Services
- 2.3 Operations
- 2.4 Technical
- 2.5 General SPIs

2.1 Aerodromes

- **SPI-POR-01 Runway Incursions**
- **SPI-POR-02 Wildlife Strikes**
- **SPI-POR-03 Collisions on Ground - RAMP**
- **SPI-POR-04 Ground handling services**
  - SPI-POR-04a GND handling services - all
  - SPI-POR-04b GND handling services - Loading
  - SPI-POR-04c GND handling services - Fuelling
- **SPI-POR-05 FOD**
- **SPI-POR-06 Runway Excursions**

SPI-POR-01 Runway Incursions

Definition

A runway incursion (RI) 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 DOC 4444)
Possible causes for runway incursions include: Deviation from ATC clearance, communication problems, weather, airport design, human error, flight preparation, traffic violations by ground handling companies, fatigue, workload …
A runway incursion can lead to: missed approach, rejected landing, go-around, runway excursion (RE), Loss of Control on Ground (LOC-G) or Inflight (LOC-I), Ground Collision (GCOL), Accidents resulting in loss of aircraft and/or casualties…

Includes:

- Runway incursions by an aircraft, by a person or by a vehicle or any kind of equipment

Not included:

- Events at unprepared/natural landing sites.
- Occurrences involving animals or birds on the runway

Note: **SPI-POR-01** does not take the role of ATM or the severity of the incident into account. This is done in **SPI-ANS-03**

Alignment with BASp / EASp

- BASp: OA06
- EASp: AER5.4

Measurement

Runway Incursions are more likely to occur at larger airports where more movements take place. Therefore it is necessary to look at each airport individually and divide the number of occurrences by the number of movements at that airport. For practical reasons, the calculation is done per 1000 movements.
The number of Runway Incursions is directly derived from the ECCAIRS database, the number of movements at the airport are taken from the official figures made available by the airports.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-POR-01 Runway Incursions			
454	State/area of occurrence		24. Belgium
390	Event type	2200100	Runway incursions
		2200101	*By an aircraft*
		2200103	*By a person*
		2200102	*By a vehicle/equipment*

Safety performance target

To be defined.

SPI-POR-02 Wildlife Strikes

Definition

Wildlife strikes include collisions with or engine ingestion of one or several birds or with wildlife on a runway or on a helipad/helideck in use.
Possible causes for wildlife strikes include: Wildlife control issues, migrating routes (seasonal), presence of FOD attracting wildlife, airport design and/or location (e.g. near natural preserves), …
Wildlife strikes may lead to: unstabilized/missed approach, rejected landing, go-around, runway excursion, Loss of Control on Ground (LOC-G) or Inflight (LOC-I), damage to Aircraft, flight delay (e.g. due to A/C or RWY inspection), aircraft return …

Includes:

- encounters with wildlife or birds on a runway in use or on any other movement area of the aerodrome.
- Includes engine ingestion of one or several birds/wildlife.
- Bird/wildlife encounters may occur at controlled or uncontrolled airports, or on unprepared/natural landing sites.

Note: No distinction is made between confirmed and unconfirmed strikes as this information is not clearly encoded in ECCAIRS until end of 2013.

Alignment with BASp / EASp

- BASp: OA01
- EASp: AER1.5

Measurement

Wildlife strikes are more likely to occur at larger airports where more movements take place. Therefor it is necessary to look at each airport individually and divide the number of occurrences by the number of movements at that airport. For practical reasons, the calculation is done per 1000 movements.
The number of Wildlife Strikes is directly derived from the ECCAIRS database, the number of movements at the airport are taken from the official figures made available by the airports.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-POR-02 Wildlife Strikes			
454	State/area of occurrence		24. Belgium
390	Event type	2140100	Turbine engine ingestion – bird
		2050301	Aircraft bird strike
		2050402	Collision aircraft-animal (excluding birds).

Safety Performance Target

To be defined.

SPI-POR-03 Collisions on Ground - RAMP

This SPI focusses on collisions on ground at aerodromes in Belgium that are directly related to ground handling activities. Collisions on the ground related to aircraft operation and occur while the aircraft is under pilot control are described in **SPI-OPS-02 GCOL**).
Possible causes for collisions on ground include: deviation from ATC clearance, communication problems, weather, airport design, flight preparation, ground traffic violations, fatigue, workload…
A collision on ground can result in: Loss of Control On Ground (LOC-G), a runway excursion, flight delay/cancellation, damage to Aircraft, …

Definition

Occurrences during (or as a result of) ground handling operations are categorized in ECCAIRS under RAMP - Occurrences during (or as a result of) ground handling operations.

The RAMP category in ECCAIRS contains incidents concerning all aspects of ground handling; this SPI focusses on collisions incidents that occurred at Belgian airports.

Includes:

- collisions of a towed aircraft with objects or obstacles
- Aircraft struck and/or damaged by vehicle
- Collision aircraft-vehicle (while the aircraft is parked)

Not included:

- Collisions while the aircraft is moving under its own power, which are coded under GCOL (refer to **SPI-OPS-02 GCOL**)
- Collisions with Wildlife (birds, animals) (refer to **SPI-POR-02 Wildlife Strikes**)

Alignment with BASp / EASp

- BASp: OA02
- EASp: -

Measurement

Ground handling related collisions are more likely to occur at larger airports where more movements take place. Therefor it is necessary to look at each airport individually and divide the number of occurrences by the number of movements at that airport. For practical reasons, the calculation is done per 1000 movements.
The number of ground handling related collisions is directly derived from the ECCAIRS database, the number of movements at the airport are taken from the official figures made available by the airports.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-POR-03 Collisions on Ground - RAMP			
454	State/area of occurrence		24. Belgium
390	Event type	5030704	A standing or parked aircraft was struck/damaged by a vehicle/equipment
		99010060	Collision of towed aircraft with object/obstacles
		2050415	Aircraft collision with a vehicle[1]

Safety performance target

To be defined.

[1] Includes only those incidents were the aircraft is parked (engines not operating)

SPI-POR-04 Ground handling services

This SPI covers all ground handling related events that occurred in Belgian airports, except for collisions (on ground) which are included in **SPI-POR-03 Collisions on Ground-RAMP**. Note that all occurrences are caused by ground handlers and services; occurrences caused by pilots are considered operational issues and are included in **SPI-OPS-02 Collisions on Ground-GCOL**. For this SPI, only international aerodromes are taken into account.
SPI-POR-04 is further divided into 3 sub-SPIs:

- SPI-ANS-04a GND handling services - all
- SPI-ANS-04b GND handling services - loading
- SPI-ANS-04c GND handling services - fuelling

SPI-POR-04a GND handling services - all

Definition

Incidents with Ground Handling Services often are a result of deviation from ATC clearance, communication problems, weather issues, airport design, fatigue, equipment failure (brakes, de-icing, …), …
Ground handling incidents may result in Ground Collision (GCOL), damage to Aircraft, Flight delay/cancellation, FOD, …

Includes:

- Aircraft marshalling and parking
- De-icing
- Line maintenance
- Catering
- Fluid and other servicing

Not included:

- collisions of a towed aircraft with objects or obstacles (see **SPI-POR-03**)
- Aircraft struck and/or damaged by vehicle (see **SPI-POR-03**)
- Collision aircraft-vehicle (while the aircraft is parked) (see **SPI-POR-03**)

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

Ground handling related events are more likely to occur at larger airports where more movements take place. Therefor it is necessary to look at each Airport individually and divide the number of occurrences by the number of movements at that airport. For practical reasons, the calculation is done per 1000 movements.

The number of ground handling related events is directly derived from the ECCAIRS database, the number of movements at the airport are taken from the official figures made available by the airports.

The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-POR-04a Ground handling services			
454	State/area of occurrence		24. Belgium
390	Event type	2130000	Ground handling related event
		99010050	Aircraft marshalling[2]
		99010051	Aircraft parking[3]
		5050100	Line maintenance
		5050200	De-icing
		5050300	Loading: events related to the action of loading the aircraft
		5050301	*Loading of baggage*
		5050302	*Loading of cargo*
		5050303	*Loading – other*
		5050400	Servicing
		5050401	*Fuelling*
		5050402	*Catering*
		5050403	*Fluid servicing (e.g. potable water)*
		5050404	*Servicing the aircraft other than fuelling, catering, etc*
		1255902	Cargo shifted
		2120100	Incorrect loading
		2120200	Incorrect fuel balance[4]
		2120400	Take-off overweight/ incorrect center of gravity

Safety performance target

To be defined.

[2] An event related to visual signaling between the ground personnel and the aircraft during an aircraft ground handling operation.

[3] An event related to securing the parking of an aircraft on the ground with the use of parking and tie-down equipment and procedures.

[4] An event involving an incorrect fuel balance as a result of action on the ground, not as a result of actions or events during the flight.

SPI-POR-04b GND handling services - Loading

Definition

All event related to the loading of the A/C.
Loading incidents can be caused by communication problems, calculation errors, poor flight preparation, fatigue, workload, aircraft design…
Possible consequences of loading problems include: flight delay/cancellation, cargo shift, overweight take off, incorrect Center of Gravity (CoG), Runway Excursion (aircraft overrun), tail tipping, …

Includes:

- events related to the action of loading the aircraft (baggage/cargo/other)
- events involving a shift of the aircraft's cargo after the aircraft was loaded.
- An event involving incorrect loading of the aircraft.

Not included:

- Fuelling (refer to **SPI-POR-04c FUELLING**)
- Incorrect fuel balance (refer to **SPI-POR-04c FUELLING**)
- Overweight landing

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

The number of loading related incidents is directly derived from the ECCAIRS database, the number of movements at the airport are taken from the official figures made available by the airports. For practical reasons, the calculation is done per 1000 movements.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-POR-04b Loading			
454	State/area of occurrence		24. Belgium
390	Event type	5050300	Loading: events related to the action of loading the aircraft
		5050301	*Loading of baggage*
		5050302	*Loading of cargo*
		5050303	*Loading – other*
		1255902	Cargo shifted
		2120100	Incorrect loading
		2120400	Take-off overweight/ incorrect center of gravity

Safety performance target

To be defined.

SPI-POR-04c GND handling services - Fuelling

Definition

All event related to the fuelling / refueling / fuel uplift.
Fuelling related problems can be caused by : communication problems, weather, airport design, flight preparation, fatigue, workload, flight preparation…
Possible consequences of fuelling problems include: flight delay/cancellation, damage to aircraft, fire/smoke/fumes (intoxication), contamination of surface (apron, TWY, RWY), Centre Of Gravity (CoG) issues, Diversion …

Includes:

- All event related to the fuelling / refueling / fuel uplift that occurred in Belgium.
- Events involving an incorrect fuel balance as a result of action on the ground, not as a result of actions or events during the flight.

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

The number of fuelling related incidents is directly derived from the ECCAIRS database, the number of movements at the airport are taken from the official figures made available by the airports. For practical reasons, the calculation is done per 1000 movements.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-POR-04c: Fuelling			
454	State/area of occurrence		24. Belgium
390	Event type	5050401	Event related to the fuelling / refueling / fuel uplift
		2120200	Incorrect fuel balance[5]

Safety performance target

To be defined.

[5] An event involving an incorrect fuel balance as a result of action on the ground, not as a result of actions or events during the flight.

SPI-POR-05 FOD

Definition

All event related to Foreign Object Debris (FOD) at the aerodrome.
FOD can be the result of airport/ground handling staff or passengers not disposing of their garbage in waste bins, not regularly emptied (overloaded) waste bins, parts coming of aircraft or equipment (maintenance issue), weather – especially heavy wind – blowing debris and even equipment onto apron, taxiway or runway, …
The presence of FOD may attract birds and/or wildlife, increasing the risk of a wildlife strike.
FOD may be ingested by an aircraft engine leading to (possibly substantial) damage, aborted, take-off, aircraft return, runway excursion, …

Includes:

- Events related to the control/removal of foreign objects at the aerodrome (FOD)
- Events involving foreign object damage to the aircraft (FOD).

Not included:

- Remains of birds or wildlife as a result of a Wildlife strike are not considered as FOD.
- Results of weather phenomena e.g. hail or snow are not considered as FOD

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

There is no direct relationship between FOD and the size of the airport or the number of movements at the airport. Hence, this SPI is based on the actual numbers of incidents. It is however useful to look at each individual airport to see where mitigating actions would be appropriate.
The number of FOD related incidents is directly derived from the ECCAIRS database.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-POR-05 FOD			
454	State/area of occurrence		24. Belgium
390	Event type	5030400	Foreign object control/removal (FOD)
		2060200	Aircraft damage caused by foreign object (FOD)

Safety performance target

To be defined.

SPI-POR-06 Runway Excursions

Definition

Runway excursions are defined by ICAO as a veer off or overrun off the runway surface.
A runway excursion occurs when an aircraft departs the runway in use during the take-off or landing run. The excursion may be intentional or unintentional.
Types of Runway Excursion

- A departing aircraft fails to become airborne or fails to successfully reject the take-off before reaching the end of the designated runway (Overrun on Take Off).
- A landing aircraft is unable to stop before the end of the designated runway is reached (Overrun on Landing).
- An aircraft taking off, rejecting take-off or landing departs the side of the designated runway (Directional Control).

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 (Undershoot on Landing).
- A runway or taxiway other than the designated one is used for a take-off or a landing (wrong runway use).

This SPI only focusses on the runway excursions that occurred in the State of Belgium.
Runway excursions can be caused by: loading problems, deviation from ATC clearance, communication issues, weather, unstabilized approach, airport design, poor flight preparation, Loss of Control on Ground (LOC-G), fatigue, overweight / hard landing, abnormal runway contact, prior runway incursions, rejected take-off (low- or high speed), landing gear / brake / thrust reverser malfunction, human error, …
Possible consequences of a runway excursion include: Ground Collision (GCOL), fire/smoke/fumes, flight delay/cancellation, tire/landing gear/other (substantial) damage to the aircraft possibly with casualties, …

<u>Includes:</u>

- Runway excursion to the side (side excursions)
- Aircraft overrun
- Landing beside landing surface
- Undershoot

Alignment with BASp / EASp

- BASp: -
- EASp: AER1.5

Measurement

Runway Excursions are more likely to occur at larger airports where more movements take place. Therefor it is necessary to look at each airport individually and divide the number of occurrences by the number of movements at that airport. For practical reasons, the calculation is done per 1000 movements.
The number of Runway Incursions is directly derived from the ECCAIRS database, the number of movements at the airport are taken from the official figures made available by the airports.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-POR-06 Overrun and side excursions			
454	State/area of occurrence		24. Belgium
390	Event type	2070100	Runway excursion to the side
		2070400	Aircraft overrun
		2010700	Beside landing surface
		2010800	Undershoot

Safety performance target

To be defined.

2.2 Air Navigation Services

- SPI-ANS-01 Operational occurrences above FL245
- SPI-ANS-02 Operational occurrences below FL245
- SPI-ANS-03 Runway Incursions
  - SPI-ANS-03a Runway Incursion – location/severity
  - SPI-ANS-03b Runway Incursion – type
  - SPI-ANS-03c Runway Incursion – by person
  - SPI-ANS-03d Runway Incursion – by vehicle
  - SPI-ANS-03e Runway Incursion – by commercial aircraft
  - SPI-ANS-03f Runway Incursion – by other than commercial aircraft
- SPI-ANS-04 Separation Minima Infringement
  - SPI-ANS-04a Separation Minima Infringement - severity
  - SPI-ANS-04b Separation Minima Infringement - MIL contribution
  - SPI-ANS-04c Inadequate Separation - severity
- SPI-ANS-05 Deviation/ATC clearance - Deviation/ATM regulation
- SPI-ANS-06 Airspace Infringement
  - SPI-ANS-06a Airspace Infringement – operation type
  - SPI-ANS-06b Airspace Infringement – leading to Separation Minima Infringement or Inadequate Separation
- SPI-ANS-07 Level bust
  - SPI-ANS-07a Level Bust - general
  - SPI-ANS-07b Level Bust - RVSM
- SPI-ANS-08 Prolonged Loss of Communications
- SPI-ANS-09 Deviation/ATC clearance - Deviation from SID EBBR

SPI-ANS-01 Operational occurrences above FL245

Definition

This SPI includes all ATM-related occurrences where ATM was either directly or indirectly a contributing factor to any incident that occurred in Belgian airspace.
More specifically this SPI focusses on occurrences that occurred in the upper airspace, which is located above flight level 245 or 24,500 feet (±7.5km). These occurrences will be reported by Maastricht Upper Area Control (MUAC) which is managed by Eurocontrol. MUAC controls aircraft flying in the upper airspace over the Benelux and north-west Germany.
Most common occurrences reported by MUAC are Separation Minima Infringements (SMIs), and handover/coordination issues.
Note: during an investigation, ATM contribution is set to unknown

Includes:

- All occurrences where the ECCAIRS field for ATM contribution has either the value "Directly involved" or "Indirectly involved" and reported by EUROCONTROL

Not included:

- Occurrences outside Belgian airspace
- Occurrences reported by other than EUROCONTROL

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

Due to the high number of upper area users it would be a very complex task to relate the number of occurrences to the number of flight hours. Hence absolute numbers are used for this SPI.
The number of occurrences where ATM was involved is directly derived from the ECCAIRS database. The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-ANS-01 Operational occurrences with ATM contribution above FL245 - Severity		
428	ATM Contribution	Directly involved Indirectly involved
454	State/area of occ	24. Belgium
431	Occurrence class	200. Serious incident 301. Major incident 302. Significant incident 400. Occurrence without safety effect 500. Not determined
438	Report identification	EUROCONTROL

Safety performance target

To be defined.

SPI-ANS-02 Operational occurrences below FL245

Definition

This SPI includes all ATM-related occurrences where ATM was either directly or indirectly a contributing factor to any incident that occurred in Belgian airspace.
More specifically this SPI focusses on occurrences reported by Belgocontrol. Belgocontrol controls aircraft flying in the lower airspace, which is located below 24,500 feet (±7.5 km) over Belgium.
Most common occurrences reported by Belgocontrol are Separation Minima Infringements (SMIs), and technical failures on equipment, e.g. Instrument Landing System (ILS) or radar failure.

Note: during an investigation, ATM contribution is set to unknown

Includes:

- All occurrences where the ECCAIRS field for ATM contribution has either the value "Directly involved" or "Indirectly involved" and reported by BELGOCONTROL

Not included:

- Occurrences outside Belgian airspace
- Occurrences reported by other than BELGOCONTROL

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

Due to the high number of lower area users it would be a very complex task to relate the number of occurrences to the number of flight hours. Hence absolute numbers are used for this SPI. The number of occurrences where ATM was involved is directly derived from the ECCAIRS database.

The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-ANS-02 Severities of Operational occurrences with ATM contribution reported by Belgocontrol		
428	ATM Contribution	Directly involved Indirectly involved
438	Report identification	**BELGO**
454	State/area of occ	24. Belgium
431	Occurrence class	200. Serious incident 301. Major incident 302. Significant incident 400. Occurrence without safety effect 500. Not determined
438	Report identification	BELGOCONTROL

Safety performance target

To be defined.

SPI-ANS-03 Runway Incursion

Definition

A runway incursion (RI) 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 DOC 4444)

Possible causes for runway incursions include: deviation from ATC clearance, communication problems, weather, airport design, human error, poor flight preparation, traffic violations by ground handling companies, fatigue, workload …

A runway incursion can lead to: missed approach, rejected landing, go-around, runway excursion (RE), Loss of Control on Ground (LOC-G) or Inflight (LOC-I), Ground Collision (GCOL), Accidents resulting in loss of aircraft and/or casualties…

Includes:

- Runway incursions by an aircraft, by a person or by a vehicle or any kind of equipment

Not included:

- Events at unprepared/natural landing sites.
- Occurrences involving animals or birds on the runway

Note: the main difference with **SPI-POR-01** is that **SPI-ANS-03** takes into account the role of the Air Traffic Management in the incident (ATM contribution) as well as the severity of the incident (occurrence class).

Alignment with BASp / EASp

- BASp: OA06
- EASp: AER5.4

Measurement

SPI-ANS-03 is further divided into 6 sub-SPIs. All of these are in function of type of ATM contribution.

- SPI-ANS-03a Runway Incursion – location/severity
- SPI-ANS-03b Runway Incursion - type
- SPI-ANS-03c Runway Incursion - by person
- SPI-ANS-03d Runway Incursion - by vehicle
- SPI-ANS-03e Runway Incursion - by commercial aircraft
- SPI-ANS-03f Runway Incursion - by other than commercial aircraft

The number of occurrences is directly derived from the ECCAIRS database; the query used to obtain the data from ECCAIRS is given in Appendix 2.

Safety performance targets

To be defined.

SPI-ANS-03a Runway Incursion – location/severity

SPI-ANS-03a Runway Incursion – location/severity			
454	State/area of occ		24. Belgium
440	location of occurrence		**EBBR / EBCI / EBLG / EBAW / EBOS / EBKT**
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident 400. Occurrence without safety effect
390	Event type	2200100	Runway incursions

SPI-ANS-03b Runway Incursion – type

SPI-ANS-03b Severities of Runway Incursion per type RI			
454	State/area of occ		24. Belgium
428	ATM Contribution		Directly involved Indirectly involved None Unknown
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident 400. Occurrence without safety effect
390	Event type	2200100	Runway incursions
		2200101	*By an aircraft*
		2200102	*By a person*
		2200103	*By a vehicle/equipment*

SPI-ANS-03c Runway Incursion - by person

SPI-ANS-03c severities of Runway Incursion by person			
454	State/area of occ		24. Belgium
428	ATM Contribution		Indirectly involved Directly involved None Unknown
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
390	Event type	*2200103*	*An event involving a runway incursion by a person.*

SPI-ANS-03d Runway Incursion - by vehicle

SPI-ANS-03d severities of Runway Incursion by vehicle			
454	State/area of occ		24. Belgium
428	ATM Contribution		Indirectly involved Directly involved None Unknown
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
390	Event type	*2200102*	*An event involving a runway incursion by a vehicle or equipment.*

SPI-ANS-03e Runway Incursion - by commercial aircraft

SPI-ANS-03e Severities of Runway Incursion by commercial aircraft			
454	State/area of occ		24. Belgium
214	Operation type	1000000	Commercial Air Transport[6]
428	ATM Contribution		Indirectly involved Directly involved None Unknown
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
390	Event type	*2200101*	*An event involving a runway incursion by an aircraft.*

SPI-ANS-03f Runway Incursion - by other than commercial aircraft

SPI-ANS-03f Severities of Runway Incursion by other than commercial aircraft			
454	State/area of occ		24. Belgium
214	Operation type	All	**except 1000000. Commercial Air Transport**
428	ATM Contribution		Indirectly involved Directly involved None Unknown
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
390	Event type	*2200101*	*An event involving a runway incursion by an aircraft.*

[6] An aircraft operation involving the transport of passengers, cargo or mail for remuneration or hire. Annex 6 Part 1, Chapter 1.

SPI-ANS-04 Separation Minima Infringement

Definition

National authorities lay down vertical and horizontal separation standards to facilitate the safe navigation of aircraft in controlled airspace. Observance of these standards ensures safe separation from the ground, from other aircraft and from protected airspace (*skybrary*).
National separation standards – so called Separation Minima - are based on the provisions of ICAO Doc 4444 (Procedures for Air Traffic Management), especially Chapter 5. When applicable, deviations from these standards are published in national Aeronautical Information Publications (AIPs).
The methods used to achieve separation are varied and complex, depending on the phase of flight and the relative trajectories of the aircraft involved.
A **Separation Minima Infringement** (SMI) is a situation where the prescribed separation minima were not maintained between aircraft. *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)*
SMI incidents can be caused by pilot or ATM error - often human factors are involved e.g. stress, workload, fatigue…- but also by navigation errors (NAV), Runway Incursions (RI) or Excursions (RE) by other A/C resulting in rejected landings and go-around situations. They can also be the result of sudden changes in weather conditions (windshear, microbursts, turbulence …), which either impact the speed or the altitude of the concerned aircraft. And last but not least, mechanical failures e.g. altimeter failure may cause SMIs.
SMI may lead to an Abrupt maneuver (AMAN), Controlled flight into or toward terrain (CFIT), Loss of Control Inflight (LOC-I), ACAS alerts, loss of separation as well as near collisions or collisions between aircraft in flight, Mid-Air Collision (MAC)...
The term '**Inadequate Separation** (IS)' refers to those cases where *'In the absence of prescribed separation minima, a situation in which aircraft were perceived to pass too close to each other for pilots to ensure safe separation' (Eurocontrol)*.
Includes:

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

Not included:

- Infringements of runway separation are excluded from this category; they are included under runway incursions.

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

Due to the high number of airspace users it would be a very complex task to relate the number of occurrences to the number of flight hours. Hence absolute numbers are used for this SPI.

The number of SMI occurrences is directly derived from the ECCAIRS database.

The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-ANS-04 is further divided into 3 sub-SPIs. All of these are in function of type of ATM contribution.

- SPI-ANS-04a Separation Minima Infringement
- SPI-ANS-04b Separation Minima Infringement – contribution by military
- SPI-ANS-04c Inadequate Separation

Safety performance targets

To be defined.

SPI-ANS-04a Separation Minima Infringement - severity

SPI-ANS-04a severities of Separation Minima Infringement			
454	State/area of occ		24. Belgium
428	ATM Contribution		Directly involved Indirectly involved Unknown none
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
390	Event type	2180107	Separation minima infringement

SPI-ANS-04b Separation Minima Infringement – MIL contribution

SPI-ANS-04b Severities of Separation Minima Infringement with "MIL" contribution			
454	State/area of occ		24. Belgium
574	MIL was involved in SMI		yes
431	Occurrence class		200. Serious incident
			301. Major incident
			302. Significant incident
390	Event type	2180107	Separation minima infringement

SPI-ANS-04c inadequate separation - severity

SPI-ANS-04c Severities of inadequate separation - severity			
454	State/area of occ		24. Belgium
428	ATM Contribution		Directly involved Indirectly involved Unknown none
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
390	Event type	2180100	Loss of separation - Near collisions - loss of separation between aircraft
NOT INCLUDED:			
390	Event type	*2180107*	*Separation minima infringement*
		2180103	*Loss of separation with aircraft - both on ground*

SPI-ANS-05 Deviation/ATC clearance - Deviation/ATM regulation

Definition

This SPI covers all instances were an aircraft deviated from the level or other clearance that was given by Air Traffic Control, as well as all incidents related to the non-compliance with Air Traffic Management regulations. No distinction is made between intentional (e.g. navigation error) or accidental (e.g. due to weather conditions) deviations.
The major cause for deviations from ATC clearances or ATM regulation is human error as a result from stress, workload, fatigue, inadvertence, poor flight preparation…. However, it could also be a consequence of equipment failure (e.g. altimeter) or adverse weather conditions (high winds, windshear, microburst, …).
Deviations from clearances as instructed by ATC or deviations from ATM regulation may lead to Airspace Infringements, Separation Minima Infringements, abrupt maneuver, abnormal runway contacts, runway incursion, runway excursion, Controlled Flight into or toward terrain (CFIT), Airprox, ACAS alerts, loss of separation as well as near collisions or collisions between aircraft in flight or on the ground, ….

Includes:

- Deviation from an air traffic control clearance
- Deviation from ATM Regulation

Not included:

- Flight crew deviation, including airspace infringements, deviation ATM SID/STAR, …

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

Due to the high number of airspace users it would be a very complex task to relate the number of occurrences to the number of flight hours. Hence absolute numbers are used for this SPI.
The number of deviations from ATC clearance or ATM regulation is directly derived from the ECCAIRS database.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-ANS-05 Deviation/ATC clearance - Deviation/ATM regulation			
454	State/area of occ		24. Belgium
428	ATM Contribution		Directly involved Indirectly involved Unknown none
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
390	Event type	2020500	Deviation from an air traffic control clearance
		2020700	Deviation from ATM Regulation

Safety performance targets

To be defined.

SPI-ANS-06 Airspace Infringement

Definition

An 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)

Airspace infringements can be caused by human factors e.g. pilot under stress, workload, fatigue, inadvertence…. They can also be the result of navigation errors (NAV), poor flight preparation, sudden changes in weather condition. Equipment failure e.g. altimeter or radio problems may also lead to Airspace Infringements (AI).

An incursion into controlled airspace may lead to a near miss, as ATC will not be aware of the unauthorized traffic and cannot take it into account when directing authorized traffic. Similarly, an incursion into restricted airspace may place an aircraft in serious danger, for instance over firing ranges. Other consequences may be a Prolonged Loss of Contact (PLOC as the pilot is not aware of his position and obligation to contact ATC, ACAS alerts, loss of separation, Inadequate Separation as well as near collisions or collisions between aircraft in flight, Mid-Air Collision (MAC)...,

Includes:

- Cases where an aircraft entered controlled or restricted airspace (TSA, D, P, R) or an ADIZ (Air Defense Identification Zone) without appropriate clearance or permission.
- Cases where an aircraft exited a training area into controlled airspace or into another training area.
- Failure of coordination between ATS bodies, resulting in an aircraft entering controlled airspace without the receiving ATS being aware of it.

Alignment with BASp / EASp

- BASp: -
- EASp: GA1.5 (SPI-ANS-06a) / AER2.1 (SPI-ANS-06b)

Measurement

Due to the high number of airspace users it would be a very complex task to relate the number of occurrences to the number of flight hours. Hence absolute numbers are used for this SPI.

The number of Airspace Infringement occurrences is directly derived from the ECCAIRS database.

The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-ANS-06 is further divided into 2 sub-SPIs. Both of these are in function of type of ATM contribution:

- SPI-ANS-06a Airspace Infringement – operation type
- SPI-ANS-06b Airspace Infringement leading to Separation Minima Infringement or Inadequate Separation

Safety performance targets

To be defined.

SPI-ANS-06a Airspace Infringement – Operation type

Note: the operation type is not shown in the table below, but distinction is made in the SPI excel-file.

SPI-ANS-06a Airspace Infringement			
454	State/area of occ		24. Belgium
428	ATM Contribution		Indirectly involved Directly involved None Unknown
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident 400. Occurrence without safety effect
390	Event type	2020400	An event involving an infringement / unauthorized penetration of a controlled or restricted airspace.

SPI-ANS-06b Airspace Infringement leading to Separation Minima Infringement or Inadequate Separation

SPI-ANS-06b Airspace Infringement leading to SMI or IS			
454	State/area of occ		24. Belgium
428	ATM Contribution		Indirectly involved Directly involved None Unknown
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident 400. Occurrence without safety effect
390	Event type	2020400	An event involving an infringement / unauthorized penetration of a controlled or restricted airspace.
		2180100	An event involving a loss of separation between aircraft

NOT INCLUDED			
390	Event type	*2180103*	*An event involving a loss of separation with aircraft operating on the ground.*

SPI-ANS-07 Level bust

Definition

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. (Source: Eurocontrol Skybrary)
Possible causes for level busts are weather issues (high wind, turbulence, wind shear, …), navigation error, communication problems, poor flight preparation, Loss of Control Inflight (LOC-I), Loss of Lifting Conditions (LOL-I), System/component failure (SCF-NP/SCF-PP), fatigue, …
A level bust may result in TCAS warnings, Separation Minima infringements (SMI), Mid-Air Collision (MAC), Controlled Flight Into Terrain (CFIT), …

Includes:

- All cases where an aircraft deviated (up or down) from the altitude for which it has been cleared.
- All occurrences reported by Eurocontrol (Upper area), Belgocontrol and Belgian airline operators.

Not included:

- All cases where the ATS gave the aircraft clearance for an incorrect altitude.

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

This SPI is twofold: SPI-ANS-07a looks at all level busts that occurred in Belgian airspace while SPI-ANS-07b considers level bust incidents that took place in Reduced Vertical Separation Minima (RVSM[7]) airspace.

- SPI-ANS-07a Level Bust
- SPI-ANS-07b Level Bust in RVSM

Unfortunately, the type of airspace is not always included in the occurrence reporting data, so for the time being, no conclusions can be drawn from SPI-ANS-07b.
Ideally this SPI should use the number of flight hours as a reference. However, since it is nearly impossible to get all flight data from all operators crossing Belgium, absolute numbers are used for this SPI.
The number of level bust incidents is directly derived from the ECCAIRS database.

[7] RVSM: An airspace of defined dimensions within which RVSM (Reduced Vertical Separation Minima) is applied.

SPI-ANS-07a Level bust - General

Cases where an aircraft deviated up or down, from the altitude for which it has been cleared, by more than 300 feet (±92m).
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-ANS-07a Level bust - general			
454	State/area of occ		24. Belgium
15	Airspace type[8]		All
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
390	Event type	2020517	Deviation-flight level/altitude

Safety performance target

To be defined.

SPI-ANS-07b Level bust - RVSM

Cases where an aircraft deviated up or down, from the altitude for which it has been cleared, by more than 200 feet (±61m) in RVSM airspace.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-ANS-07b Level bust - RVSM			
454	State/area of occ		24. Belgium
15	Airspace type		11 - RVSM
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
390	Event type	2020517	Deviation-flight level/altitude

Safety performance target

To be defined.

[8] Airspace types: Airway – ATS Route, ATZ, CBA, CTA, CTR, CVSM, Danger Area, FAB, FIR/UIR, Lower Control Area (LTA), Prohibited area, TMA, RVSM, Restricted area, Transitional area, TSA, Upper Control Area (UTA), Other and Unknown. Refer to ICAO Annex 2.

SPI-ANS-08 Prolonged Loss of Communications (PLOC)

Definition

EUROCONTROL : “Loss of communications between aircraft and ATC may occur for a variety of reasons, some technical and others resulting from mismanagement of the human-machine interface. Losses of communications can vary considerably in length; it is, however, those with an impact on day-to-day ATC functions which have drawn attention to the problems and led to studies for their resolution.
The term "PLOC", an acronym for "prolonged loss of communications", has come into use in civil aviation to describe this phenomenon, while the term "COMLOSS", an abbreviation of "communications loss", is preferred by the military. “
Communication between air traffic controllers and pilots continues to be an essential part of air traffic control operations and communication-related problems can lead to hazardous situations. The duration of any loss of communication can vary greatly. The description "Prolonged Loss Of Communication" (PLOC) has yet to be officially defined but it is usually applied to a period of loss of communication in excess of ten minutes. However, the absolute time before any loss of communication is so defined often depends on the airspace it takes place within.
Contributory factors that may lead to PLOC are poor read-back, , poor air-ground transmission, distraction, communication equipment problems, radio interference, call sign confusion, use of phraseology, workload, fatigue…
A PLOC may lead to airspace infringements, (expensive) military interception, loss of separation/separation minima infringement, TCAS warning triggered, level bust, deviation from flight path …

Includes:

- Prolonged loss of communication between Air Traffic Control and airborne aircraft.

Not included:

- Events caused by technical problems with communication equipment.

Alignment with BASp / EASp

- BASp: OA08
- EASp: -

Measurement

Ideally this SPI should use the number of flight hours as a reference. However, since it is nearly impossible to get all flight data from all operators and general aviation flying through Belgian airspace, absolute numbers are used for this SPI.

The number of PLOC incidents is directly derived from the ECCAIRS database.

The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-ANS-08 Prolonged Loss of Communications (PLOC)			
454	State/area of occ		24. Belgium
390	Event type	2020300	Communication flight crew with ANS
385	Descriptive factor	24010109	Loss of communications (LOC)

Safety performance target

To be defined.

SPI-ANS-09 Deviation/ATC clearance - Deviation from SID EBBR

Definition

This is an SPI that has been specifically introduced in the context of noise abatement procedures for Brussels Airport (EBBR).
The geographical distribution of the areas suffering from noise hindrance due to the landings and take-offs depends entirely on political decisions taken by the Belgian federal government and by the Regions (for the regional airports). The role of Belgocontrol is to advise on the applicability of the measures from an operational point of view with safety as its prime criterion. At Brussels National Airport, Belgocontrol is responsible for implementing the **Preferential Runway System (PRS)** after a safety survey. The application of the PRS by Belgocontrol is verified by the Belgian Civil Aviation Authority and the Belgian Supervisory Authority (BSA). The Preferential Runway System is available in the AIP.

Includes:

- Deviation from standard instrument departure at EBBR (BRU)

Not included:

- Other airports than EBBR (BRU).

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

This SPI uses the number of movements at Brussels Airport that are made available by the airport. Movements at an airport are the combination of arriving and departing aircraft; only the number of departing is needed to calculate this SPI so this number is divided by 2. For practical reasons, the calculation is done per 1000 movements.
The number of SID deviations is directly derived from the ECCAIRS database.
The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-ANS-09 Deviation/ATC clearance Deviation from SID EBBR			
428	ATM Contribution		Directly involved Indirectly involved
431	Occurrence class		200. Serious incident 301. Major incident 302. Significant incident
167	Last departure point	22016	EBBR (BRU): Bruxelles/National
390	Event type	2020803	Deviation from standard instrument departure

Safety performance target

To be defined.

2.3 Operations

- SPI-OPS-01 Unstabilized approach & landing, missed approach
  - SPI-OPS-01a Unstabilized Worldwide (Belgian OPS)
  - SPI-OPS-01b Unstabilized Belgium (Belgian OPS)
  - SPI-OPS-01c Missed approach Belgium (Belgian OPS)
- SPI-OPS-02 Collisions on Ground-GCOL

SPI-OPS-01 Unstabilized approach & landing, missed approach

Definition

Stabilized approach: the recommended parameters that define a stabilized approach and should be met by 1,000 feet above airport elevation in IMC or 500 feet in VMC are summarized below. If any of these parameters is not met, the approach is unstabilized.

1. The aircraft is on the correct flight path;
2. Only small changes in heading/pitch are required to maintain the correct flight path;
3. The aircraft speed is not more than VREF + 20 knots indicated airspeed and not less than VREF;
4. The aircraft is in the correct landing configuration;
5. Sink rate is no greater than 1,000 feet per minute; if an approach requires a sink rate greater than 1,000 feet per minute, a special briefing should be conducted;
6. Power setting is appropriate for the aircraft configuration and is not below the minimum power for approach as defined by the aircraft operating manual;
7. All briefings and checklists have been conducted;
8. Specific types of approaches are stabilized if they also fulfill the following:
   - Instrument Landing System (ILS) approaches must be flown within one dot of the glide slope and localizer;
   - a Category II or Category III ILS 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,
9. Unique approach procedures or abnormal conditions requiring a deviation from the above elements of a stabilized approach require a special briefing. (FSF ALAR tool kit)

An approach that becomes unstabilised below 1000 feet above airport elevation in IMC or 500 feet above airport elevation in VMC requires an immediate go-around.

Unstabilized approaches can be the result of weather conditions (cross wind, tailwind, windshear, precipitation…), pilot skills or human error, equipment or system failure (e.g. flaps), …

Continuation of an unstabilized approach to land may result in an aircraft arriving at the runway threshold too high, too fast, out of alignment with the runway centre-line, incorrectly configured or otherwise unprepared for landing. This can result in aircraft damage on touch-down (hard landing), or runway excursion and consequent injury or damage to the aircraft or airfield installations.

Includes:

- All incidents where the event type is set to 'Unstabilized Approach' (SPI-OPS-01a)
- All incidents where the event type is set to 'Unstabilized Approach' and that occurred at Belgian airports (SPI-OPS-01b)
- All incidents where the event type is set to 'Missed Approach' (SPI-OPS-01c)

Not included:

- Incidents categorized as 'rejected landing[9]'.

Alignment with BASp / EASp

- BASp: -
- EASp: -

Measurement

This SPI uses absolute numbers; the number of unstabilized approach occurrences is directly derived from the ECCAIRS database.

The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-OPS-01 is divided into 3 sub-SPIs. All of these are in function of type of ATM contribution.

- SPI-OPS-01a Unstabilized approach – worldwide (Belgian operators)
- SPI-OPS-01b Unstabilized approach – Belgium (Belgian operators)
- SPI-OPS-01c Missed approach – Belgium (Belgian operators)

Safety performance targets

To be defined.

SPI-OPS-01a Unstabilized approach – worldwide (Belgian OPS)

SPI-OPS-01a Unstabilized approach – worldwide (Belgian OPS)			
390	Event type	2011000	Unstabilized approach

SPI-OPS-01b Unstabilized approach - Belgium (Belgian OPS)

SPI-OPS-01b Unstabilized approach – Belgium (Belgian OPS)			
454	State/area of occ		24. Belgium
390	Event type	2011000	Unstabilized approach

SPI-OPS-01c Missed approach - Belgium (Belgian OPS)

SPI-OPS-01c Missed approach – Belgium (Belgian OPS)			
454	State/area of occ		24. Belgium
390	Event type	3050000	Missed approach

[9] A rejected landing is an event that occurs when the pilot has the runway in sight and is in a position to land, but is unable to complete the landing. Reasons for rejected landing can be something on the runway, high winds/microburst, mechanical issue (the landing gear does not come down), etc.

SPI-OPS-02 Collisions on Ground-GCOL

This SPI focusses on collisions on ground at aerodromes in Belgium that are related to aircraft operation, thus when the pilot is in control of the aircraft. Occurrences caused by ground handling actions are described in **SPI-POR-03 RAMP**.
Possible causes for collisions on ground include: deviation from ATC clearance, communication problems, weather, airport design, flight preparation, ground traffic violations, Loss of Control On Ground (LOC-G), fatigue, workload…
A collision on ground can result in: Loss of Control On Ground (LOC-G), a runway excursion, flight delay/cancellation, damage to Aircraft, …

Definition

Collisions of vehicles with moving aircraft are covered under aircraft operations (aircraft collision with vehicle) and are categorized in ECCAIRS under GCOL - Collision while taxiing to or from a runway in use.

Includes:

- Collision aircraft-structure / tall structure / building / lights
- Collision aircraft-cable/wire/power line
- Collision aircraft-person / vehicle (while the aircraft is moving under its own power)
- Collision aircraft-parked aircraft
- Collision aircraft-submerged log / the shore / wave
- Collision aircraft-tree / tall vegetation / snow bank
- Collision aircraft- object ground / other object

Not included:

- collisions of a towed aircraft with objects or obstacles (refer to **SPI-POR-03 RAMP**)
- Aircraft struck and/or damaged by vehicle (refer to **SPI-POR-03 RAMP**)
- Collisions with Wildlife (birds, animals) (refer to **SPI-POR-02 Wildlife Strikes**)

Measurement

Ground handling related collisions are more likely to occur at larger airports where more movements take place. Therefor it is necessary to look at each Airport individually and divide the number of occurrences by the number of movements at that airport. For practical reasons, the calculation is done per 1000 movements.

The number of ground handling related collisions is directly derived from the ECCAIRS database, the number of movements at the airport are taken from the official figures made available by the airports.

The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-OPS-02 Collisions on Ground - GCOL			
454	State/area of occurrence		24. Belgium
390	Event type	2050400	Collision aircraft - object ground
NOT INCLUDED:			
390	Event type	*2050402*	*Aircraft collision with an animal - excluding birds.*

Alignment with BASp / EASp

- BASp: -
- EASp: -

Safety performance target

To be defined.

2.4 Technical

- SPI-TEC-01 Flight controls

SPI-TEC-01 Flight Controls

Definition

This SPI covers all incidents related to flight control components of the aircraft (ATA Code:2700) An event involving the units and components furnishing a means of manually controlling the flight attitude characteristics of the aircraft. Typical parts are hydraulic boost system, controls and mounting brackets.

Includes:

- the functioning and maintenance aspects of the flaps, spoilers and other control surfaces
- Trailing edge flap control system (ATA code 2750)
  The system components and parts, except the actuator and position indicator which controls position and movement of wing trailing edge flaps. Typical parts are control valve, switch, flow limiter, cable, torque tube, transmission, jackscrew, bypass valve, limit switch, return spring, buss cable, etc.
- Leading Edge Slat Control System (ATA 2780)
  The system components and parts except the actuator and position indicating system that controls the position and movement of the wing leading edge devices used for lift augmenting. Typical parts are leading edge flaps, variable opening wing slots, priority valve, switch, cable, pulley, actuator bracket, torque shaft, regulator, etc.

Not included:

- the structure of flaps, spoilers and other control surfaces
- rotorcraft flight controls

Alignment with BASp / EASp

- BASp: OA04
- EASp: -

Measurement

Due to the lack of data, the SPI for flight control incidents is currently represented by absolute numbers. When more data becomes available, these incidents will be linked to operators and flight hours.
The number of flight control related occurrences is directly derived from the ECCAIRS database. The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-TEC-01 Flight Controls			
390	Event type	1270000	Aircraft flight control related event (ATA Code:2700)
		1270100	*Trailing edge flap control system (ATA code 2750)*
		1270200	*Leading Edge Slat Control System (ATA 2780)*

Safety performance target

To be defined.

2.5 General

- SPI-GEN-01 Laser beams
- SPI-GEN-02 Unruly PAX

SPI-GEN-01 Laser beams

Definition

This SPI monitors all incidents related to aircraft or control tower being targeted by a laser or beamer from the ground. These incidents are considered a real hazard as they can lead to distraction, glare (night vision deteriorating) or even temporary flash blindness (portion of visual field temporarily obscured/after-images) during a critical phase of the flight, most often during landing when the cockpit is in a lower position than during take-off. The same goes for Air Traffic Controllers when the control tower is subject to a laser illumination, resulting in distraction, glare and/or flash blindness, leading to decreased performance and a serious impact on aviation safety.

A laser is a device that generates an very narrow, intense directional beam of coherent monochromatic light (or other electromagnetic radiation) with wave lengths covering the visual spectrum of 400-700nm, whereas a laser beamer (or projector) is a device that projects changing laser beams in the sky for entertainment or professional use. Use of a laser beamer is subject to authorization by the Authorities and great caution should be exercised when used in the vicinity of an airport.

Laser beams – visible or invisible – may cause permanent damage to a pilot's eyes. However, laser pointers that are sold in normal wholesale or retail are not capable of causing structural damage to an aircraft.

Possible causes for laser beams incidents include: unauthorized or negligent use of beamers, exterior lighting of buildings shining upwards, reflection of floodlights, deliberate pointing laser pen at cockpit, …

A laser beam incidents can lead to: missed approach, rejected landing, go-around, runway excursion, Loss of Control Inflight (LOC-I), Accidents resulting in loss of aircraft and/or casualties, uncontrolled flight into terrain…

Includes:

- Interference with aircraft from the ground: Interference by LASER/Beamer
- Air Traffic Management emergency/security situation: Interference by LASER/Beamer

Not includes:

- Interference by fire works

Note: laser beam incidents always occur during night-time. Incident rate will increase during the winter season when sunset comes early and nights are long.

Alignment with BASp / EASp

- BASp: OA05
- EASp: -

Measurement

Laser beam incidents are more likely to occur at larger airports where more movements take place. Therefore it is necessary to look at each airport individually and divide the number of occurrences by the number of movements at that airport. For practical reasons, the calculation is done per 1000 movements.

The number of laser beam attacks is directly derived from the ECCAIRS database, the number of movements at the airport are taken from the official figures made available by the airports.

The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-GEN-01 Interference by LASER/Beamer			
454	State/area of occurrence		24. Belgium
390	Event type	2270100	Interference with aircraft from the ground
		99010095	Air Traffic Management emergency/security situation

Safety performance target

To be defined.

SPI-GEN-02 Unruly PAX

Definition

This SPI monitors all incidents related to passengers showing unacceptable behavior during flight. Difficult or unruly passengers pose a security problem; their actions can have an operational impact, can cause safety problems or even damage the aircraft (smoking on board).

In ECCAIRS the category 'difficult/unruly passengers' is further divided into subcategories:

- Aggressive passenger
- Cockpit intrusion
- Drunken passenger
- Smoking in cabin/toilet
- Use of mobile and PEDs.

However, this SPI is limited to the general category of difficult/unruly passengers.

Includes:

- All incidents under ECCAIRS category difficult / unruly passenger

Not includes:

- Medical issues or emergencies related to passengers which are categorized under cabin safety

Possible causes for difficult or unruly behavior are unawareness of the rules (use of mobile phones, smoking on board), (exaggerated) use of alcohol or drugs before or after boarding leading to intoxication, smoking or alcohol addiction, panic/fear of flying, inappropriate behavior of other passengers ...

Unruly passengers' actions may lead to major consequences ranging from operational issues (flight diversion, delay, …), over safety related problems (aggressive behavior towards cabin crew/other passengers, not following instructions, threads) to technical problems (smoking on board the aircraft potentially leading to fire/fumes/smoke).

Note: to clarify the difference between 'hijacking' and 'cockpit intrusion':

Hijacking is an intentional illegal act, in which an individual or a group of people takes over an aircraft and force it to divert from its original flight plan and destination. The goal could be to make a political statement, ask for ransom, … . It is planned way ahead of the flight and usually involves multiple persons working together. Hijacking is a criminal act that falls under the ECCAIRS category 'Security'.

A cockpit intrusion is either unintentional (by mistake) or intentional (e.g. a passenger wants to talk (or complain) to the pilot), but without the intention of taking over the aircraft. The intrusion was not planned in advance and usually involves a single person.

Alignment with BASp / EASp

- BASp: OA03
- EASp: -

Measurement

Unruly passenger incidents are more likely to occur on larger aircraft and on long distance flights. For no apparent reason, flights to some destinations seem to have a higher risk of being confronted with difficult or unruly passengers than others. To avoid complex calculations absolute numbers are used for this SPI.

The number of unruly passengers is directly derived from the ECCAIRS database. The ECCAIRS database contains all difficult/unruly passenger incidents that occurred on aircraft registered in Belgium (OO-*xxx*) as well as aircraft flying for a Belgian operator.

The query used to obtain the data from ECCAIRS is given in Appendix 2.

SPI-GEN-02 Unruly PAX			
390	Event type	2230500	Difficult / unruly passenger[10]

Safety performance target

To be defined.

[10] Difficult / unruly passenger: includes aggressive behavior, smoking, not following instructions, significant intoxication, indecent actions etc.

List of abbreviations

AAIU(Be)	Air Accidents Investigation Unit (Belgium)
ADIZ	Air Defense Identification Zone
ADREP	Accident Data REPorting system
A/C	Aircraft
ADREP	Accident/Incident Data Reporting
AI	Airspace Infringement
AIP	Aeronautical Information Publication
ALAR	Approach and Landing Accident Reduction
ATC	Air Traffic Control
ATM	Air Traffic Management
ATS	Air Traffic Services
ATZ	Aerodrome Traffic Zones
BASp	Belgian Aviation Safety plan
BSA	Belgian Supervisory Authority
CAT	Commercial Air Transport
CBA	Cross Border Area
CFIT	Controlled Flight Into Terrain
CoG	Centre of Gravity
CTA	ConTrol Area
CTR	Control Traffic Region
CVSM	Conventional Vertical Separation Minima
EASA	European Aviation Safety Agency
EASP	European Aviation Safety Programme
EASp	European Aviation Safety plan
ECCAIRS	European Coordination Centre for Accident and Incident Reporting Systems
FAB	Functional Airspace Block
FIR	Flight Information Region
FOD	Foreign Object Debris
FSF	Flight Safety Foundation
GCOL	Ground Collision
GND	Ground
GPWS	Ground Proximity Warning System
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
LOC-G	Loss of Control on Ground
LOC-I	Loss of Control In flight
LOL-I	Loss of Lifting Conditions
LTA	Lower conTrol Area
MAC	Mid-Air Collision
MIL	Military
MMO	Mach Maximum Operational
MUAC	Maastricht Upper Area Control Centre

NCC	Non-Commercial operations with Complex aircraft
NCO	Non-Commercial operations with aircraft Other than complex
NoA	Network of Analysts
PLOC	Prolonged Loss of Communication
PRS	Preferential Runway System
RE	Runway Excursion
RI	Runway Incursion
RPAS	Remotely Piloted Air System
RVSM	Reduced Vertical Separation Minima
RVSM	Reduced Vertical Separation Minima
RWY	Runway
SCF	System / Component Failure
SCF-NP	System / Component Failure - Non Power plant
SCF-PP	System / Component Failure - Power Plant
SID	Standard Instrument Departure
SMI	Separation Minima Infringement
SPI	Safety Performance Indicator
SPO	Special Operations
SPT	Safety Performance Target
T/O	Take Off
TCAS	Traffic (alert and) Collision Avoidance System
TMA	Terminal Control Area
TSA	Temporary Segregated Area
TWY	Taxiway
UAV	Unmanned Aerial Vehicle
UIR	Upper Information Region
ULM	Ultra-Light Motorized
UTA	Upper conTrol Area
VMC	Visual Meteorological Conditions
VMO	Velocity Maximum Operational

References

- [1] European Aviation Safety Agency (EASA): Annual Safety Review 2014
- [2] European Aviation Safety Programme (EASP)
- [3] European Aviation Safety Plan 2011-2014 (EASp)
- [4] 2014_02_18_EASp SYS3.14 EASA Member States Common Safety Performance Indicators (Network of Analysts)
- [5] International Civil Aviation (ICAO) Doc 9859: Safety Management Manual (SMM), Third Edition - 2013
- [6] Convention on International Civil Aviation (ICAO): Annex 13 - Aircraft Accident and Incident Investigation
- [7] International Civil Aviation Accident Data REPorting system: ICAO ADREP
- [8] Regulation **(EC) No 216/2008** OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 February 2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/EC
- [9] Regulation **(EU) No 996/2010** OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and repealing Directive 94/56/EC
- [10] ECCAIRS 5 Common Framework, Version: 5.2.1.8; Current Taxonomy: ECCAIRS Aviation v.2.4.0.0 - English

APPENDIX 1: Cross reference matrix

POR		EASp	BASp	Hazard list
SPI-POR-01	**Runway Incursion**	**X**	**OA06**	**AER5.4**
SPI-POR-02	**Wildlife Strikes**		**OA01**	**AER1.5**
SPI-POR-03	**Collisions on Ground - RAMP**			
SPI-POR-04	**Ground Handling Services**			
SPI-POR-04a	SPI-POR-04a GND handling services - all		**OA02**	
SPI-POR-04b	SPI-POR-04a GND handling services - Loading			
SPI-POR-04c	SPI-POR-04a GND handling services - Fuelling			
SPI-POR-05	**FOD**			
SPI-POR-06	**Runway Excursions**	**X**		**AER1.5**
ANS		**EASp**	**BVp**	**Hazard list**
SPI-ANS-01	**Operational occurrences above FL245**			
SPI-ANS-02	**Operational occurrences below FL245**			
SPI-ANS-03	**Runway Incursions**	**X**	**OA6**	**AER5.4**
SPI-ANS-03a	Runway Incursion – location/severity			
SPI-ANS-03b	Runway Incursion – type			
SPI-ANS-03c	Runway Incursion - by person			
SPI-ANS-03d	Runway Incursion - by vehicle			
SPI-ANS-03e	Runway Incursion - by commercial aircraft			
SPI-ANS-03f	Runway Incursion - by other than commercial aircraft			
SPI-ANS-04	**Separation Minima Infringement**			
SPI-ANS-04a	Separation Minima Infringement - severity			
SPI-ANS-04b	Separation Minima Infringement - MIL contribution			
SPI-ANS-04c	Inadequate Separation - severity			
SPI-ANS-05	**Deviation/ATC clearance and Deviation/ATM regulation - ATM contribution**			
SPI-ANS-06	**Airspace Infringementl**			
SPI-ANS-06a	Airspace Infringement – operation type			GA1.5
SPI-ANS-06b	Airspace Infringement - leading to Separation Minima Infringement or Inadequate Separation			AER2.1
SPI-ANS-07	**Level bust**			
SPI-ANS-07a	Level bust - general			
SPI-ANS-07b	Level bust - RVSM			
SPI-ANS-08	**Prolonged Loss of Communications (PLOC)**		**OA8**	
SPI-ANS-09	**Deviation/ATC clearance Deviation from SID EBBR**			

OPS		EASp	BVp	Hazard list
SPI-OPS-01	**Unstabilized approach & landing, missed approach**			
SPI-OPS-01a	Unstabilized approach - worldwide (Belgian OPS)			
SPI-OPS-01b	Unstabilized approach - Belgium (Belgian OPS)			
SPI-OPS-01c	Missed approach - Belgium (Belgian OPS)			
SPI-OPS-02	**Collisions on Ground - GCOL**			
TEC		**EASp**	**BVp**	**Hazard list**
SPI-TEC-01	**Flight Controls**			
GEN		**EASp**	**BVp**	**Hazard list**
SPI-GEN-01	**Laser beams**		**OA5**	
SPI-GEN-02	**Unruly PAX**		**OA3**	

APPENDIX 2: Queries

Aerodromes

SPI-POR-01: Runway Incursions

{
Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By an aircraft
or
Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By a person
or
Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By a vehicle/equipment
or
Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions
and
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
File number {Occurrence} starts with '2013-'
}

SPI-POR-02: Wildlife Strikes

{
Event Type {Occurrence/Events} equal to Aircraft operation general - Object ingestion by engine - Turbine - bird
or
Event Type {Occurrence/Events} equal to Aircraft operation general - Aircraft - collisions with obstacle/terrain/aircraft - Collision aircraft - object ground - Collision aircraft-animal
or
Event Type {Occurrence/Events} equal to Aircraft operation general - Aircraft - collisions with obstacle/terrain/aircraft - Aircraft collision - object aloft - Aircraft bird strike
and
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
File number {Occurrence} starts with '2013-'
}

SPI-POR-03 Collisions on Ground - RAMP

{
Event Type {in any Events} equal to Aerodrome & ground aids - Aerodrome services / operations - Vehicle/equipment operations - Collision of towed aircraft with object/obstacles
or
Event Type {in any Events} equal to Aerodrome & ground aids - Aerodrome services / operations - Vehicle/equipment operations - Aircraft struck/damaged by vehicle
or

[
Event Type {Occurrence/Events} equal to Aircraft operation general - Aircraft - collisions with obstacle/terrain/aircraft - Collision aircraft - object ground - Collision aircraft-vehicle
and
[
Phase {Occurrence/Events} equal to Powered Fixed-wing aircraft - Standing
or
Phase {Occurrence/Events} equal to Powered Fixed-wing aircraft - Taxi - Push-back/tow
]
]
and
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-POR-04: Ground Handling Services

SPI-POR-04a GND handling services – all

{
Event Type {in any Events} has at least one of Aircraft operation general - Ground handling, Aerodrome & ground aids - Ground handling services - Aircraft marshalling, Aerodrome & ground aids - Ground handling services - Aircraft parking, Aerodrome & ground aids - Ground handling services - De-icing, Aerodrome & ground aids - Ground handling services - Line maintenance, Aerodrome & ground aids - Ground handling services - Servicing, Aerodrome & ground aids - Ground handling services - Servicing - Catering, Aerodrome & ground aids - Ground handling services - Servicing - Fuelling, Aerodrome & ground aids - Ground handling services - Servicing - Fluid servicing, Aerodrome & ground aids - Ground handling services - Servicing - Servicing - other, Aerodrome & ground aids - Ground handling services - Loading, Aerodrome & ground aids - Ground handling services - Loading - Loading of baggage, Aerodrome & ground aids - Ground handling services - Loading - Loading of cargo, Aerodrome & ground aids - Ground handling services - Loading - Loading - other, Aircraft operation general - Cargo related - Cargo shifted, Aircraft operation general - Flight preparation - Incorrect loading, Aircraft operation general - Flight preparation - Take-off overweight/incorrect centre of gravity (COG), Aircraft operation general - Flight preparation - Incorrect fuel balance
and
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-POR-04b: GND handling services - Loading

{
Event Type {in any Events} equal to Aerodrome & ground aids - Ground handling services - Loading
or
Event Type {in any Events} equal to Aerodrome & ground aids - Ground handling services - Loading - Loading of baggage
or

Event Type {in any Events} equal to Aerodrome & ground aids - Ground handling services - Loading - Loading of cargo

or

Event Type {in any Events} equal to Aerodrome & ground aids - Ground handling services - Loading - Loading - other

or

Event Type {in any Events} equal to Aircraft operation general - Cargo related - Cargo shifted

or

Event Type {in any Events} equal to Aircraft operation general - Flight preparation - Incorrect loading

or

Event Type {in any Events} equal to Aircraft operation general - Flight preparation - Take-off overweight/incorrect centre of gravity (COG)

and

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

File number {Occurrence} starts with '2013'

}

SPI-POR-04c: GND handling services - Fuelling

{

Event Type {in any Events} equal to Aerodrome & ground aids - Ground handling services - Servicing – Fuelling

or

Event Type {in any Events} equal to Aircraft operation general - Flight preparation - Incorrect fuel balance

and

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

File number {Occurrence} starts with '2013'

}

SPI-POR-05: FOD

{

Event Type {in any Events} equal to Aerodrome & ground aids - Aerodrome services / operations - Foreign object control

or

Event Type {in any Events} equal to Aircraft operation general - Damage to aircraft - Foreign object damage

and

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

File number {Occurrence} starts with '2013'

}

SPI-POR-06: Runway Excursions

{

Event Type {in any Events} equal to Aircraft operation general - Aircraft off movement area - Runway side excursion

or

Event Type {in any Events} equal to Aircraft operation general - Aircraft handling - Beside landing surface

or

Event Type {in any Events} equal to Aircraft operation general - Aircraft off movement area - Aircraft overrun

or

Event Type {in any Events} equal to Aircraft operation general - Aircraft handling - Undershoot

and

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

File number {Occurrence} starts with '2013-'

}

Air Navigation Services

SPI-ANS-01 Operational occurrences above FL245

{
{
Report identification {in any Reporting history} contains (ci) 'BELGO'
or
Report identification {in any Reporting history} contains (ci) 'EURO'
}
and
{
ATM contribution {Occurrence} equal to Directly involved
or
ATM contribution {Occurrence} equal to Indirectly involved
}
and
File number {Occurrence} starts with (ci) '2014-'
}

SPI-ANS-02 Operational occurrences below FL245

{
{
Report identification {in any Reporting history} contains (ci) 'BELGO'
or
Report identification {in any Reporting history} contains (ci) 'EURO'
}
and
{
ATM contribution {Occurrence} equal to Directly involved
or
ATM contribution {Occurrence} equal to Indirectly involved
}
and
File number {Occurrence} starts with (ci) '2014-'
}

SPI-ANS-03 Runway Incursion

SPI-ANS-03a Runway Incursion – location/severity

{
Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By an aircraft
or
Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By a person
or
Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By a vehicle/equipment
or

Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions

and

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

File number {Occurrence} starts with '2013-01'

}

SPI-ANS-03b Runway Incursion - type

{

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

Event Type {in any Events} has at least one of Aircraft operation general - Incursions generally - Runway incursions, Aircraft operation general - Incursions generally - Runway incursions - By an aircraft, Aircraft operation general - Incursions generally - Runway incursions - By a person, Aircraft operation general - Incursions generally - Runway incursions - By a vehicle/equipment

and

File number {Occurrence} starts with (ci) '2013-'

}

SPI-ANS-03c Runway Incursion - by person

{

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By a person

and

File number {Occurrence} starts with (ci) '2013-'

}

SPI-ANS-03d Runway Incursion - by vehicle

{

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By a vehicle/equipment

and

File number {Occurrence} starts with (ci) '2013-'

}

SPI-ANS-03e Runway Incursion - by commercial aircraft

{

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By an aircraft

and

Operation type {in any Aircraft} has at least one of Commercial Air Transport - Revenue operations - Passenger, Commercial Air Transport - Revenue operations - Cargo, Commercial Air Transport - Non-revenue operations - Acceptance Check flight, Commercial Air Transport - Non-revenue operations - Post maintenance function check flight, Commercial Air Transport - Non-revenue operations - Flying displays, Commercial Air Transport - Non-revenue operations -

Ferry/positioning, Commercial Air Transport - Non-revenue operations - Training/check, Commercial Air Transport - Non-revenue operations - Other, Commercial Air Transport - Non-revenue operations - Unknown, Commercial Air Transport - Other - Air taxi, Commercial Air Transport - Other - Emergency Medical Service, Commercial Air Transport - Other - Off-shore, Commercial Air Transport - Other - Sightseeing, Commercial Air Transport - Other - Other, Commercial Air Transport - Other - Unknown, Commercial Air Transport - Unknown

and

File number {Occurrence} starts with (ci) '2013-'

}

SPI-ANS-03f Runway Incursion - by other than commercial aircraft

{

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

Event Type {in any Events} equal to Aircraft operation general - Incursions generally - Runway incursions - By an aircraft

and

Operation type {in any Aircraft} doesn't have any of Commercial Air Transport - Revenue operations - Passenger, Commercial Air Transport - Revenue operations - Cargo, Commercial Air Transport - Non-revenue operations - Acceptance Check flight, Commercial Air Transport - Non-revenue operations - Post maintenance function check flight, Commercial Air Transport - Non-revenue operations - Flying displays, Commercial Air Transport - Non-revenue operations - Ferry/positioning, Commercial Air Transport - Non-revenue operations - Training/check, Commercial Air Transport - Non-revenue operations - Other, Commercial Air Transport - Non-revenue operations - Unknown, Commercial Air Transport - Other - Air taxi, Commercial Air Transport - Other - Emergency Medical Service, Commercial Air Transport - Other - Off-shore, Commercial Air Transport - Other - Sightseeing, Commercial Air Transport - Other - Other, Commercial Air Transport - Other - Unknown, Commercial Air Transport - Unknown

and

File number {Occurrence} starts with (ci) '2013-'

}

SPI-ANS-04 Separation Minima Infringement

SPI-ANS-04a Separation Minima Infringement - severity

{

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

Event Type {in any Events} equal to Aircraft operation general - Aircraft - near collisions/loss of separation - Loss of separation between aircraft - Separation minima infringement

and

File number {Occurrence} starts with (ci) '2013-'

}

SPI-ANS-04b Separation Minima Infringement - “MIL” contribution

{

State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium

and

Event Type {in any Events} equal to Aircraft operation general - Aircraft - near collisions/loss of separation - Loss of separation between aircraft - Separation minima infringement

and

Military a/c involved {in any Separation} equal to Yes

and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-ANS-04c Inadequate Separations - severity

{
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
[
Event Type {Occurrence/Events} equal to Aircraft operation general - Aircraft - near collisions/loss of separation - Loss of separation between aircraft - Loss of separation - aircraft both airborne
or
Event Type {Occurrence/Events} equal to Aircraft operation general - Aircraft - near collisions/loss of separation - Loss of separation between aircraft - Loss of separation - one aircraft airborne
or
Event Type {Occurrence/Events} equal to Aircraft operation general - Aircraft - near collisions/loss of separation - Loss of separation between aircraft - Loss of separation: no risk of collision
or
Event Type {Occurrence/Events} equal to Aircraft operation general - Aircraft - near collisions/loss of separation - Loss of separation between aircraft - Loss of separation: potential collision
or
Event Type {Occurrence/Events} equal to Aircraft operation general - Aircraft - near collisions/loss of separation - Loss of separation between aircraft - Loss of separation: risk undetermined
]
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-ANS-05 Deviation/ATC clearance - Deviation/ATM regulation

{
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
Event Type {in any Events} [Level 3] equal to Aircraft operation general - Flight crew/ANS - Deviation/ATC clearance
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-ANS-06 Airspace Infringement

SPI-ANS-06a Airspace Infringement – operation type

{
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
Event Type {in any Events} equal to Aircraft operation general - Flight crew/ANS - Flight crew deviation - Airspace infringement
and

File number {Occurrence} starts with (ci) '2013-'
}

SPI-ANS-06b Airspace Infringement - leading to Separation Minima Infringement or Inadequate Separation

{
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
Event Type {in any Events} [Level 2] equal to Aircraft operation general - Aircraft - near collisions/loss of separation
and
Event Type {in any Events} [Level 4] not equal to Aircraft operation general - Aircraft - near collisions/loss of separation - Loss of separation between aircraft - Loss of separation - aircraft both on ground
and
Event Type {in any Events} equal to Aircraft operation general - Flight crew/ANS - Flight crew deviation - Airspace infringement
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-ANS-07 Level bust

SPI-ANS-07a Level bust – general

{
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
Event Type {in any Events} equal to Aircraft operation general - Flight crew/ANS - Deviation/ATC clearance - Deviation-flight level/altitude
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-ANS-07a Level bust – RVSM

{
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
Event Type {in any Events} equal to Aircraft operation general - Flight crew/ANS - Deviation/ATC clearance - Deviation-flight level/altitude
and
Airspace type {in any Air Space} equal to RVSM
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-ANS-08 Prolonged Loss of Communications (PLOC)

{
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
Event Type {in any Events} equal to Aircraft operation general - Flight crew/ANS - Communications flight crew with ANS
and

Descr factor subject {in any Descriptive Factor} equal to ATM aircraft management - ATM provision of service - ATC provision of service - ATC air/ground communications - Loss of communications

and

File number {Occurrence} starts with (ci) '2013-'

}

SPI-ANS-09 Deviation/ATC clearance - Deviation from SID EBBR

{

Last departure point {in any Aircraft} equal to Belgium - EBBR (BRU): Bruxelles/National

and

Event Type {in any Events} equal to Aircraft operation general - Flight crew/ANS - Flight crew deviation - ATM SID

and

File number {Occurrence} starts with (ci) '2013-'

}

Operations

SPI-OPS-01 Unstabilized approach & landing, missed approach

SPI-OPS-01a Unstabilized approach worldwide (Belgian OPS)

{
Event Type {in any Events} equal to Aircraft operation general - Aircraft handling - Unstabilized approach
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-OPS-01b Unstabilized approach Belgium (Belgian OPS)

{
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
Event Type {in any Events} equal to Aircraft operation general - Aircraft handling - Unstabilized approach
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-OPS-01c Missed approach Belgium (Belgian OPS)

{
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
Event Type {in any Events} equal to Consequential events - Missed approach
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-OPS-02: Collisions on Ground - GCOL

{
Event Type {in any Events} [Level 3] equal to Aircraft operation general - Aircraft - collisions with obstacle/terrain/aircraft - Collision aircraft - object ground
and
Event Type {in any Events} [Level 4] not equal to Aircraft operation general - Aircraft - collisions with obstacle/terrain/aircraft - Collision aircraft - object ground - Collision aircraft-animal
and
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
File number {Occurrence} starts with (ci) '2013-'
}

Technical

SPI-TEC-01 Flight controls

{

Event Type {in any Events} equal to Aircraft/system/component - 2700 Aircraft flight control

or

Event Type {in any Events} equal to Aircraft/system/component - 2700 Aircraft flight control - 2750 Trailing edge flap control system

or

Event Type {in any Events} equal to Aircraft/system/component - 2700 Aircraft flight control - 2780 Leading Edge Slat Control System

and

File number {Occurrence} starts with (ci) '2013-'

}

General

SPI-GEN-01 Laser beams

{
Event Type {in any Events} equal to Aircraft operation general - Interference with aircraft from the ground - Interference by LASER/Beamer
or
Event Type {in any Events} equal to Air Navigation Services - ATM emergency/security situation - Interference by LASER/Beamer
and
State/area of occ {Occurrence} equal to Europe and North Atlantic - Belgium
and
File number {Occurrence} starts with (ci) '2013-'
}

SPI-GEN-02 Unruly PAX

{
Event Type {in any Events} equal to Aircraft operation general - Security generally - Difficult / unruly passenger
and
File number {Occurrence} starts with (ci) '2013-'
}