

PRB Monitoring Report 2018

Annex III – Safety Report

The 2018 monitoring consists of five reports:

- PRB Monitoring Report 2018
- Annex I – Union-wide detailed analysis for experts
- Annex II – Member States' detailed analysis for experts
- **Annex III – Safety Report**
- Annex IV – CAPEX Report

October 2019



**COPYRIGHT NOTICE
AND DISCLAIMER**

© European Union, 2019

This PRB Monitoring Report 2018 – Annex III – Safety Report has been prepared for the European Commission by the European Union Aviation Safety Agency (EASA).

Reproduction is authorised provided the source is acknowledged. However, neither the European Commission, nor any person acting on its behalf, may be held responsible for the use which may be made of the information contained in this publication, or for any errors which may appear, despite careful preparation and checking.

Table of Contents

1	INTRODUCTION AND CONTEXT.....	3
1.1	ABOUT THIS DOCUMENT.....	3
1.2	BACKGROUND.....	3
1.3	OVERVIEW OF S(K)PIS AND ASSOCIATED TARGETS FOR RP2	4
1.4	SAFETY PERFORMANCE REVIEW	5
1.5	VERIFICATION ACTIVITIES.....	6
	<i>Verification Process of Effectiveness of Safety Management.....</i>	6
	<i>Verification Process for Just Culture.....</i>	7
	<i>Verification of RAT Methodology Application</i>	7
1.6	DATA SOURCES AND ASSOCIATED CAVEATS	8
	<i>Data Sources to Populate S(K)Pis.....</i>	8
	<i>Exposure Data.....</i>	9
2	SAFETY PERFORMANCE ANALYSIS	11
2.1	ANS-RELATED ACCIDENTS AND SERIOUS INCIDENTS	11
	<i>Types of ANS-Related Accidents and Serious Incidents.....</i>	13
2.2	SAFETY KEY PERFORMANCE INDICATORS.....	15
	<i>Effectiveness of Safety Management.....</i>	15
	<i>EoSM State Level - FAB View.....</i>	19
	<i>EoSM ANSP Level - FAB View.....</i>	20
	<i>Application of the RAT Methodology</i>	22
	<i>Application of the RAT Methodology - FAB View.....</i>	24
	<i>Just Culture.....</i>	27
2.3	SAFETY PERFORMANCE INDICATORS	30
	<i>Automated Safety Data Recording Systems</i>	30
	<i>Level of Reporting.....</i>	31
	<i>Union-wide/FAB Level of Reporting.....</i>	32
	<i>Member States/ANSP Level of Reporting.....</i>	37
	<i>Safety Performance by Type of Occurrence</i>	40
3	NETWORK MANAGER	47
3.2	EoSM - NM.....	47
	<i>EASA Verification of NM EoSM Results.....</i>	47
3.3	APPLICATION OF THE RAT METHODOLOGY - NM	49
3.4	JUST CULTURE – NM.....	49
4	SUMMARY OF OBSERVATIONS.....	50
ANNEX I.	ENDNOTES	53

List of Figures

FIGURE 1: SAFETY (K)PIS IN RP2	5
FIGURE 2: RP2 TARGET FOR EFFECTIVENESS OF SAFETY MANAGEMENT (EoSM)	5
FIGURE 3: RP2 TARGET FOR APPLICATION OF THE SEVERITY CLASSIFICATION BASED ON THE RISK ANALYSIS TOOL (RAT) METHODOLOGY	5
FIGURE 4: ANS-RELATED ACCIDENTS AND SERIOUS INCIDENTS (2010-2018)	11
FIGURE 5: ANS CONTRIBUTION TO ACCIDENTS AND SERIOUS INCIDENTS (2010-2018)	13
FIGURE 6: ANS-RELATED ACCIDENT BY OCCURRENCE CATEGORIES (2012-2018).....	14
FIGURE 7: SERIOUS INCIDENT OCCURRENCE CATEGORIES (2012-2018).....	14
FIGURE 8: PROPORTION OF ANS CONTRIBUTION IN ACCIDENTS AND SERIOUS INCIDENTS (2012-2018)	15
FIGURE 9: EFFECTIVENESS OF SAFETY MANAGEMENT FOR STATES – YEAR 2018.....	16
FIGURE 10: STATE EoSM LEVEL PER COMPONENT (UNION-WIDE) – YEAR 2018.....	17
FIGURE 11: NO OF STATES BELOW EoSM 2019 TARGET LEVEL PER EACH EoSM COMPONENT.....	17
FIGURE 12: EFFECTIVENESS OF SAFETY MANAGEMENT FOR ANSPs – YEAR 2018	18
FIGURE 13: ANSP EoSM RESPONSES PER COMPONENT (UNION-WIDE).....	18
FIGURE 14: NO OF ANSPs BELOW EoSM 2019 TARGET LEVEL PER EACH EoSM COMPONENT.....	19
FIGURE 15: STATE EoSM RESPONSES PER EoSM LEVEL (FAB VIEW)	19
FIGURE 16: NUMBER OF EoSM STATE QUESTIONS BELOW 2019 EoSM TARGET – LEVEL C.....	20
FIGURE 17: ANSP EoSM RESPONSES (EXCLUDING SAFETY CULTURE) PER EoSM LEVEL (FAB VIEW)	21
FIGURE 18: NUMBER OF EoSM ANSP QUESTIONS BELOW 2019 EoSM TARGET – LEVEL C OR D	21
FIGURE 19: SEVERITY ASSESSMENT USING RAT METHODOLOGY (UNION WIDE) – YEAR 2018.....	23
FIGURE 20: VARIATION OF OCCURRENCES THAT SES PERFORMANCE SCHEME REQUIRES RAT APPLICATION.....	23
FIGURE 21: VARIATION OF HIGH SEVERE OCCURRENCES (SEVERITY AA-A/B)	24
FIGURE 22: SEVERITY ASSESSMENT USING RAT METHODOLOGY (FAB VIEW) – YEAR 2018.....	25
FIGURE 23: RAT METHODOLOGY APPLICATION FOR SEVERITY CLASSIFICATION OF SMIs – YEAR 2018	25
FIGURE 24: RAT METHODOLOGY APPLICATION FOR SEVERITY CLASSIFICATION OF RIs – YEAR 2018.....	26
FIGURE 25: RAT METHODOLOGY APPLICATION FOR SEVERITY CLASSIFICATION OF ATM SPECIFIC – YEAR 2018	27
FIGURE 26: ANSPs USING AUTOMATED RECORDING SYSTEMS.....	30
FIGURE 27: TYPE OF REPORTABLE EVENT	31
FIGURE 28: UNION-WIDE NUMBER OF HIGH AND LOW SEVERITY REPORTED OCCURRENCES.....	32
FIGURE 29: UNION-WIDE PROPORTION OF HIGH AND LOW SEVERITY REPORTED OCCURRENCES – YEAR 2018	33
FIGURE 30: FAB PROPORTION OF HIGH SEVERITY OF REPORTED OCCURRENCES VS UNION-WIDE	34
FIGURE 31: BOX PLOT OF UNION-WIDE AND FAB REPORTING RATES OF SMIs.....	35
FIGURE 32: BOX PLOT OF UNION-WIDE AND FAB REPORTING RATES OF RIs.....	35
FIGURE 33: BOX PLOT OF UNION-WIDE AND FAB REPORTING RATES OF AIs	36
FIGURE 34: BOX PLOT OF UNION-WIDE AND FAB REPORTING RATES OF ATM-S.....	36
FIGURE 35: EVOLUTION OF NUMBER OF SMI OCCURRENCES REPORTED BY FAB IN 2018.....	41
FIGURE 36: EVOLUTION OF NUMBER OF RI OCCURRENCES REPORTED BY FAB IN 2018.....	41
FIGURE 37: EVOLUTION OF NUMBER OF AI OCCURRENCES REPORTED BY FAB IN 2018	42
FIGURE 38: EVOLUTION OF NUMBER OF ATM-S OCCURRENCES REPORTED BY FAB IN 2018	42
FIGURE 39: TOTAL NUMBER OF OCCURENCES PER FAB	44
FIGURE 40: TOTAL NUMBER OF SMIs PER FAB	44
FIGURE 41: TOTAL NUMBER OF RIs PER FAB	45
FIGURE 42: TOTAL NUMBER OF AIs PER FAB	45
FIGURE 43: TOTAL NUMBER OF ATM-S PER FAB.....	46
FIGURE 44: LEVEL OF NM ANSWERS PER COMPONENT	48
FIGURE 44: NM RESULTS OF APPLICATION OF THE SEVERITY CLASSIFICATION (BASED ON RAT).....	49

List of Tables

TABLE 1: JUST CULTURE IMPLEMENTATION AT FAB LEVEL	29
TABLE 2: UNION-WIDE NUMBER OF HIGH AND LOW SEVERITY REPORTED OCCURRENCES- YEAR 2018.....	40
TABLE 3: NM KPIS IN NPP 2015-19.....	47
TABLE 4: NM PIS IN NPP 2015-19	47
TABLE 5: NM LEVEL OF EoSM.....	48

1 Introduction and Context

1.1 About this Document

- 1.1.1 This Annual Monitoring Report 2018 – Annex III – *Safety Report* was prepared by the European Union Aviation Safety Agency (EASA) in support to the Performance Review Body (PRB) of the Single European Sky (SES). It covers the fourth year (2018) of the second Reference Period (RP2), which runs for five years from 2015 to 2019. The report provides a summary of the performance of Air Navigation Services (ANS) and network functions achieved for 2018 in the Key Performance Area (KPA) of safety. It refers to, and uses data from, the Member States subject to the provisions of the SES Performance Scheme in RP2, as laid down in Article 1 of Regulation (EU) No 390/2013. Therefore, it covers the 28 EU Member States, plus Norway and Switzerland.
- 1.1.2 The document is structured in four Chapters. This first Chapter describes the background and a brief reminder of Safety (Key) Performance Indicators (S(K)PIs) and targets used in the RP2, and the process and methods used to collect data, to assess and to review the performance of the ANS from a safety perspective. This section is similar to the one published in the previous years, but it is repeated for convenience of the reader. The second Chapter presents and analyses in detail the achieved values of S(K)PIs during the year 2018 and previous years of RP2, based on the information gathered from the submitted data from each Member State/Functional Airspace Block (FAB) in their FAB Performance Monitoring Reports (PMRs). Where applicable, it provides feedback on safety performance against targets. The third Chapter provides an assessment of safety indicators of the network functions for 2018. The final fourth Chapter provides a summary of observations concerning 2018 safety performance.

1.2 Background

- 1.2.1 The performance scheme for the ANS and network functions was set up by Regulation (EU) No 691/2010 to contribute to a sustainable development of the air transport system by improving the KPAs of safety, environment, capacity, and cost-efficiency of ANS and network functions. This Regulation established the principles of the scheme and the provisions of the initial implementation during RP1 – from 2012 till 2014- through target setting and continuous monitoring of national supervisory authorities (NSAs), air navigation services providers (ANSPs) and network functions at national/FAB and Union-wide level. During RP1, established as a transitional period of three years, the performance area of safety was limited to SPIs used for monitoring purposes only, with no targeted indicators.
- 1.2.2 Regulation (EU) 390/2013, repealing Regulation (EU) 691/2010, was adopted on 3rd May 2013, establishing the legal requirements for RP2 which aim at improving the processes of the performance scheme based on the experienced gained during RP1. In particular, and related to the safety performance area, the current Regulation (EU) 390/2013 introduced additional S(K)PIs with associated targets (set up in Commission Implementing Decision 132/2014). The Regulation defines a number of S(K)PIs, which shall be monitored at both European and national/FAB levels and used for the safety performance assessment during RP2.
- 1.2.3 In addition, EASA has published Acceptable Means of Compliance (AMC) and Guidance Material (GM) for point 1 of Section 2 of Annex I to Regulation (EU) 390/2013 for the implementation and measurement of S(K)PIsⁱ. AMCs are non-binding standards adopted by EASA to illustrate means to establish compliance with Regulation (EU) 390/2013. When these AMCs are complied with, the obligations on the measurement of the S(K)PIs in the Regulation (EU) 390/2013 are considered as met.

1.3 Overview of S(K)PIs and Associated Targets for RP2

- 1.3.1 In RP2, targets have been introduced by the Regulation (EU) 390/2013 for three RP1 SPIs:
- SKPI1: the Effectiveness of Safety Management (EoSM);
 - SKPI2: the application of the severity classification based on the Risk Analysis Tool (RAT) methodology; and
 - SKPI3: the level of just culture (JC).
- 1.3.2 The SKPI EoSM shows, at a State level, the capability of authorities to manage the State Safety Programme (SSP) whenever it is in place and, at a service provision level, the service provider's capability to manage an effective Safety Management System (SMS). The starting point was the International Civil Aviation Organization (ICAO SSP and SMS framework) while additional components and elements have been added to better reflect the European context.
- 1.3.3 The SKPI 'the application of the severity classification based on the RAT methodology' aims at measuring to what extent the RAT methodology has been applied to assign severity levels to reported ATM incidents (covering Runway Incursions (RIs), Separation Minima Infringements (SMIs) and ATM Specific Occurrences (ATM-S') by the ANSPs and the Member States.
- 1.3.4 The SKPI, 'the level of JC', aims at measuring the level of presence of just culture at State and at ANSP level. The main objective of the indicator is to identify possible obstacles and impediments to the application of just culture at State and ANSP level.
- 1.3.5 In addition, Regulation (EU) 390/2013 introduces three additional performance indicators (PIs) without targets for monitoring purposes. These are as follows:
- SPI1: The application by the ANSPs of automated safety data recording systems where available, which shall include, as a minimum monitoring of separation minima infringements and runway incursions; (This PI aims at measuring if ANSPs use these tools in a just culture environment to improve the gathering of occurrences' information and analysis by the organisations' SMS)
 - SPI2: The reporting by the Member States and air navigation service providers on the level of occurrence reporting, on an annual basis, aiming at measuring the level of reporting and addressing the issue of improvement of reporting culture; and
 - SPI3: The number of, as a minimum, separation minima infringements, runway incursions, airspace infringements, and ATM-specific occurrences at all air traffic services units.
- 1.3.6 The overview of all S(K)PIs used in RP2 and their associated targets are presented in the next table:

KPI	TARGET LEVEL
The Effectiveness of Safety Management (EoS _M)	Union Wide and Local
The application of the severity classification based on the Risk Analysis Tool (RAT) methodology to the reporting of, as a minimum, three categories of occurrences: separation minima infringements, runway incursions and ATM-specific occurrences at all air traffic services units	Union-Wide and Local
The reporting by the Member States and their air navigation service providers of the level of presence and corresponding level of absence of just culture (JC).	Local
The application by the air navigation service providers of automated safety data recording systems where available, which shall include, as a minimum monitoring of separation minima infringements and runway incursions.	None
The reporting by the Member States and air navigation service providers on the level of occurrence reporting, on an annual basis, aiming at measuring the level of reporting and addressing the issue of improvement of reporting culture.	None
The number of, as a minimum, separation minima infringements, runway incursions, airspace infringements, and ATM-specific occurrences at all air traffic services units.	None

Figure 1: Safety (K)PIs in RP2

1.3.7 Figure 2 and Figure 3 show the Union-wide targets for RP2 which were set at Union-Wide level by Commission Implementing Decision (EU) 132/2014ⁱⁱ.

LEVEL OF EFFECTIVENESS OF SAFETY MANAGEMENT (EoS _M)		2015	2016	2017	2018	2019
State level	Union-wide target					C
ANSP level	Union-wide target for Safety Culture Management Objective (MO)					C
	Union-wide target for all other MOs					D

Figure 2: RP2 target for Effectiveness of Safety Management (EoS_M)

APPLICATION OF THE SEVERITY CLASSIFICATION BASED ON THE RISK ANALYSIS TOOL (RAT) METHODOLOGY						
Ground score (ANSP level)		2015	2016	2017	2018	2019
Union-wide targets	S _M I _s			≥ 80%		100%
	R _I s			≥ 80%		100%
	ATM-S			≥ 80%		100%
Overall score (State level)		2015	2016	2017	2018	2019
Union-wide targets	S _M I _s			≥ 80%	≥ 80%	≥ 80%
	R _I s			≥ 80%	≥ 80%	≥ 80%
	ATM-S ⁱⁱⁱ			≥ 80%		100%

Figure 3: RP2 target for application of the severity classification based on the Risk Analysis Tool (RAT) methodology

1.4 Safety Performance Review

1.4.1 The review of safety performance is based on the data submitted by the Member States through different instruments. The Member States, through their National Supervisory Authorities (NSAs) or bodies which are responsible for coordination within the FAB as regard the monitoring of the performance plans, are required to submit their performance monitoring reports (PMRs) to the

European Commission (EC) by 1st June each year with the aim of monitoring performance plans and targets. With regard to data related to SKPIs, the States are required to submit/populate EoSM and JC questionnaires by 1st February of each year, while information on the RAT methodology application should, if submitted via the Annual Safety Template (AST) mechanism, be submitted by 21st April.

- 1.4.2 With regard to other SPIs, and in order to facilitate the task of Member States to elaborate the PMRs and to submit the safety data as required by the Regulation (EU) 390/2013 and its associated AMC/GM as described in the EASA Decision 2014/035/R of 16 December 2014 and its amendments, the PRU and EASA elaborated a template where all data required for the performance review are collected. During the summer, these reports, together with results of SPI monitoring for 2018 are assessed by the PRB (supported by PRU and EASA) resulting in the preparation of this PRB Monitoring Report.
- 1.4.3 The output of this review of safety performance together with identified risks and recommendations is submitted to the PRB, the EC and shared more widely within EASA.
- 1.4.4 The review of PMRs in relation with the safety KPA consists of an assessment of the safety aspects of the performance monitoring reports, in particular the reporting on performance indicators. The general objective is to review and report on achieved safety performance of the NSAs and ANSPs to ensure an effective monitoring of the safety performance of ANS and network functions. The assessment of the PMRs is conducted by EASA and focuses on two distinct areas: those elements, which are addressed in the safety-related sections of the PMRs, and those elements received through measurement of SKPIs reported to and collected by EASA by February 2019. In addition, this review of the PMRs includes adequately substantiated comments and observations that will be the basis for the PRB recommendations to Member States.

1.5 Verification Activities

- 1.5.1 The safety review process includes some verification of the data submitted by the Member States to compute the SKPIs. These verification activities were performed by EASA for EoSM and JC, whilst application of the RAT methodology was verified by EUROCONTROL. Measuring and verifying the S(K)PIs of the performance scheme Regulation (EU) 390/2013 is done in accordance with the AMC/GM annexed to EASA Decision 2014/035/R^{iv} and its amendment EASA Decision 2015/028/R^v.

Verification Process of Effectiveness of Safety Management

- 1.5.2 The EoSM indicator is measured by the verified responses to questionnaires^{vi} completed by the State/competent authorities (normally the NSA) and their ANSPs, which results in a double metric: a score and a maturity level. The score is measured on a scale from 0 to 100, and the maturity level in a scale from A to E for each question, later grouped in components. This is done in accordance with Acceptable Means of Compliance (AMC) and Guidance Material (GM) for the Implementation and Measurement of Safety Key Performance Indicators (EASA Decisions ED Decision 2014/035/R^{vii} and ED Decision 2015/028/R^{viii}).
- 1.5.3 The EoSM SKPI shows, at a State level, the capability of authorities to manage the State Safety Programme (SSP) whenever it is in place and, at a service provision level, the service provider's capability to manage an effective Safety Management System (SMS). The starting point was the ICAO SSP and SMS framework while additional components and elements have been added to better reflect the European context.
- 1.5.4 The results of the States' EoSM self-evaluated questionnaires and the evidence provided were cross-checked with the results of the EASA standardisation inspections on the NSAs, and the level of maturity and score corrected when necessary based on the inspections.
- 1.5.5 The coordination between EASA and the competent authority/authorities is done through the National Coordinator appointed by the State and in accordance with Article 6 of Commission Implementing Regulation (EU) 628/2013. In most cases this is directly managed with a Sectorial Focal Point dealing with ATM issues. The ATM Sectorial Focal Point/national Coordinator is responsible for coordination within the State authorities and for coordination with the ANSPs in order to provide EASA

with the responses to the questionnaires (both competent authority and ANSP, aggregated where required).

Verification Process for Just Culture

- 1.5.6 The Just Culture SKPI aims at measuring the level of presence and corresponding level of absence of Just Culture at State and at ANSP level. The main objective of the indicator and of the questionnaires is to identify possible obstacles and impediments to the application of Just Culture at State and ANSP level. The Just Culture indicator is measured as well by evaluating the verified responses to questionnaires^{ix}.
- 1.5.7 The questionnaires for both the State and the ANSP level were divided into sections where Just Culture elements are relevant, with an additional sub-division into key elements for each section. The three main areas are:
- policy and its implementation;
 - legal/judiciary; and
 - occurrence reporting and investigation.
- 1.5.8 As for the previous years, the questions were to be answered by “yes” or “no”, and States and ANSPs were again encouraged to provide additional information and justification to their responses.
- 1.5.9 In addition, it should be highlighted once more that, although the AMC/GM indicate that a positive reply gives an indication of a Just Culture context, while a negative reply indicates potential deficit/obstacles in Just Culture implementation, the key element which allows for the measurement of an effective level of Just Culture is not in the counting of the “yes” and “no” responses but in the explanation and justification provided by the State and the ANSP, which are captured in this report as best practices.
- 1.5.10 The information provided by States and ANSPs relating to the SKPI Just Culture was verified during RP1 and in 2015, and no major changes have been reported this year so no additional verification has been performed in 2018.

Verification of RAT Methodology Application

- 1.5.11 The application of the severity classification using the RAT methodology is identified for each individual occurrence using “YES/NO” value of application of the RAT methodology for severity classifications of all Separation Minima Infringements (SMIs), Runway Incursions (RIs) and ATM Specific Occurrences (ATM-s) at ATS Centres and airports, as appropriate.
- 1.5.12 The indicator is measured as the percentage (%) of occurrences for which severity has been assessed using the RAT methodology over a subset of the annually reported occurrences by Member States and ANS Providers in relation with the respective scope of the RAT method: ATM Ground and ATM Overall.
- 1.5.13 This subset of occurrences was introduced during RP2 and it is restricted to:
- the RAT methodology is only mandatory for deriving the severity of A, B and C reported SMIs and RIs, and AA, A, B and C severity for ATM-s^x;
 - the Regulation (EU) 390/2013 may not be applicable at airports and traffic units with less than 70,000 IFR movements per year (hence, the use of the RAT Methodology on the occurrences that were reported at those units may be excluded);
 - contrary to the previous reference period, the EC has set targets for the application of the RAT Methodology (Commission Implementing Decision 2014/132/EU) for deriving the severity of both ATM Ground and ATM Overall of SMIs, RIs, and ATM-S.

- 1.5.14 The EASA AMC 8 - SKPI RAT methodology — Monitoring mechanism, accepts any of both existing occurrence reporting mechanisms for the measure of application of the RAT methodology such as the Annual Summary Template (AST) or the European Central Repository (ECR). During this year, figures of the RAT application have been collected via the AST mechanism for all Member States, as the use of ECR as common repository of all aviation occurrences has been only introduced since 16 November 2015, as per Regulation (EU) 376/2014.
- 1.5.15 As the AST reporting mechanism was used for reporting of RAT methodology application, the EUROCONTROL DPS/SSR has performed the following verification activities to measure performance of this SKPI during 2018:
- Collected and processed the RAT derived severity score for each reported occurrence;
 - Validated the correctness of the processed data with the national AST Focal Points;
 - Agreed, in case differences are still identified between the RAT score reported via the AST mechanism and the PMRs, actions with the AST Focal Points to address the issues.

1.6 Data Sources and Associated Caveats

- 1.6.1 This section discusses the sources of data used to populate the performance indicators, the exposure data used, and some caveats related to both data sets.

Data Sources to Populate S(K)PIs

- 1.6.2 Three data sources have been used to populate the safety information in the S(K)PIs, in addition to the Network Manager for the exposure data and EASA database to gather information of accidents and serious incidents, as explained later. These three sources are as follow:
- Questionnaires that capture information from the States and their ANSPs through a web platform managed and later verified by EASA, used to populate SKPI1 (EoSM) and SKPI3 (Just Culture). Member States submit completed questionnaires for the State level and the ANSP level (State's largest ANSP also submits its questionnaire). However, EASA is only responsible for verification of responses at the State level, while the NSAs are responsible of the verification of ANSP's responses. The verification process relies on cross-referencing evidence that has been reported with the results of authorities' oversight activities.
 - Reporting of the number of each type of occurrences and the severity classification was carried out through the AST reporting mechanism, operated by EUROCONTROL. The AST database was used to gather information related to SKPI2 (application of the RAT methodology) and SPI2 (ratio of high-severity and low-severity occurrences), and SPI3 (number of occurrences). In a few cases, the data was crosschecked with data submitted in the ECR.
 - The submitted FAB Monitoring Reports was used to gather information related to SPI1 (use of automated reporting tool), and any amendment of incorrect figures of other PIs.
- 1.6.3 It is worth noting that EASA AMC/GM gives the option of using the ECR or AST as source of ANS occurrences to populate the S(K)PIs for the Performance Scheme on an individual basis. As the Regulation (EU) 376/2014 entered into force as from 15th November 2015 and that the States may still be in the process to report consistently in ECR certain information (e.g. RAT application), the AST data has been used during this year, as in previous years of RP2.
- 1.6.4 Whereas the ECR data contains detailed information regarding the nature and location of the occurrence, it is important to note that the AST contains only aggregated numbers. It does not include the location information of the occurrence; so it is impossible to discriminate the occurrences that happened within locations included in the Performance Scheme, if they have not been filtered beforehand by the State reporters. EUROCONTROL DPS/SSR has been in close contact coordination with reporters to filter and eliminate occurrences that are outside of the scope of the Performance

Scheme, and the figures included in the pre-filled report were the best data available at the time. This may have been a source of inaccurate figures in some instances. In some instances, ECR data have been used to verify the data submitted by the MS.

- 1.6.5 The data used in the performance indicators (SPI1, SPI2, and SPI3) were taken directly from what the States reported in their Monitoring Reports without further verification or challenge (e.g. use of automated reporting tools or the total number of occurrences by type). To facilitate gathering the data, a reporting template was developed, which was part of the FAB Monitoring Report Template.
- 1.6.6 At the present time, EASA and EUROCONTROL are conducting a study to analyse the ECR quality, which may be used to better diagnose the issues and improve further ECR quality, in view of the future use of the ECR data in RP3. In addition, EASA initiated in 2018, on behalf of European Commission, standardisation inspections to verify the applicability of certain articles of the Regulation (EU) 376/2014, which will result in an improvement of data quality and harmonization of the reporting of occurrences into the ECR. As the quality and completeness of the ECR improves, its use within the Performance Scheme will change in the future, aiming at becoming the single data occurrence source in the RP3.

Exposure Data

- 1.6.7 The use of exposure data (e.g. number of airport movements or flight hours) is limited to one single performance indicator (SPI 2 on level of occurrence reporting) and they are not used directly to derive the indicator, but as a way to normalise the number of occurrences in each Member State and have a Union-wide overview of distribution of occurrence rates for reference in the analysis. This allows the estimation of occurrence type rates, i.e. "the number of outcomes" divided by "the amount of units of exposure". Otherwise, the comparison of occurrences reported between different States that have different units of exposure may not be possible and lead to incorrect conclusions.
- 1.6.8 The selection of the units of exposure should consider both the relationship of the exposure unit on the occurrence type and the data availability and quality. In certain cases, the most appropriate exposure units were not the ideal, but due to unavailability of data or quality issues, alternative units were chosen. In such cases, the selection of exposure units was based on feasibility to capture and use. This principle applied in this report analysis was in relation to the use of IFR flights, as explained below.
- 1.6.9 The selection of exposure data was made based on the best data availability and quality at the time of elaboration of this report. Therefore, it was decided to use data from the Network Manager (restricted mainly to IFR flights, with capture of only a minimal number of VFR flights) and in certain cases to use corrected data provided by Member States through their Monitoring Reports.
- 1.6.10 The exposure data selected for the different type of occurrences are as follows:
- For SMIs, the exposure data used are the number of IFR flight hours;
 - For RIs, the exposure data used are the number of IFR movements (departures and arrivals);
 - For AIs, the exposure data used are the number of IFR flight hours;
 - For the ATM-Specific, the exposure data are the number of IFR movements.
- 1.6.11 The exposure data cover the scope as defined in the RP2 legislation, i.e., when related to airports, they cover all airports above 70,000 IFR flights or at least to the largest airport in the Member (as per Regulation 390/2013 Art 1. Paragraphs 3 and 4). To identify the list of airports included in the Performance Scheme, the latest available Performance Plan was used. Furthermore, the regions are those, within EUR and AFI ICAO regions, where the States are responsible of provisions of ANS (as per Art 1 paragraph 1 of said Regulation). Therefore, those territories outside EUR and AFI regions were not included. The basis taken to aggregate flight hours was the Flight Information Regions (FIRs), as opposed to flight hours controlled by ANSP.
- 1.6.12 It is worth noting that in some cases, the units of exposure are not the ideal ones when considering the relationship between the unit and the occurrence type. However, based on availability and quality

criteria, they have been considered adequate for the purpose of the indicator. For example, VFR flights may be more prone to infringe controlled airspace, and therefore, the VFR and IFR flight hours could be more appropriate exposure unit for the calculation of the airspace infringement rate. However, VFR flight hours were not consistently available. IFR flight hours can be, however, considered a valid notion of exposure as the IFR flights are the main receivers of ATC services. Similarly, the operating hours of ATS units to calculate rates of ATM-S may be the most appropriate exposure unit to use, but again these data are not available to EASA, hence IFR flight hours were used. There is, however, a notional link between the amount of traffic handled by the system and the demand on the system performance (e.g., amount of flight plans correlated by FDPS).

2 Safety Performance Analysis

2.1 ANS-Related Accidents and Serious Incidents

2.1.1 Besides the S(K)PIs required by Regulation (EU) 390/2013, this section provides an analysis of additional performance measurements using information from the EASA’s Occurrence Database^{xi}. More precisely, the section presents the review of ANS-related accidents and serious incidents, as defined by ICAO Annex 13, extracted from the EASA database for the duration of the Performance Scheme, covering the period 2010 – 2018. The scope of the review is Commercial Air Transport (CAT) fixed wing aeroplanes above 2,250 kg maximum take-off mass and it covers the 28 EU States plus Norway and Switzerland (SES States).

2.1.2 This additional analysis brings value to the performance review of safety as it provides an overview of the ANS-related safety occurrences with highest risks at EU-level^{xii}. ‘ANS-related’ and ‘ANS contribution’ have been defined as follows:

ANS-related vs. ANS contribution

“**ANS related**” means that the ANS system may not have had a contribution to a given occurrence, but it **may** have a role in preventing similar occurrences in the future.

“**ANS contribution**” means that **at least one** ANS factor was in the causal chain of events leading to an occurrence, or at least one ANS factor potentially increased the level of risk, or it played a role in the occurrence encountered by the aircraft

2.1.3 Figure 4 shows the number of accidents and serious incidents per year that are related to the provision of ANS, alongside a rate calculated using the number of flight hours performed within the EU. In the nine-year period analysed, it is worth noting that most of the ANS-related accidents reported in the figure were non-fatal (21 out of 23), being the last fatal accident observed in 2012 (with 2 accidents that year), and that no fatal accident with ANS contribution is registered in the analysed period, which makes them rare.

2.1.4 The figure shows a decreasing trend in the rate of accidents plus serious incidents since 2010, whereas the absolute number of accidents has remained low for the entire period, with a maximum of 11 in 2014 and a minimum of 1 in 2017. In 2018, 4 ATM-related accidents without fatalities were recorded. This observation is also reflected in other measures of aviation system safety, such as the global fatality rate for CAT Aeroplanes, or the European CAT accident rate^{xiii}.

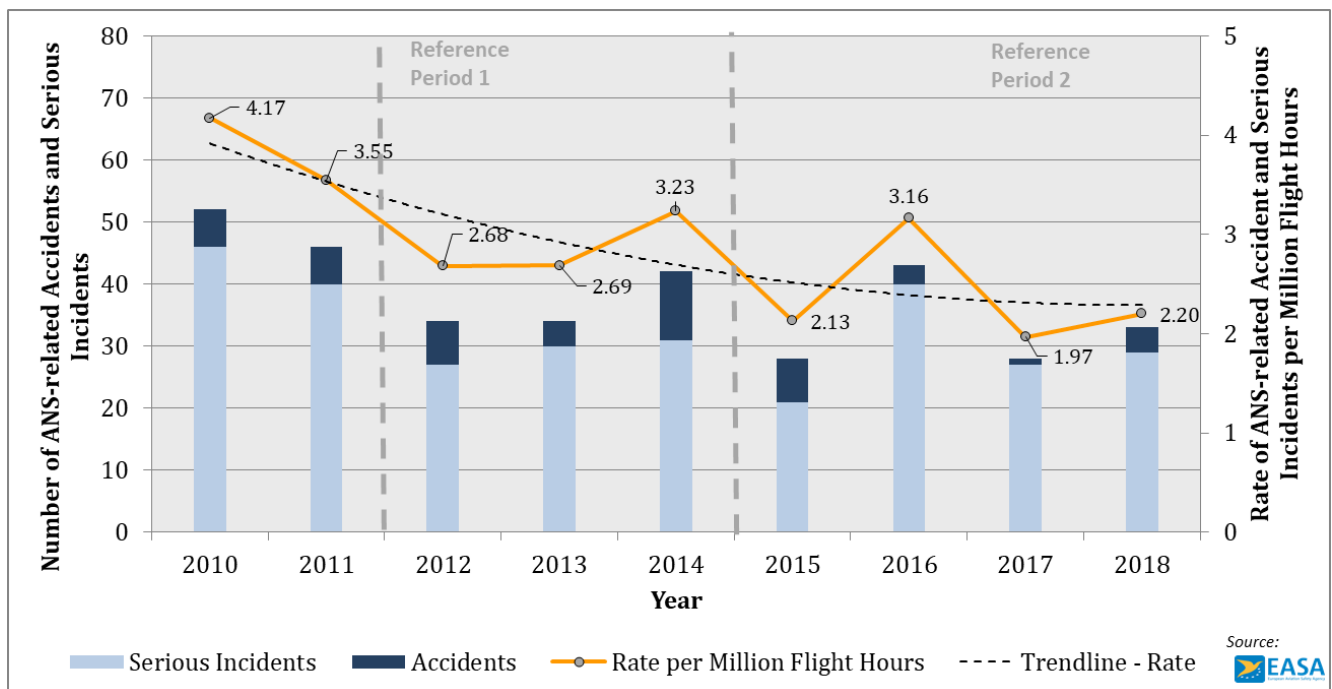


Figure 4: ANS-related accidents and serious incidents (2010-2018)

- 2.1.5 Although presented alongside one another, the accidents and serious incidents that the data comprises are very different in their characteristics. Taking the most recent years, 2017 and 2018, as an example, the five accidents recorded^{xiv} were categorised into six^{xv} types:
- Turbulence encounters that injure aircraft occupants (3 accidents);
 - Ground Collision (1 accident)
 - ATM/ANS (1 accident)
 - Cabin Safety (1 accident);
 - Abrupt manoeuvre (1 accident); and
 - Mid-air collision (1 accident).
- 2.1.6 Only two of these five accidents appear at the first glance to be related to air traffic management. However, all of them have in common that ANS may have a role in preventing future accidents of these types (e.g. having additional and more accurate weather information available to ATC help pilots to avoid certain airspace with risk of turbulence or thunderstorm). Only one had ANS as a contributory factor. By contrast, the serious incidents have more precursors clearly linked to ANS. They are typically events that could lead to more accidents may share with accidents similar precursors, hence the interest in analysing them together. For example, out of the 56 serious incidents in 2017 and 2018, the most frequent occurrence category related to them was near mid-air collisions (present in 29 serious incidents), navigation error (present in 10 serious incidents), thunderstorms/turbulence (in 10 encounters) and runway incursions (with 6 serious incidents). Serious incidents are often a better source of measure of the performance of the ANS system than accidents, because they are more frequent and they relate more closely to ANS itself.
- 2.1.7 Figure 5 shows the number of accidents and serious incidents with some ANS contribution per year, alongside a rate calculated using the number of flight hours performed within the EU. This is a more appropriate metric to directly measure the performance of the ANS system. It is worth noting that the accidents shown in the graph were all non-fatal in the nine-year period analysed. In 2018, there was one accident non-fatal with ANS contribution. The figure shows a decreasing trend in the rate of accidents plus serious incidents since 2010 as well. These figures for 2018 suggest overall a better safety level than average previous eight (8) years. Figure 5 also indicates that the trend in number of accidents (dark blue bar) is decreasing from RP1 to RP2, from 2 accidents/year to less than 1 accident/year. This suggests that overall, safety outcomes with ANS contribution have improved since the beginning of the Performance Scheme, even though there is no evidence of a causal effect with the introduction of the Performance Scheme. The observation should be taken cautiously due to the low number of events considered. All in all, it could be concluded that the ANS sector is acceptably managing the safety risks that directly relate to the air navigation services provided.

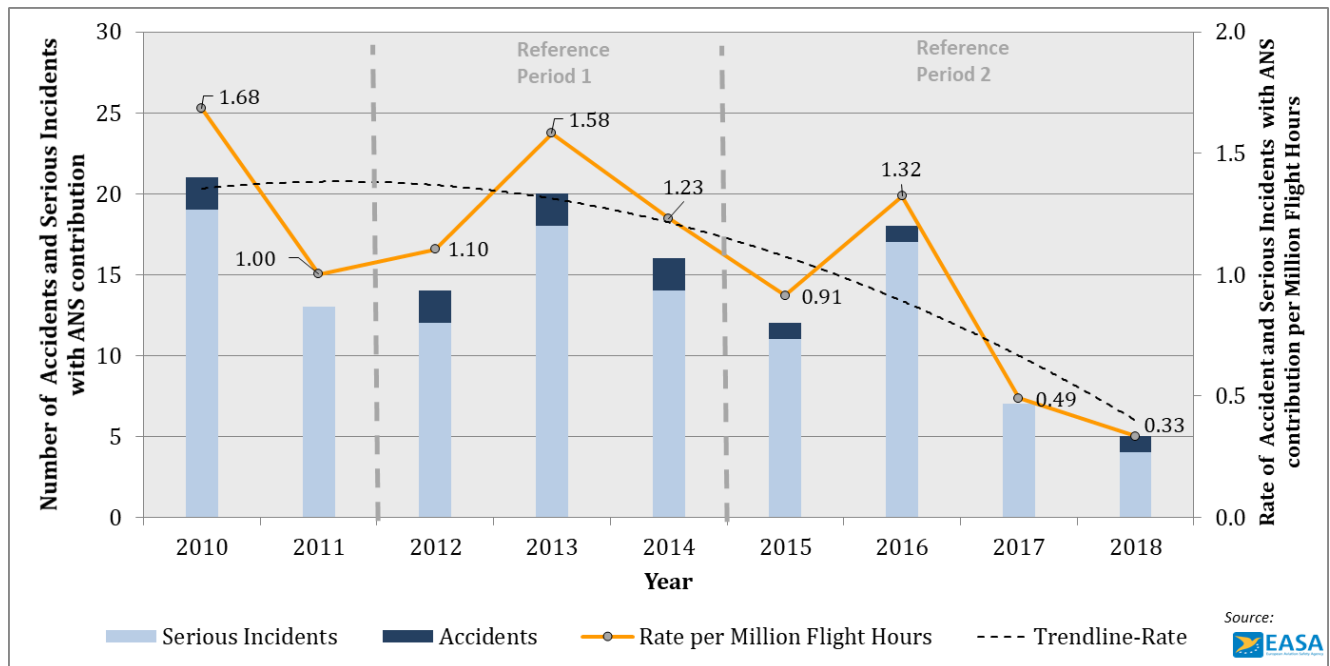


Figure 5: ANS contribution to accidents and serious incidents (2010-2018)

Types of ANS-Related Accidents and Serious Incidents

- 2.1.8 Figure 6 and Figure 7 show the top occurrence categories assigned to ANS-related and ANS-contribution accidents and serious incidents during the last seven-year period, which correspond to the RP1 and the four first years of RP2. The reader should note that the occurrence categories describe at a high level the type of occurrence. It should be also noted that more than one category can be assigned per occurrence.
- 2.1.9 For example, the inclusion of loss of control in-flight may appear to be unrelated to ANS, however, occurrences are the result of the coincidence of several factors or the sequence of related events, where (for example) a trigger event like a TCAS-RA may lead to a subsequent abrupt manoeuvre and loss of aircraft control. By monitoring the occurrence types, it is possible to identify risk-transfer from one aviation sector to another.
- 2.1.10 Therefore, any accident and serious incident may be coded using more than one occurrence category^{xvi} either because several occurrence types are pertinent to the event or due to the presence of several events in the same occurrence report. This explains why the number of occurrence types present in accidents and serious incidents is higher than the number of reports. Both figures indicate whether the ANS had a contribution (light blue bars) or not (dark blue bars) and the type of occurrence in question.

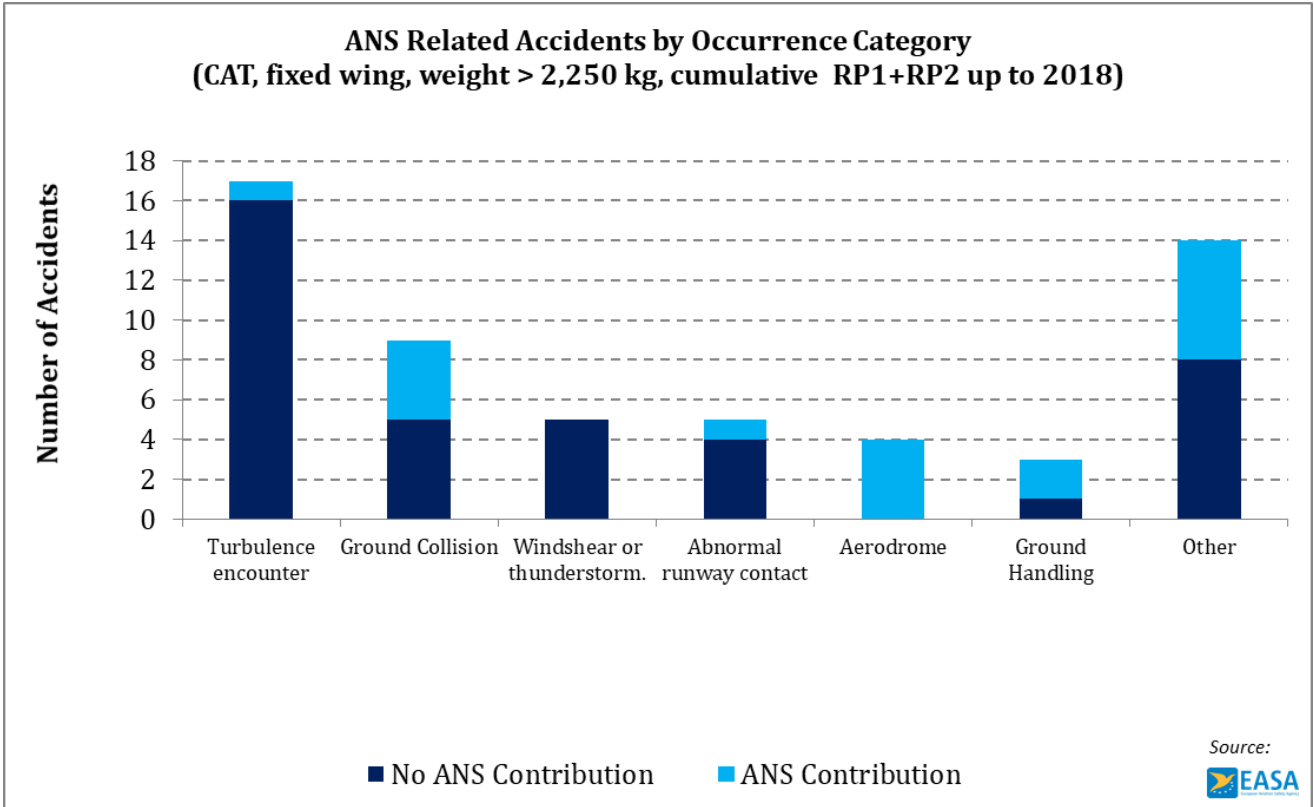


Figure 6: ANS-related accident by occurrence categories (2012-2018)

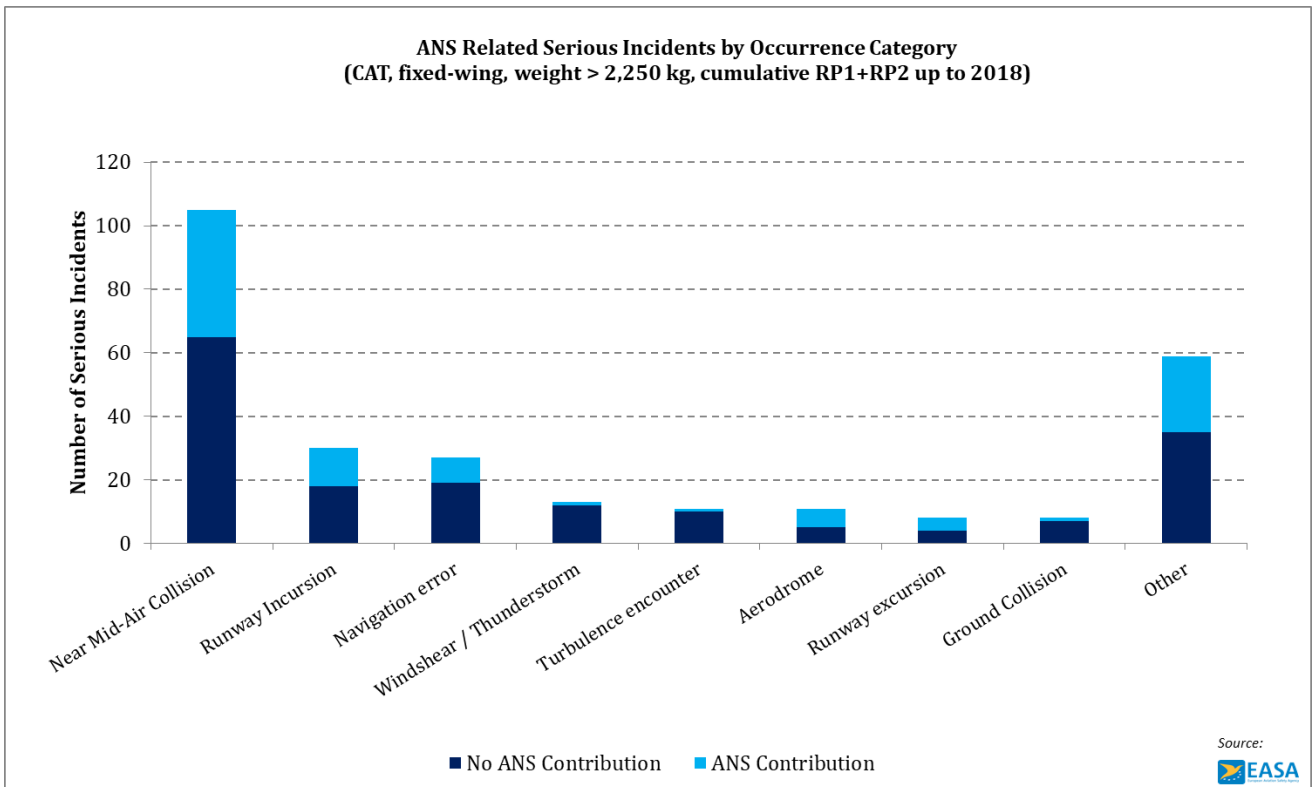


Figure 7: Serious Incident Occurrence Categories (2012-2018)

- 2.1.11 Figure 8 reinforces more clearly the observation that the proportion of events with ANS contribution is smaller in ANS-related accidents than in ANS-related serious incidents during the last seven-year period. This seems to indicate that the ANS has lower contribution in the highest severity occurrences, i.e., accidents.

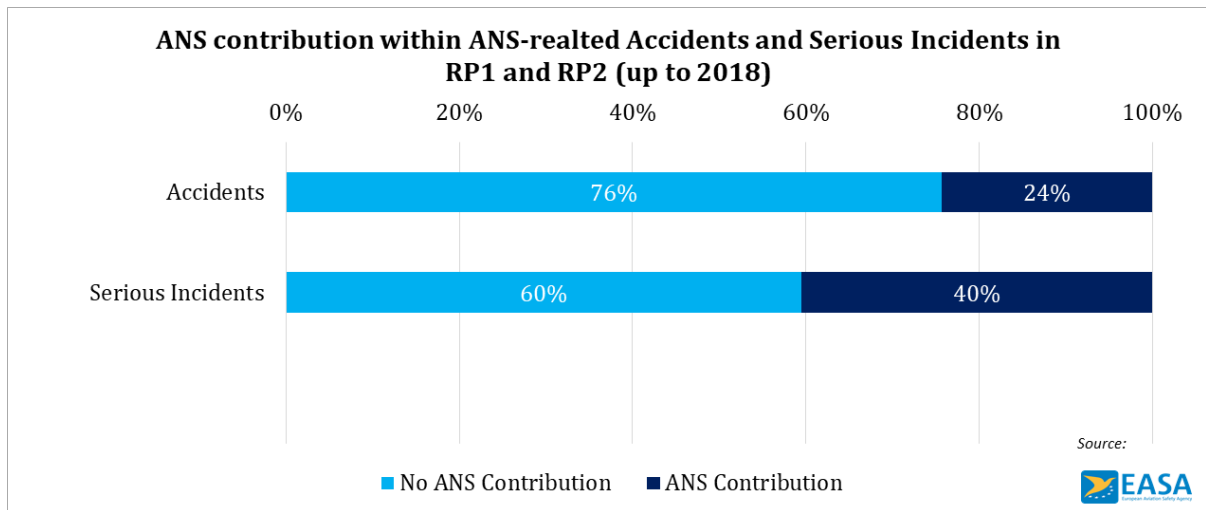


Figure 8: Proportion of ANS contribution in accidents and serious incidents (2012-2018)

2.2 Safety Key Performance Indicators

- 2.2.1 This Section describes the Union-wide review of 2018 safety performance measured by the Key Safety Performance Indicators (KPIs) required by Regulation (EU) 390/2013: EoSM, RAT methodology application and JC for States subject to the Performance Scheme.

Effectiveness of Safety Management

- 2.2.2 All 30 States and 31 ANSPs, including MUAC, filled in the questionnaires used for the measurement of the EoSM SKPI in accordance with AMC/GM for the Implementation and Measurement of Safety Key Performance Indicators (EASA Decision 2011/017R, amended by ED Decision 2014/035/R and ED Decision 2015/028/R). In accordance with the AMC, the responses of all States have been verified by EASA standardisation team using the data from the standardisation audits and the follow-up of the corrective measures, while the responses of the ANSPs have been verified by the State Competent Authorities.
- 2.2.3 Figure 9 shows the EoSM results of States in 2018. The figure depicts both the EoSM overall Score (blue bars) and the EoSM Maturity Level (on the second axis – orange dots) achieved at State level. The RP2 has introduced targets to be achieved by 2019 only on the EoSM minimum Maturity Level achieved: at least level C for all management objectives shall be achieved, as per Commission Implementing Decision (EU) 2015/19. The EoSM score gives an overview of the effectiveness in a single continuous scale, but has no associated target.
- 2.2.4 The lowest EoSM Score provided by the individual States in 2018 is 40, with two States scoring below 50 (Bulgaria and Hungary), as opposed to 3 in 2017, and the highest EoSM score at State level in 2018 is 88 (UK) (Figure 9). The average EoSM score has increased from 63.2 in 2017 to 66 in 2018, which continues the increasing trend of improvement observed across RP2 (it started as 56 in 2015). These values are not directly comparable with RP1 values as in RP1 reflected the self-assessed score and EASA did not verify the responses. From the start of RP2, EASA has verified all self-assessed scores including levels D and E with the exception of the questions Q3.8 (Safety Assurance), Q5.1 and Q5.2 (Safety Culture), all of them related to the existence and measurement of a safety culture. This means that State responses were adjusted (if necessary) after EASA verification.

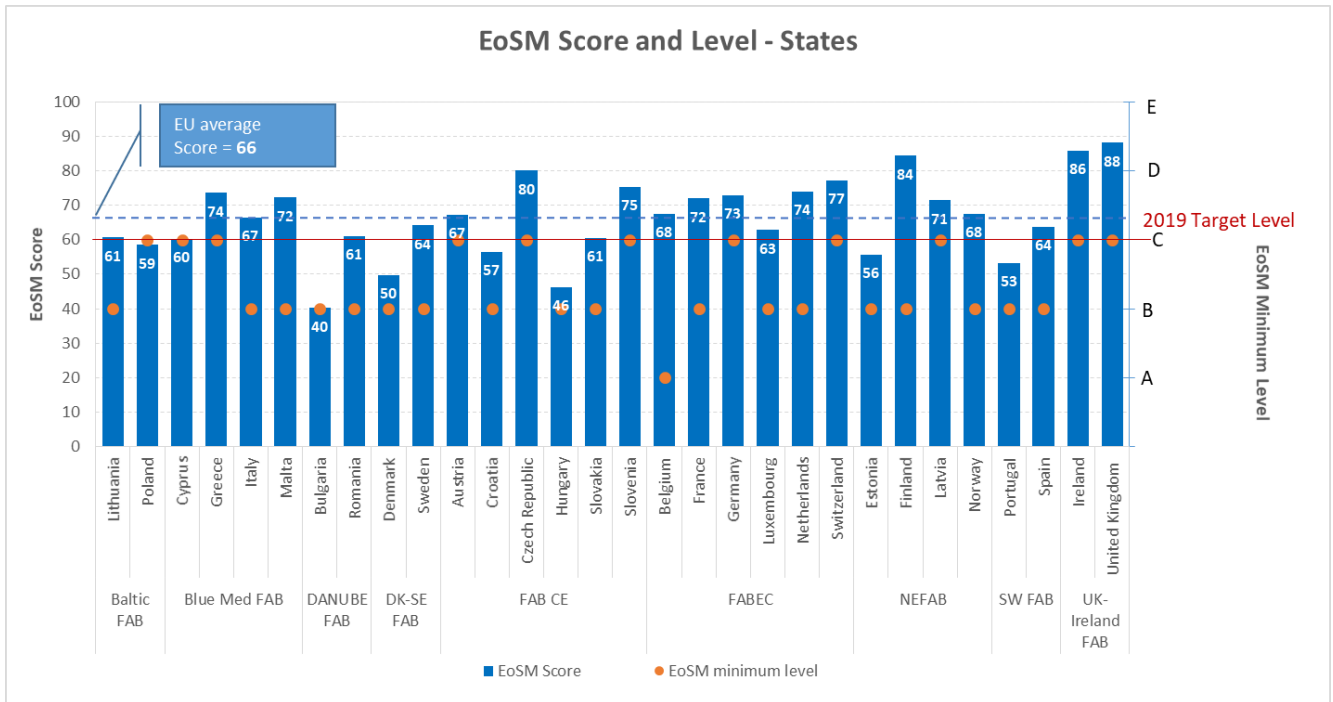


Figure 9: Effectiveness of Safety Management for States – Year 2018

2.2.5 Despite the improvement on the EoS M overall score in 2018, Figure 9 supports the observation that some core elements of the safety oversight system still need further improvements in several States. These elements are closely monitored by EASA as part of its obligations.

2.2.6 Analysis of the overall EoS M Minimum Maturity Level Achieved further shows that eleven (11) States out of 30, 36,7%, are at Level C (Figure 9). One State has a Level A. When excluding Component 5 – *Safety Culture*, which was not verified, there are 14 States out of 30, 47%, below 2019 RP2 target level C.

2.2.7 Figure 10 shows how the level of EoS M State questions (marked from Level A to Level E) are distributed per each EoS M Component. It can be observed that the EoS M Management Objectives that need the most improvement are *Safety Policy and Objective and Safety Culture*. On the contrary, the most effective component at State level is *Safety Risk Management*. This has not changed significantly from 2017.

Maturity Levels are defined as:

- Level A “Initiating” — processes are usually ad hoc and chaotic;
- Level B “Planning/Initial Implementation” — activities, processes and services are managed;
- Level C “Implementing” — defined and standard processes are used for managing;
- Level D “Managing & Measuring” — objectives are used to manage processes and performance is measured;
- Level E “Continuous Improvement” — continuous improvement of processes and process performance.

(for detailed information see EASA AMC)

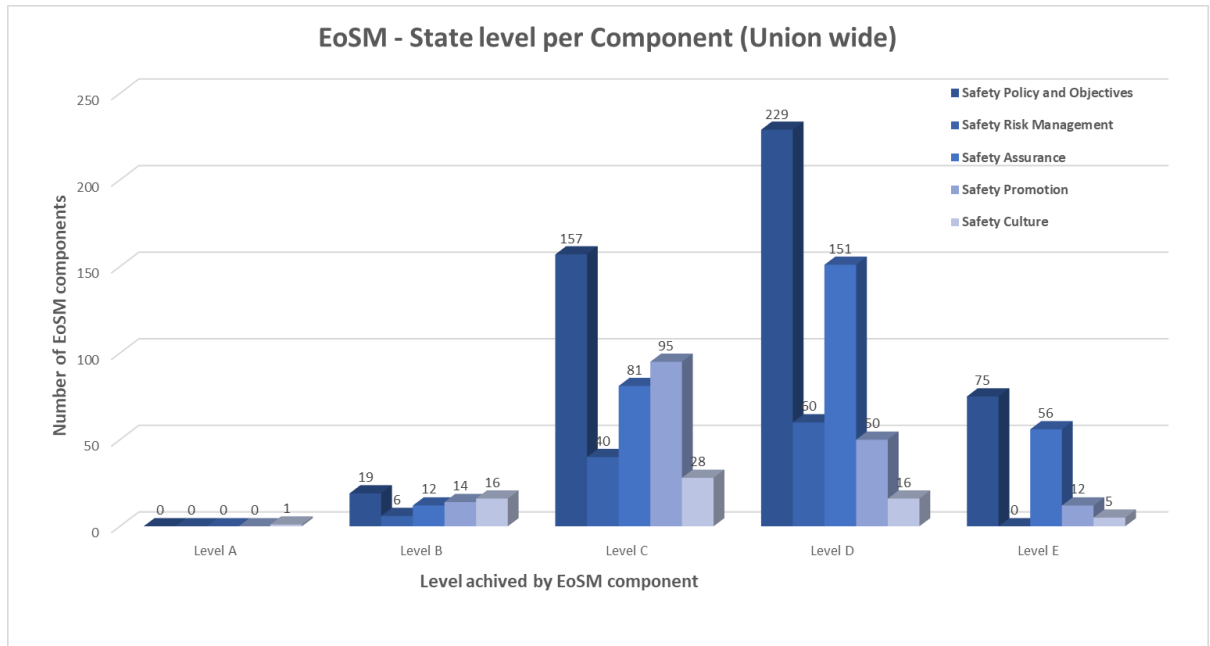


Figure 10: State EoSM level per Component (Union-wide) – Year 2018

2.2.8 Figure 11 shows the evolution by EoSM component where the States are below Level C throughout the years of RP2. There have been improvements in the level achieved on all components. It also supports the finding that areas of *Safety Policy and Objective and Safety Culture* will require the most attention in the future, as 8 and 15 States, respectively, have not achieved the target level C yet.

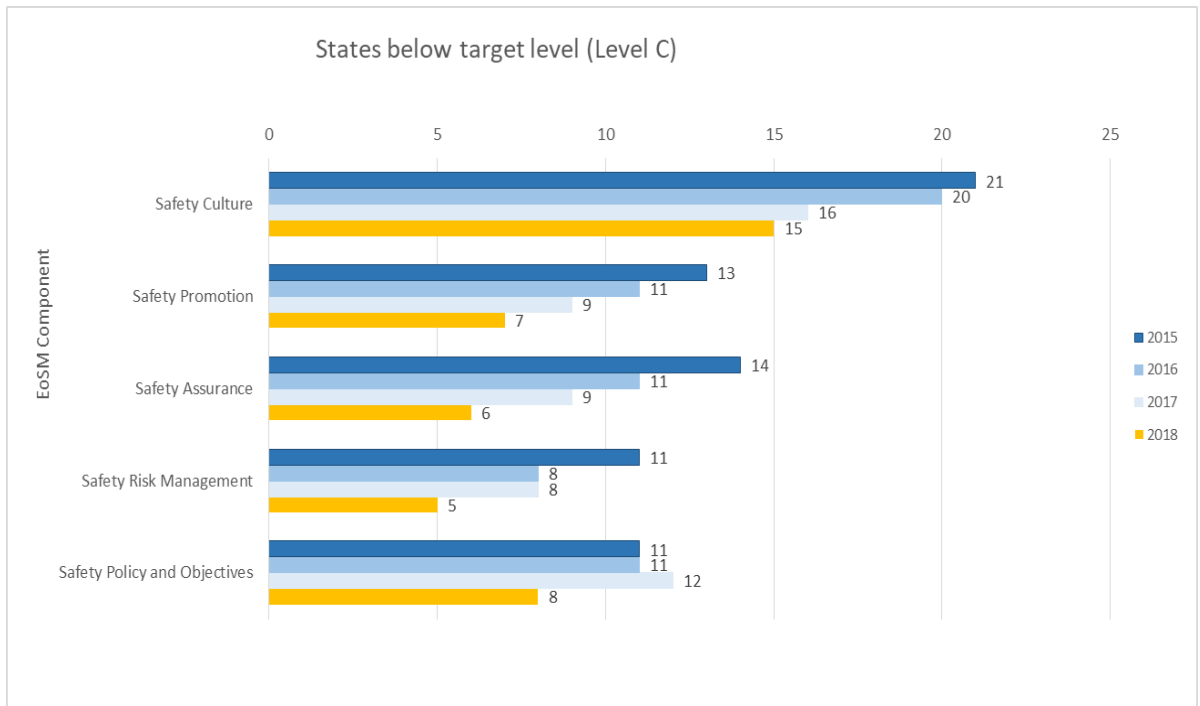


Figure 11: No of States below EoSM 2019 Target Level per each EoSM Component

2.2.9 Figure 12 shows the EoSM results of ANSPs in 2018. The figure depicts the EoSM overall Maturity Score (blue bars), the minimum Maturity Level (on the second axis – orange dots for the Safety Culture component and purple triangle for all other management objectives) achieved by at ANSP level. The RP2 has introduced targets to be achieved by ANSPs by 2019 on different management objectives of EoSM: to achieve at least minimum level D for *Safety Policy and Objectives, Safety Risk Management, Safety Assurance, and Safety Promotion* (depicted as a blue line in the graph) and at least level C for *Safety Culture* (depicted as red line), as per Commission Implementing Decision (EU) 2015/19.

2.2.10 The minimum effectiveness score by an individual ANSPs in 2018 is 59. The maximum effectiveness score at ANSP level in 2018 is 95 (NAV Portugal), with eight (8) ANSPs above 90. The average score value achieved by all ANSPs increased from 82.1 in 2017 to 83 in 2018, showing an increasing improvement throughout RP2 (starting as 79 in 2015).

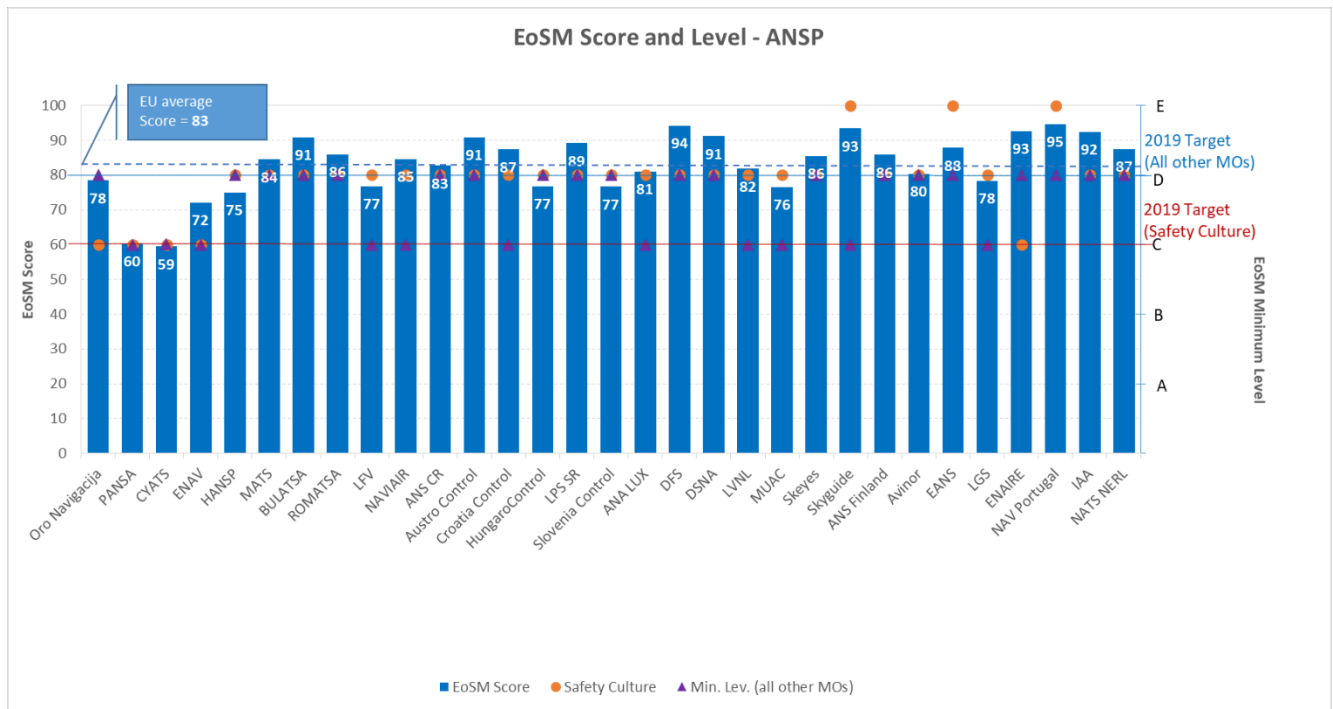


Figure 12: Effectiveness of Safety Management for ANSPs – Year 2018

2.2.11 The analysis of the overall EoS M Minimum Maturity Level Achieved by ANSPs shows that all ANSPs are already at Level C or above for Safety Culture, which is the 2019 target Level, and that 20 ANSPs out of 31, approximately 64,5%, have achieved the 2019 EoS M target, i.e. level D, for all other MOs (the four EoS M Components other than Safety Culture).

2.2.12 The analysis of the EoS M ANSP questionnaire responses per each EoS M Component (Figure 13) shows that the number of EoS M areas / Management Objectives that need the most improvement are within areas of *Safety Policy* and *Objectives*, and *Safety Assurance* and *Safety Promotion*.

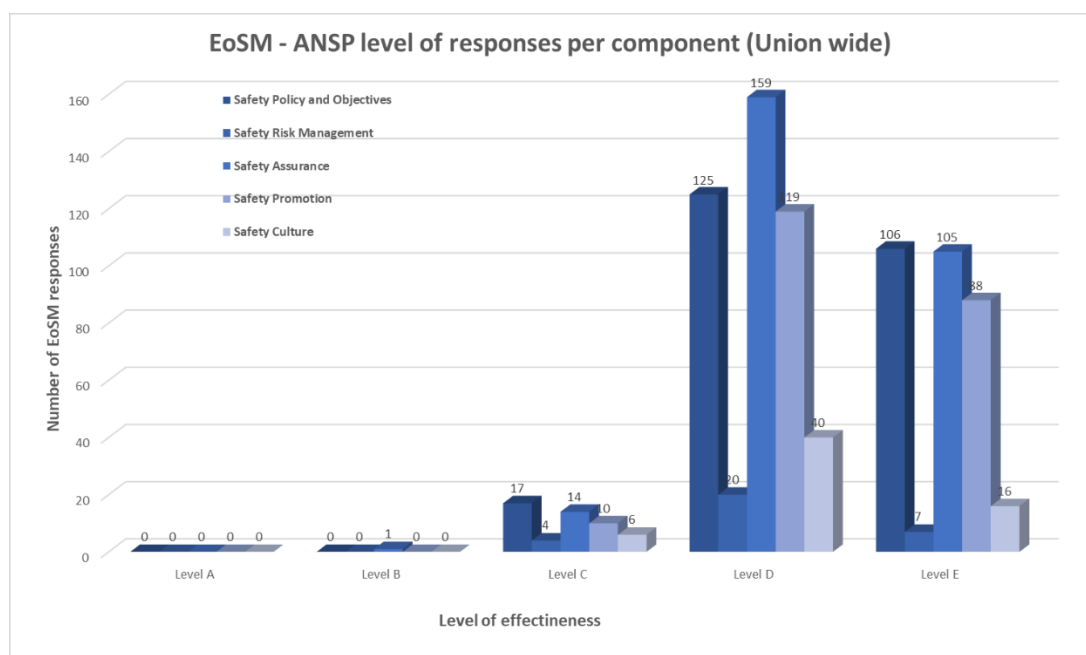


Figure 13: ANSP EoS M responses per Component (Union-wide)

2.2.13 Figure 14 shows how many ANSPs are below the 2019 EoS M Target Level on each EoS M Component, i.e. below Level C for Safety Culture and Level D for all other MOs. The components that require more attention, as the ANSPs did not reach the target level, are *Safety Policy and Objectives* and *Safety Promotion*. At the same time, the major improvements during the last year have been achieved in *Safety Promotion*, while *Safety Risk Management* shows some deterioration. Despite the deterioration in some areas, the overall score has improved, as indicated in 2.2.10. Interestingly, Safety culture has been achieved by all ANSPs, contrary to the State level, where this component was the one that needs more attention and improvement.

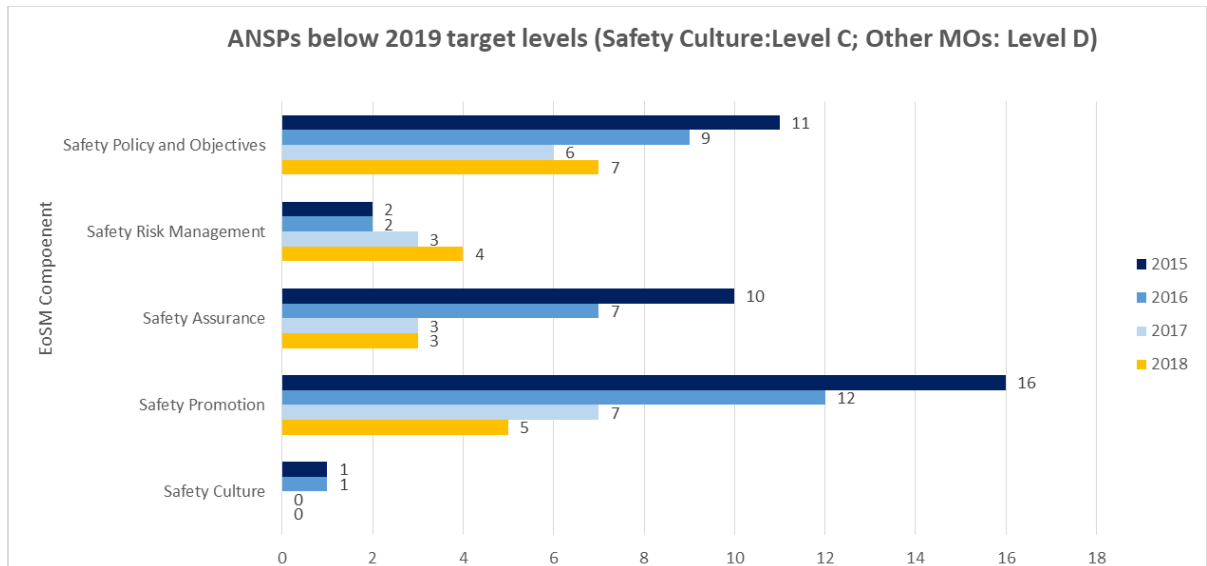


Figure 14: No of ANSPs below EoS M 2019 Target Level per each EoS M Component

EoS M State Level - FAB View

2.2.14 Based on the analysis of the EoS M State questionnaire responses, Figure 15 shows that the majority of States/FABs are on the right path to achieve the 2019 EoS M Target of Level C in all Management Objectives (MOs). There are eleven (11) States, but only one FAB – UK-Ireland FAB-, that have already reached the target level C in all EoS M questions. The rest of States, 19 States, have to improve between 1 to a maximum of 18 questions of the EoS M questionnaire out of 36 (see Figure 16).

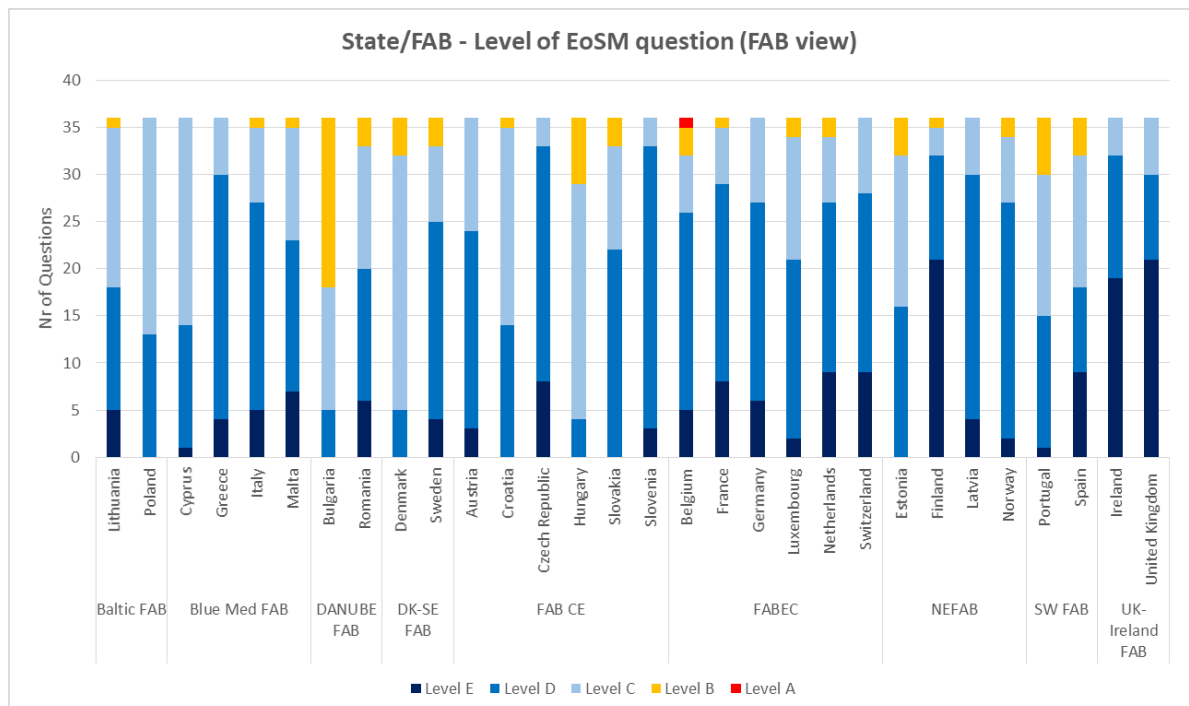


Figure 15: State EoS M responses per EoS M Level (FAB view)

2.2.15 Three States, Portugal, Hungary, and, especially, Bulgaria should increase the effort in improving maturity in a higher number of elements, i.e., questions in the EoSM, to achieve the target level C in all of them at the end of 2019 (see Figure 16). The risk of these States to not achieve the target is significant.

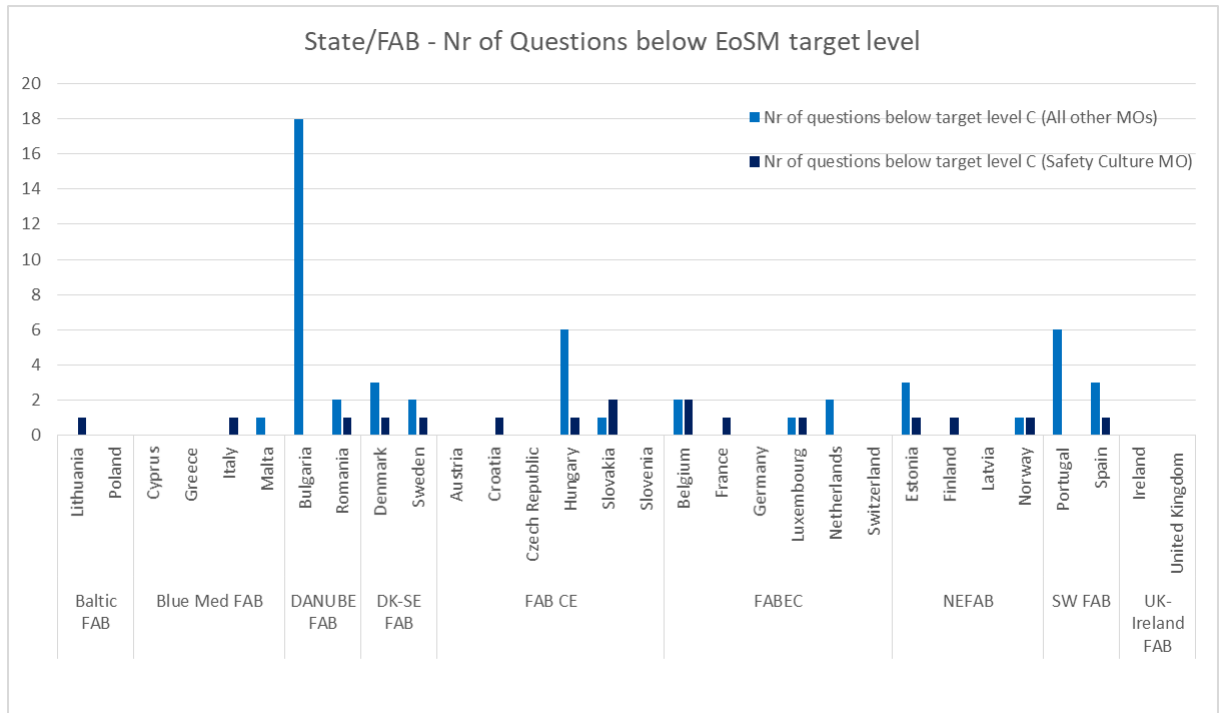


Figure 16: Number of EoSM State questions below 2019 EoSM target – Level C

EoSM ANSP Level - FAB View

2.2.16 The analysis of the individual EoSM ANSP questionnaire responses in Figure 17 shows that the majority of ANSPs/FABs are on the right path to achieve the 2019 EoSM Target of Level C in Safety Culture and Level D in all other Components/MOs. There is only one ANSP that has a question/area of SMS implementation below level C.

2.2.17 In the 2016 Monitor Report, the Polish Air Navigation Services Agency (PANSAs) was highlighted as a concern, due to its low EoSM score, which resulted in a PRB recommendation to its oversight authority. In 2017, PANSAs has achieved an EoSM score of 45.4, and in 2018, the score was 60 which shows a significant improvement and puts the organisation in the position to achieve the target at the end of 2019. There is, however, a significant number of questions at level C and they should continue to put effort into during 2019 to achieve the target.

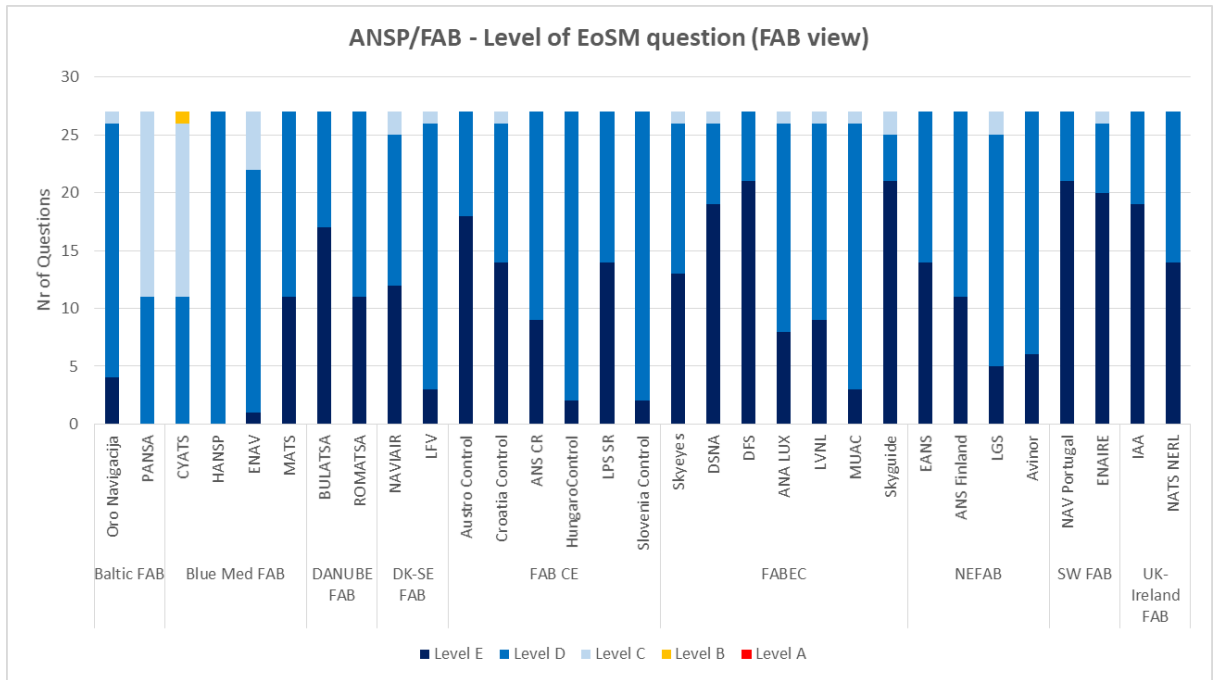


Figure 17: ANSP EoSM responses (excluding Safety Culture) per EoSM Level (FAB view)

2.2.18 Figure 18 shows the number of questions that are below the target level. No ANSP needs to improve the Safety Culture questions, as all achieved already 2019 target level, whilst 13 out of 31 have to improve questions/elements of All Other Management Objectives, with only two ANSPs, PANSA and CYATS, with a significant number of questions to still improve in 2019, 15 each. Three FABs (Danube FAB, SW FAB, and UK-Ireland FAB) have already achieved fully the EoSM target.

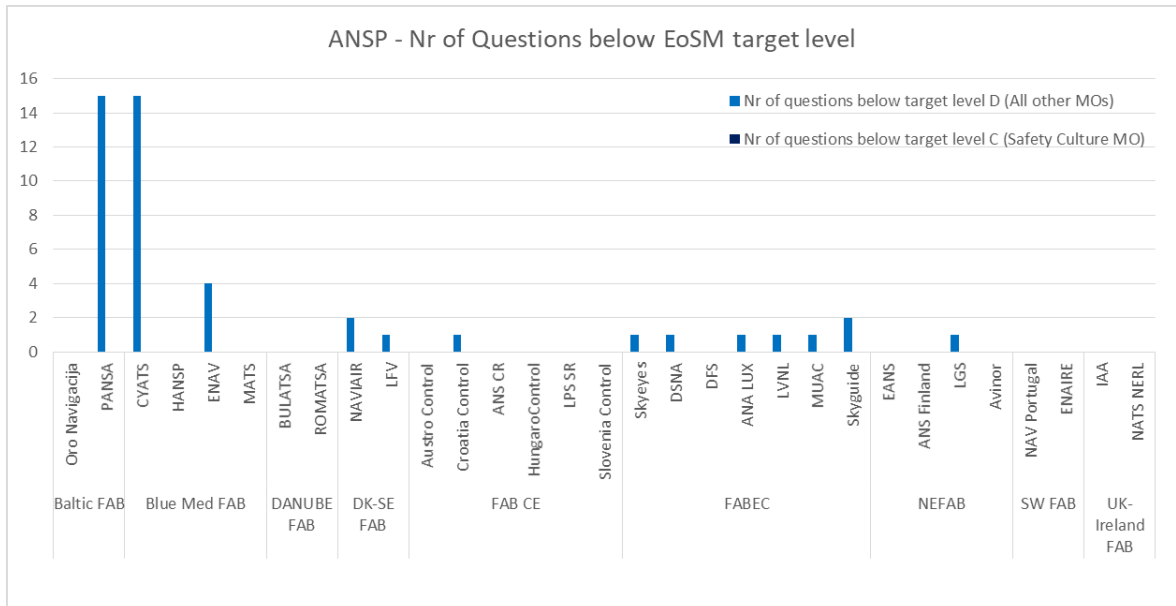


Figure 18: Number of EoSM ANSP questions below 2019 EoSM target – Level C or D

Application of the RAT Methodology

- 2.2.19 In accordance with Regulation (EU) 390/2013, States are required to report the proportion of SMIs, RIs and ATM-S, for which severity classification was assessed using the RAT methodology.
- 2.2.20 In 2018, the AST reporting mechanism was still used as the main vehicle for reporting the application of severity classification using the RAT methodology.

Note: The data presented and analysed takes into account the information reported by the end of April 2019 covering the whole 2018 reporting year. As mentioned above, updates are expected during the September 2019 AST reporting cycle, which may not be reflected in the final figures reported in this report.

- 2.2.21 The following sections provide the analysis of the severity classification 2018 results provided by States. The analysis of the of severity classification using the RAT methodology is split by the scope of the assessment: ATM Ground and ATM Overall. For more information refer to EASA AMC/GM in ED Decision 2014/035/R amended by ED Decision 2015/028/R.
- 2.2.22 It is important to note that due to the change introduced in RP2, with regard to the definition of targets, the total number of occurrences reported is no longer equal to the total number of occurrences, for which the application of the RAT methodology is mandated by the target. This means, for example, that the numbers of occurrences that require the application of RAT for ATM Ground and ATM Overall may be different or that reported occurrences collected in SPI#3, if pre-assessed as D or E, may not be severity assessed with the RAT methodology, and they are not considered in achieving the target.
- 2.2.23 In addition, the requirement to determine, at the level of individual occurrence, whether it is to be considered within the scope of Regulation (EU) 390/2013 (Articles 1(3) and (4)) based on both the location (traffic higher than 70,000 IFR movements) and the scope, has led to a situation where the application of the RAT methodology could be mandatory for the ATM Ground and not for the ATM Overall, or vice-versa. Moreover, Member States may end up in the difficult situation where the determination of the Overall severity is mandatory without having the possibility to use the results of the ATM Ground severity, provided by the ANSPs, because the ANSP was not required to assess the latter (i.e. if the ATM Ground was severity D or E and Overall severity was A, B, or C). These situations have the potential to negatively affect the harmonisation of the severity assessment using the RAT methodology that has started to be noticeable at the end of RP1.
- 2.2.24 Nevertheless, the main elements of the monitoring for this indicator are still the total number of occurrences for which the application of the methodology is mandatory and the percentage of application over that total.
- 2.2.25 From the Union-wide perspective and taken all occurrences reported collectively into account, the application of RAT worsened for RI Ground and Overall, and improved for ATM-s occurrences. Targets of 2017, as per Commission Implementing Decision (EU) 2015/19, were achieved in 2018 for all categories except RI ground.
- 2.2.26 The SMI Overall and RI Overall applied by NSAs achieved the target set for 2019, whilst the RAT applicability to the RI Ground applied by ANSPs need the most improvement after a drop from 2017 levels of applicability. It is worth noting that only a reduced number of ANSPs/States, as indicated in the next section, are not applying RAT to 100% to the occurrences required by the Regulation.

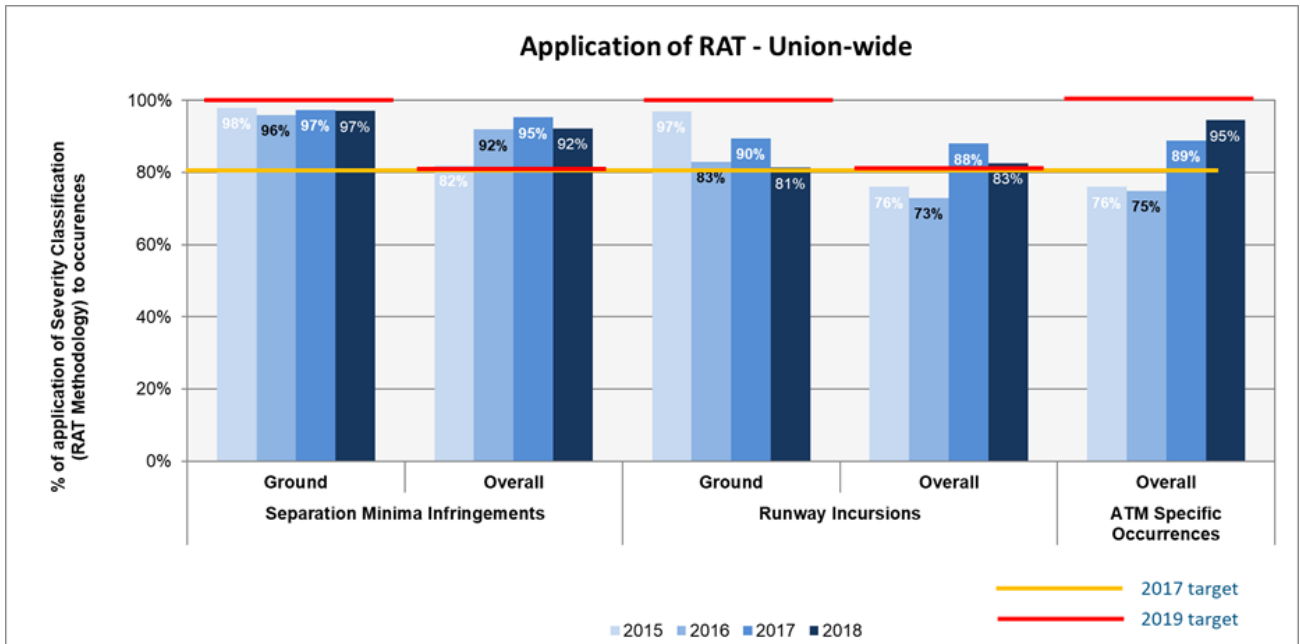


Figure 19: Severity assessment using RAT methodology (Union wide) – Year 2018

2.2.27 It is observed that, at the Union level, the number of SMI and RI occurrences that required the application of RAT have increased in both elements where RAT is applied, ground and overall, but in greater proportion in the ground component, which is the one evaluated by the ANSP, than in the overall component, evaluated by the NSAs (see Figure 20). SMI ground and SMI overall increased by 44% and 10%, respectively, while RI ground and RI overall increased by 58% and 9%, respectively. The number of and ATM-S occurrences that required the RAT application by the ANSPs have slightly increase by 3% at Union level. In a context of scarce resources, this may have been the reason to reduce the percentages of applicability of ground components in RIs, as shown in Figure 19.

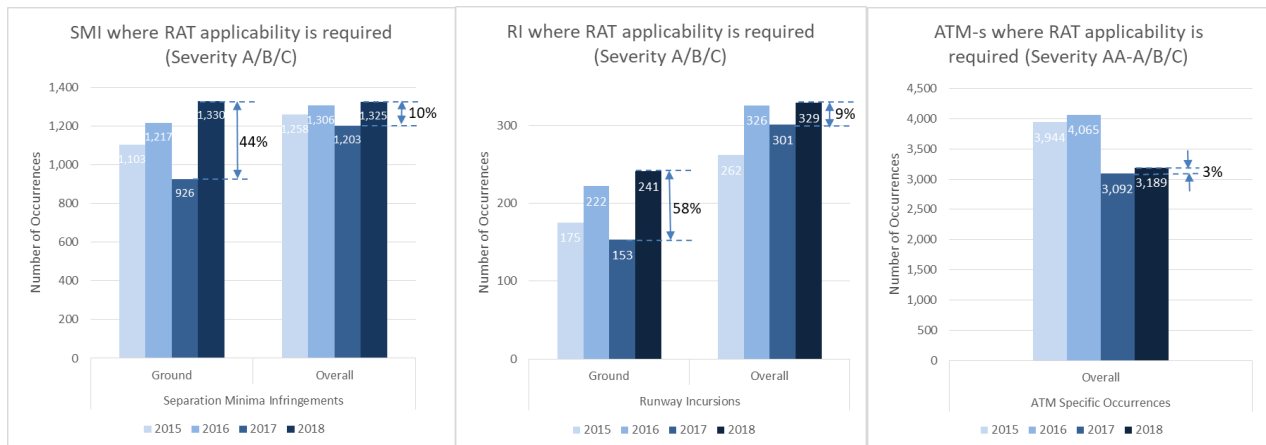


Figure 20: Variation of occurrences that SES Performance Scheme requires RAT application

2.2.28 When looking only at occurrences with high severity rating (i.e. severities AA-A and B) in Figure 21, the numbers in 2018 are slightly lower in SMIs, RIs, AIs and higher in ATM-s when compared to previous year. This observation, in combination with the increase of occurrences that required RAT applicability of Figure 20, suggests that the increase has occurred mainly in occurrences rated as severity C.

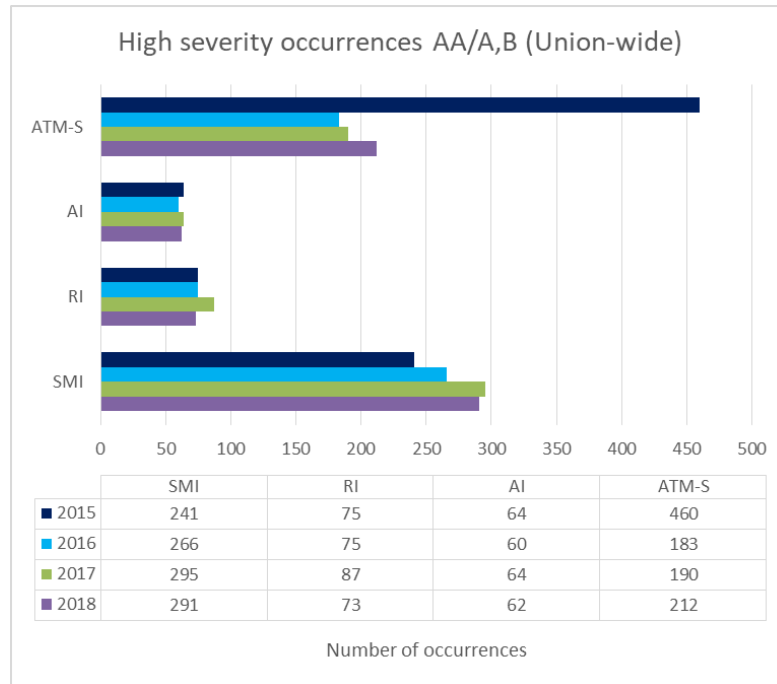


Figure 21: Variation of high severe occurrences (severity AA-A/B)

Application of the RAT Methodology - FAB View

- 2.2.29 Figure 22 shows the average application of the RAT methodology in FABs during 2018, for SMIs, RIs and ATM-s occurrences respectively. Note when an ANSP/NSA did not apply RAT because they did not report any occurrence of this type or because the severity was below the level that requires its application, i.e. below C, this is depicted without any bar in the figure and with letters “N/A”. This does not mean that they did not comply with the requirements, but it simply was not required. However, if there were occurrences that required the RAT application, but RAT was not applied, this is depicted without a bar but with the label “0%”, indicating non-compliance with requirements.
- 2.2.30 Union-wide targets for 2017 have been achieved in full by six FABs in 2018: Blue Med, Danube FAB, DK-SE FAB, FAB CE, NEFAB and UK-Ireland FAB. FABEC and SW FAB did not achieve the 2017 target by a small margin, and Baltic FAB failed to achieve the target by a significant margin (only the overall component of occurrences SMIs and RIs).

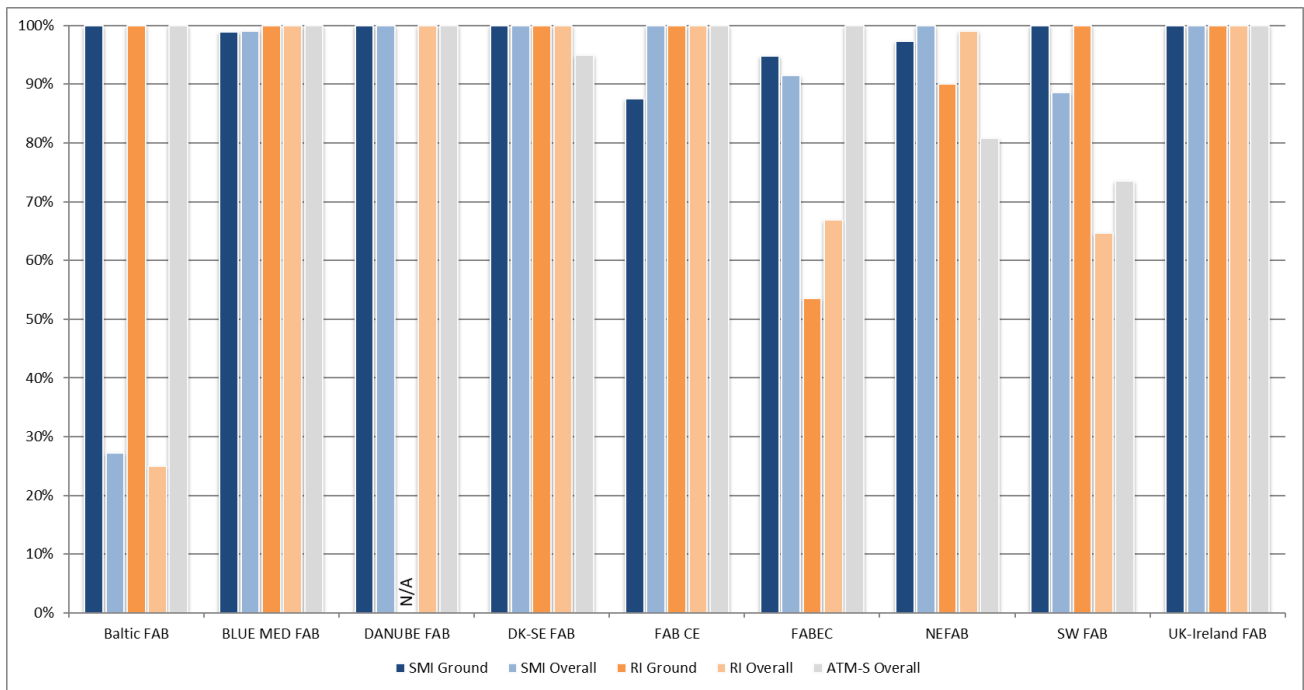


Figure 22: Severity assessment using RAT methodology (FAB view) – Year 2018

2.2.31 25 States and their ANSPs used the RAT Methodology for deriving the severity of reported Separation Minima Infringements (Figure 23) for both SMI Overall and SMI Ground, respectively.

2.2.32 Note that two States (Poland and The Netherlands) did not apply the RAT methodology to derive the ATM Overall component for those SMIs within the scope of the Performance Scheme when it should, failing to achieve the target set in 2017. In addition, two States did not apply RAT either because they did not report any SMIs (Latvia) or because the severity was below C (Slovakia), hence, there was no scope for the application of the RAT Methodology. Luxemburg did not provide data in its Monitoring Report, and the achievement of the target was not proved. The ANSP of Hungary, while applying the RAT methodology, did not achieve the 2017 target for the SMI Ground. Similarly, the ANSP of The Netherlands failed to achieve the 2017 target. The rest of States and ANSPs, achieved in full both the 2017 and 2019 targets in 2018.

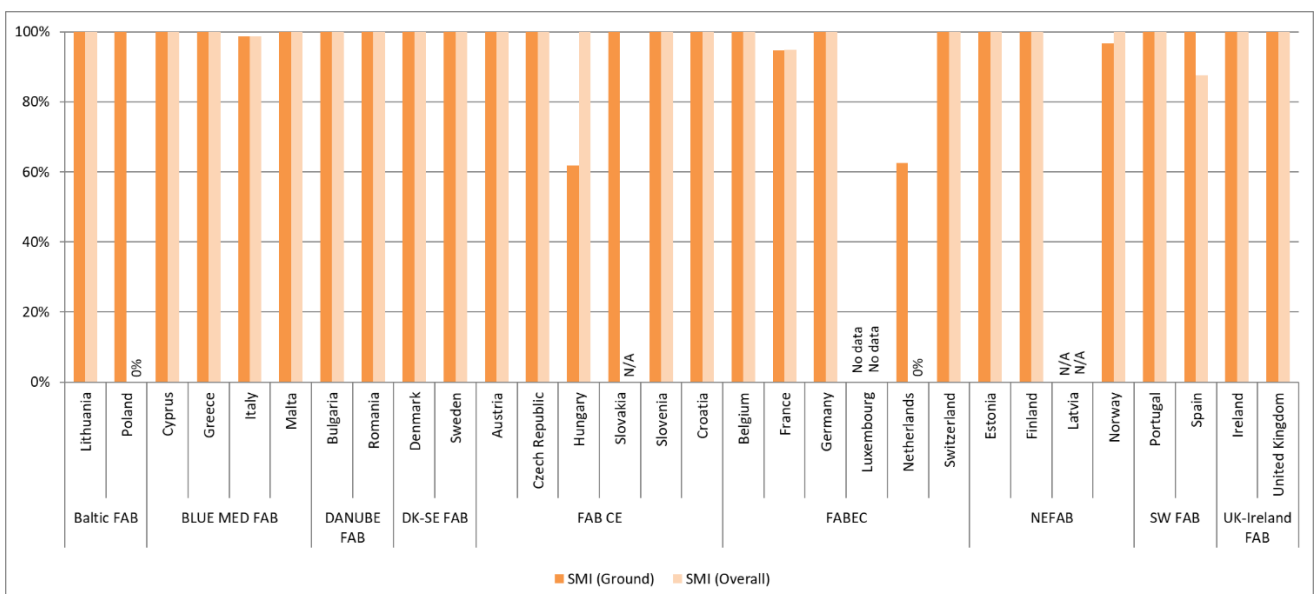


Figure 23: RAT methodology application for severity classification of SMIs – Year 2018

- 2.2.33 22 States and their ANSPs used the RAT Methodology for deriving the severity of applicable Runway Incursions (Figure 24 for both RI Overall and RI Ground, respectively).
- 2.2.34 Luxemburg did not provide data in its Monitoring Report, and the achievement of the target was not proved. In addition, seven (7) States did not apply RAT either because they did not report any RIs (Latvia and Slovakia) or because the severity was below C (Croatia, Bulgaria, Romania, Estonia, and Slovenia), hence, there was no scope for the application of the RAT Methodology. The Netherlands, while applying the RAT methodology, did not achieve the 2017 target, achieving 7% in both RI ground and RI overall. The NSA of Poland did not apply RAT. The NSA of Spain failed to achieve the target (63%) and so did the German ANSP (78%), despite they used the RAT methodology. The rest of States, i.e. 15 States, achieve in full both the 2017 and 2019 targets in 2018.

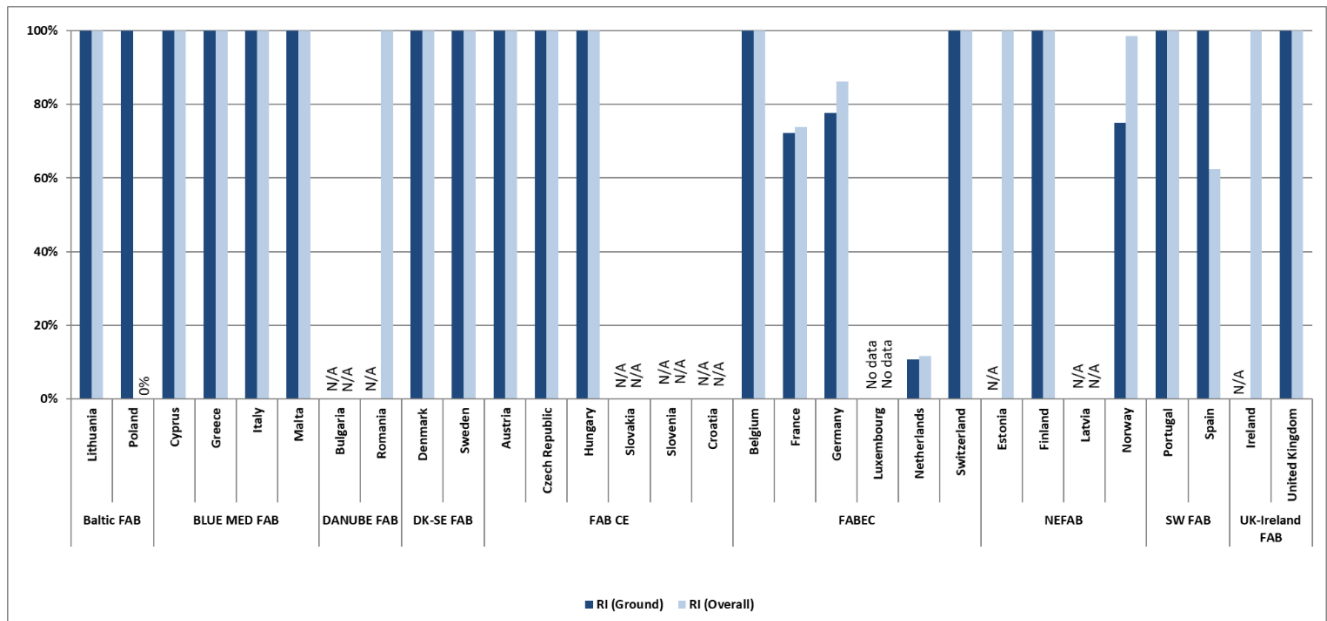


Figure 24: RAT methodology application for severity classification of RIs – Year 2018

- 2.2.35 26 ANSPs in their States used the RAT Methodology for deriving the severity of applicable ATM Specific Occurrences (Figure 25) for the ATM-s Overall only.
- 2.2.36 One State, Luxemburg, did not provide data, and the achievement of the target was not proved. One State, Latvia, did not apply RAT to the ATM-s Overall as the severity was below C, hence, there was no scope for the application of the RAT Methodology. Two States, Norway and Spain did fail to achieve the 2017 target, with percent of application of 68% and 78%, respectively. The rest of States, i.e. 26 States, achieve in full both the 2017 and 2019 targets in 2018.

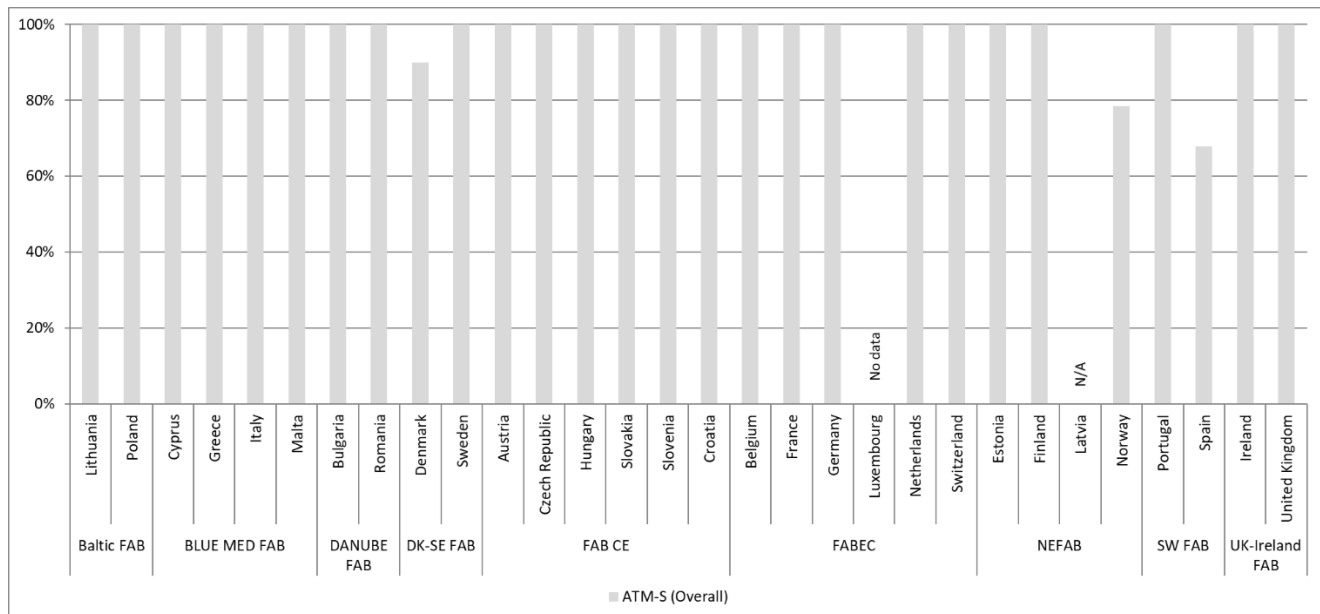


Figure 25: RAT methodology application for severity classification of ATM Specific – Year 2018

Note: Data concerning the verification of the RAT application is based on **preliminary 2018** information (collected end of April 2019), and the data submitted by the States in their Monitoring Reports of June 2019, later updated during August 2019. Updates may occur during the September 2019. The Dashboard will be updated with **final 2018** data.

Just Culture

- 2.2.37 The Safety Key Performance Indicator (SKPI) on Just Culture is assessed on the basis of the responses given to the self-assessment questionnaires for both States and ANSPs, as defined under Regulation (EU) 390/2013. The questionnaires are included in AMC/GM material developed by EASA under the rulemaking procedure and adopted as a Decision of the EASA Executive Director.
- 2.2.38 The aim of the assessment is to identify those institutional tendencies and approaches which indicate the presence (or corresponding absence) of a Just Culture environment in a given State or ANSP. Both the State and the ANSP questionnaires on Just Culture are divided into the three main sections: Policy and its implementation; Legal & Judiciary; and Occurrence reporting and investigation.
- 2.2.39 For RP2, FABs were expected to set Just Culture local targets – as per Regulation (EU) 390/2013 i.e. FAB level.
- 2.2.40 For the monitoring exercise of 2018, all 30 States and 31 ANSPs filled in the self-assessment questionnaires used for the measurement of the JC SPI in accordance with EASA AMC/GM. In addition, FABs were to report via the FAB Monitoring Reports on common FAB approaches for improvement in certain Just Culture areas, providing details on possible areas of improvement at both State and ANSP level.
- 2.2.41 Based on the review of the 2018 FAB Monitoring Report, it appears that there is no harmonised approach to the implementation of Just Culture. Some FABs made a commitment to apply the Just Culture principles and to work together on Just Culture issues. Others have provided either no or very little detail on working arrangements and indications of how improvements will be measured.
- 2.2.42 When compared with 2017, very little has changed. This is not surprising as most changes in the Just Culture questionnaire are linked to legal changes that require a longer time to be implemented.
- 2.2.43 Table below show observations based on analysis of 2018 FAB Monitoring Reports.

FAB	OBSERVATION
BALTIC	<p>The BALTIC FAB has not established a common approach to improve Just Culture either at State or at ANSP level.</p> <p>At State level, just culture training programmers for staff have been identified as areas for improvement, but has not been implemented yet. With regard to the Legal system, the States have to implement in the national legislation the provision concerning protection of information and reports, as stated in Art. 16 of Reg (EU) 376/2014. No progress has been reported yet.</p> <p>At ANSP level, just culture training programmers for staff have been identified as areas for improvement, but not implemented yet.</p>
BLUE MED	<p>Blue MED FAB has reported that a common approach to improve Just Culture is established at both State and ANSP level.</p> <p>Possible areas of improvement were not identified for either the State or ANSP level. No progress has been reported.</p>
Danube FAB	<p>Danube FAB has not established a common approach to improve Just Culture either at State or at ANSP level. In 2017, it was reported that the ANSP level had a common approach.</p> <p>At State level, it is reported that Just Culture principles was adopted within the CAAs of Romania and Bulgaria. These principles have been included in the SSPs. Both States have provisions regarding protection of reporters and confidentiality in the national database, capturing all main protection and just culture requirements of Regulation 376/2014 into national Regulations. Assurance regarding the avoidance of prosecution is given by CAAs, without prejudice to the applicable criminal law, as a result of unintentional or involuntary violation of the law and serious and ignorance of an obvious risk. No agreements with the judiciary system are reported.</p> <p>At ANSP level, all areas of improvements in the Just Culture areas reported are specific and do not refer to this FAB common approach. ROMATSA has formally implemented a Just culture policy, having periodic awareness campaigns. BULATSA has updated its Safety Policy to include specifically Just Culture principles stemming from Regulation (EU) 2017/373. BULATSA is planning a workshop with the judiciary representatives to debate Just Culture principles in 2019.</p>
DK-SE FAB	<p>DK-SE FAB has reported that a common approach to improve Just Culture is established ANSP level, but not at State level.</p> <p>No progress has been reported under areas of improvement. Last year (2017) at State level, a common governance body was established to identify areas of improvements. No legal changes are foreseen in any State. Legal constraints relating to the exchange of occurrence data at State level (between NSAs) were reported as having been resolved. Last year (2017), at the ANSP level, both organisations reported that a common just culture policy and harmonised SMS was implemented, including processes for occurrence reporting and investigation. The legal constraints to exchange of information were identified but are yet implemented.</p>
FABCE	<p>FABCE has reported that a common approach to improve Just Culture is established at both State and ANSP levels. No progress has been reported at this stage.</p> <p>Possible areas of improvement were not identified for either State or ANSP level.</p>
FABEC	<p>FABEC has reported that a common approach to improve Just Culture is established at both the State and ANSP levels.</p> <p>At the State level, the FAB has reported the commitment of its Member States to identify a clear Just Culture be endorsed by all CAAs, and that there will be a requirement for ANSP to implement a common just culture policy. There is a commitment to train the staff on Just Culture elements in a harmonized manner across the ANSPs of the FAB. No other improvements are identified for either the Legal system or occurrence reporting processes.</p> <p>At ANSP level, the 7 ANSPs will adopt a common Just Culture policy and principles and will ensure their staff are trained on Just culture elements. Training courses will be prepared in coordination with the NSAs. There are several commitments among the 7 ANSPs to:</p>

FAB	OBSERVATION
	<ul style="list-style-type: none"> • Ensure subject matter experts are involved in the determination of “unacceptable behavior”; • Provide legal support for its own staff in case of prosecution, and to preserve in full, the pay and benefits of the staff member concerned until the end of the investigation; • Establish a well-known stress management system.
NEFAB	<p>NEFAB has reported that a common approach to improve Just Culture is established at the ANSP level, but not at the State level.</p> <p>At the State level, a common policy is not foreseen as necessary and no agreements will be reached to cover legal aspects with regards Just Culture. The legal systems in each State of the FAB are different and they do not expect to cover any common legal aspect regarding Just Culture. Latvia organized a workshop with judiciary representatives on Just Culture principles in 2019.</p> <p>With regard occurrence reporting, the collaboration is established to harmonise principles and procedures to classify occurrences and severities, which will facilitate exchange and dissemination of safety information at NEFAB level.</p> <p>At ANSP level, possible areas of improvement were not identified and progress has been reported at this stage.</p>
SW FAB	<p>SW FAB has not established a common approach to improve Just Culture at State level. They have established a common FAB approach at ANSP level.</p> <p>Possible areas of improvement were not identified for either the State or ANSP level; SW-FAB has only reported that work is in progress to define a common framework at ANSP level. Training of Just Culture was reported to have been implemented and delivered in ENAIRE in 2017.</p>
UK-IE FAB	<p>UK-IE FAB has reported that a common approach to improve Just Culture is established at both State and ANSP levels.</p> <p>At State level, a common Regulator Just Culture policy was developed including a commitment to deliver focused training to staff. This was delivered. Induction training for new staff since this has included a Just Culture (JC) element. The JC programme described above included the implementation of EC376/2014 in both the CAA and IAA to ensure a common understanding of the implications of this Regulation. Regulatory oversight of this occurrence reporting Regulation has been embedded into the routine oversight of all CAA and IAA approved organisations. No areas of improvements were identified in the legal/judiciary system.</p> <p>At ANSP level, both ANSPs have published harmonised Just Culture policies and principles. There is however no identified need for formal agreement with the Judiciary, since safety investigations are protected by law. The occurrence reporting and investigation are reported similar on both ANSPs, being independent of the operational management, and no further common improvements are foreseen. No national level targets relating to the safety culture questionnaire have been published by the NSAs within the UK-Ireland</p> <p>No targets have been set for the JC questionnaire.</p>

Table 1: Just Culture implementation at FAB level

- 2.2.44 It is apparent that further work is needed in this area, as FAB Member States and their ANSPs need to work together to enhance cooperation in order to ensure that a Just Culture environment is maintained in all the States and in participating ANSPs. Establishing a Just Culture in all States is an essential pre-requisite for any achievements for the European wide safety improvements.
- 2.2.45 Even when FABs state that they have established a common FAB approach in certain areas for Just Culture improvements, detailed information that explains the basic elements in place to promote the application of Just Culture is usually not provided (i.e. local/FAB targets appear to be only set informally). Setting common approaches at FAB level might allow a greater level of harmonization.

2.3 Safety Performance Indicators

2.3.1 This Section describes the 2018 safety performance review by monitoring at local level the Safety Performance Indicators (SPIs) as defined in paragraph 1.2 Section 2 Annex I of Regulation (EU) 390/2013: the application by ANSPs of automated safety data recording systems, the level of occurrence reporting, and the number of SMIs, RIs, AIs, and ATM-specific occurrences. Local means at functional airspace block level with an indication of the contribution at national level.

Automated Safety Data Recording Systems

2.3.2 This PI aims at capturing the application by ANSPs of automated safety data recording systems used for detecting, recording and post-operation analysis and reporting of SMIs and RIs.

2.3.3 10 States have reported that their ANSPs were using some type of automated safety occurrences recording systems in 2018, one (Bulgaria) more than in 2017. Some States have not reported information, but in previous years they reported that no implementation was done, thus it can be assumed that their ANSPs have not implemented these tools yet. Ireland has reported that its ANSPs is testing such a system and implementation will be effective in the next years.

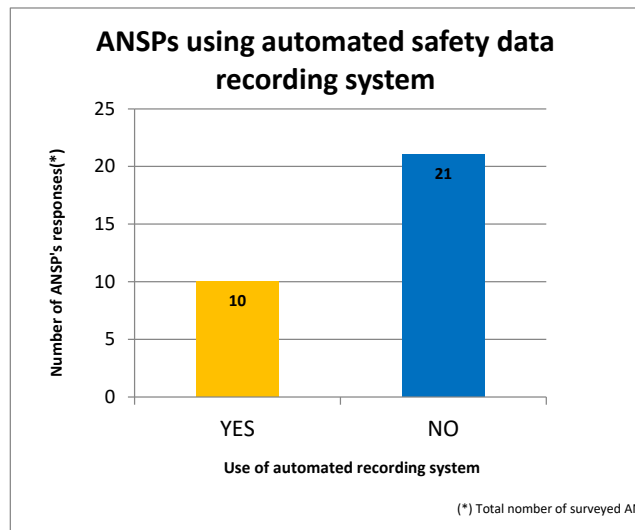


Figure 26: ANSPs using automated recording systems

2.3.4 Out of these ten States that have some type of automated recording systems, nine (9) of them collect information about SMIs, whilst one (1) collects information on both SMIs and RIs (Error! Reference source not found.).

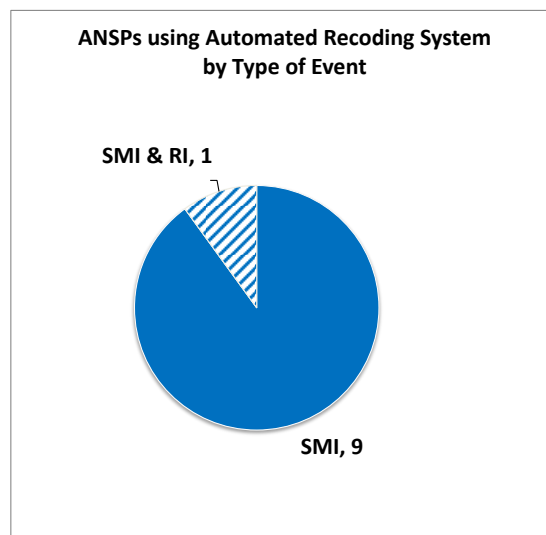


Figure 27: Type of reportable event

- 2.3.5 Most States did not provide the requested information about numbers of detected events using these automated recording tools. In certain cases, the ANSP reported that it was impossible to determine how many formally reported events were automatically detected, or that the use of the tool was not aimed at improving occurrence reporting. Most of the ANSPs reported that the tools were not used to improve occurrence reporting, but for other purposes.
- 2.3.6 Among the States that did report the use of these automated tools by their ANSPs, eight provided the definition of the events that trigger the automatic detection of events for further analysis. It is observed that the parameters used were not harmonised, which is not, however, surprising as within the local ATC environment, the use of the tool and the associated processes by the ANSP may differ. For example, two of these ANSPs use a vertical separation of 800' to trigger the events, and a horizontal parameter similar to the standard separation. One State reported different triggering parameters for different ACCs. Another ANSP triggers the detection of SMIs when the separation is 50% of the standard separation provided in its controlled airspace, both horizontally and vertically, and only for FL above FL100. Finally, another ANSP uses intermediate parameters: in a 5NM separation standard environment, the tool triggers encounters of 3.5 miles laterally and 600 feet vertically, and in a 3NM separation standard environment, it triggers for aircraft encounters of 2 miles laterally and 600 feet vertically. It is apparent that the event definition seems to serve a different purpose for each ANSP. For example, the use of triggering parameters much lower than the standard separation aims at reducing the number of nuisance events recorded that will ultimately be discarded as genuine SMIs. On the contrary, the use of parameters close to separation standard aims at capturing as many encounters with separation below prescribed standards as possible, and ultimately may capture many non-genuine events.
- 2.3.7 Having reviewed the information provided by the Member States, it can be concluded that the use of automated safety data reporting tools is not widely implemented among ANSPs in the MS. This limited implementation does not include a harmonised definition of the events that trigger the capture of occurrences, as it may serve to different purposes for each ANSP. In addition, even when these tools are implemented, their use seems, in some cases, be devoted to operational analysis (e.g. identification of hotspots) and not to complement occurrence reporting. The widest automated recording tool is for detecting SMIs, and only one ANSP use these tools to detect RIs. An example on how to define the triggering event and its use was identified in the UK report and is presented below.

Example of definition of Triggering Event to capture candidate SMIs with automated data recording tools:

In a 5NM separation standard environment, the automated tool will trigger a candidate event for aircraft encounters of 3.5 miles laterally and 600 feet vertically. In a 3NM separation standard environment, the tool will trigger a candidate event for aircraft encounters of 2 miles laterally and 600 feet vertically. Operational supervisors are required to acknowledge all detected encounters and determine where the event is a genuine Separation Minima Infringement occurrence. For all genuine events the supervisors will confirm whether an associated SMI occurrence has been formally reported. When the event has not been reported a new incident report is raised.

Level of Reporting

- 2.3.8 This PI aims at monitoring the level of reporting in the SES States, both at Member State and ANSP level. The section is divided in two subsections. The first subsection gives, quantitatively, a Union-wide and FAB view of the characteristics of occurrences reported during 2018, including both the ratio of high-severity and low-severity occurrences and the reporting rates. The second subsection provides a

summary of the reported assessment provided by each Member State about the level of occurrence reporting in their State and ANSP.

Union-wide/FAB Level of Reporting

Ratio of high severity and low severity reported occurrences

- 2.3.9 Figure 28 collects the reported occurrences during 2018 grouped by severity, high and low, split by type of occurrence, namely SMI, RI, ATM-S and Airspace Infringements (AIs). High-severity occurrences include occurrences classified using the RAT methodology as AA/A and B and low-severity occurrences include occurrences classified as C and E. Those occurrences for which the severity has not been determined, i.e. class D, where data were insufficient, are excluded from the analysis of this section.
- 2.3.10 This severity scale corresponds to the severity result of the application of the RAT methodology for those occurrences that the Performance Scheme requires its application. For the other occurrences for which the Performance Scheme does not require the application of the RAT methodology (i.e. airspace infringements or occurrences with severity E), the severity may have been assigned through other means such as expert judgement or the application of another severity classification method.

TYPE OF OCCURRENCE		# OF HIGH SEVERITY	# OF LOW SEVERITY
Union-wide reported occurrences	SMI	291	1,820
	RI	73	817
	AI	62	4,272
	ATM-S	212	13,942

Figure 28: Union-wide number of high and low severity reported occurrences

- 2.3.11 Figure 29 illustrates the percent of high-severity and low-severity occurrences graphically at Union-wide level, i.e. the percentages represented in the figure are calculated considering collectively all reported occurrences by SES Member States. SMIs and RIs show 14% and 8% of high-severity occurrences over the total, respectively, while AIs and ATM-Ss show 1% both. This difference may be the result that SMI and RI occurrences bear higher severity than AIs or ATM-s or that the assessment of severity of certain type of occurrences were biased by the analysts towards less/higher severe categories, or even a combination of both reasons. These percentages of high severity occurrences have decreased, in comparison of 2017 figures, for the RI and AI by two and one percentage points, respectively, and increased for SMI by one percentage point. ATM-s proportion has remained the same.
- 2.3.12 The proportion of high severity occurrences of AIs and ATM-s are significantly lower than the proportion of high severity occurrences of SMIs and RIs. One of the potential reasons is that these types of events contain less information that allows the investigators to assign accurately the severity of the occurrence, thus classified as category E. With regards AIs, the ANSP may lack of the aircraft view and the occurrence reporting system may only capture the ground perspective. With regards ATM-s, in most of the situations there is no effect on the ATM service due to redundancies in the systems.

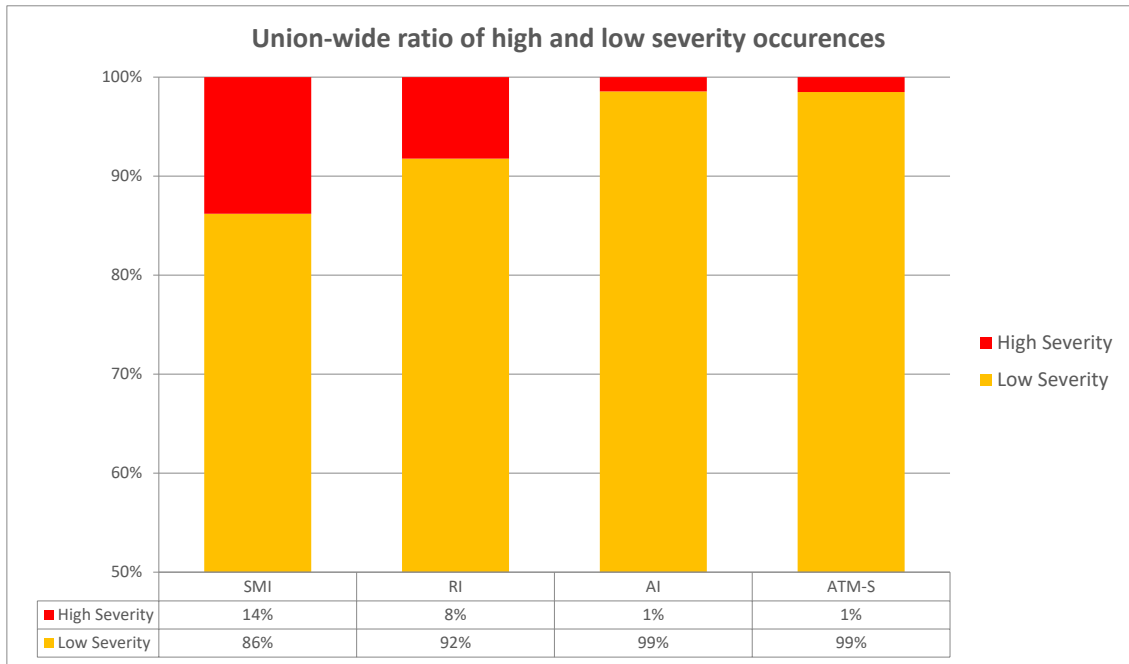


Figure 29: Union-wide proportion of high and low severity reported occurrences – Year 2018

2.3.13 Figure 30 depicts the percent of high-severity occurrences by type of occurrences observed in each FAB. It is assumed that consistent levels of reporting within the Member States and similar safety levels in the provision of the services should lead to the proportion of high-severity occurrences in the FAB to vary around the Union-wide figures. There are, however, several factors that explain why this may not be the case in practice, among which the more important are: the level of reporting may not be consistent across Member States and/or FABs, analysts may apply different criteria to assign severity across types of occurrence (the likelihood is higher when the method is not common to all type of occurrences or involves higher degree of subjectivity), and the actual safety performance of ANS services achieved may be different. The identification of the more likely reasons is not possible with the data available and should be done at local level. For the time being, nothing has been reported in the monitoring reports with regard to this local analysis.

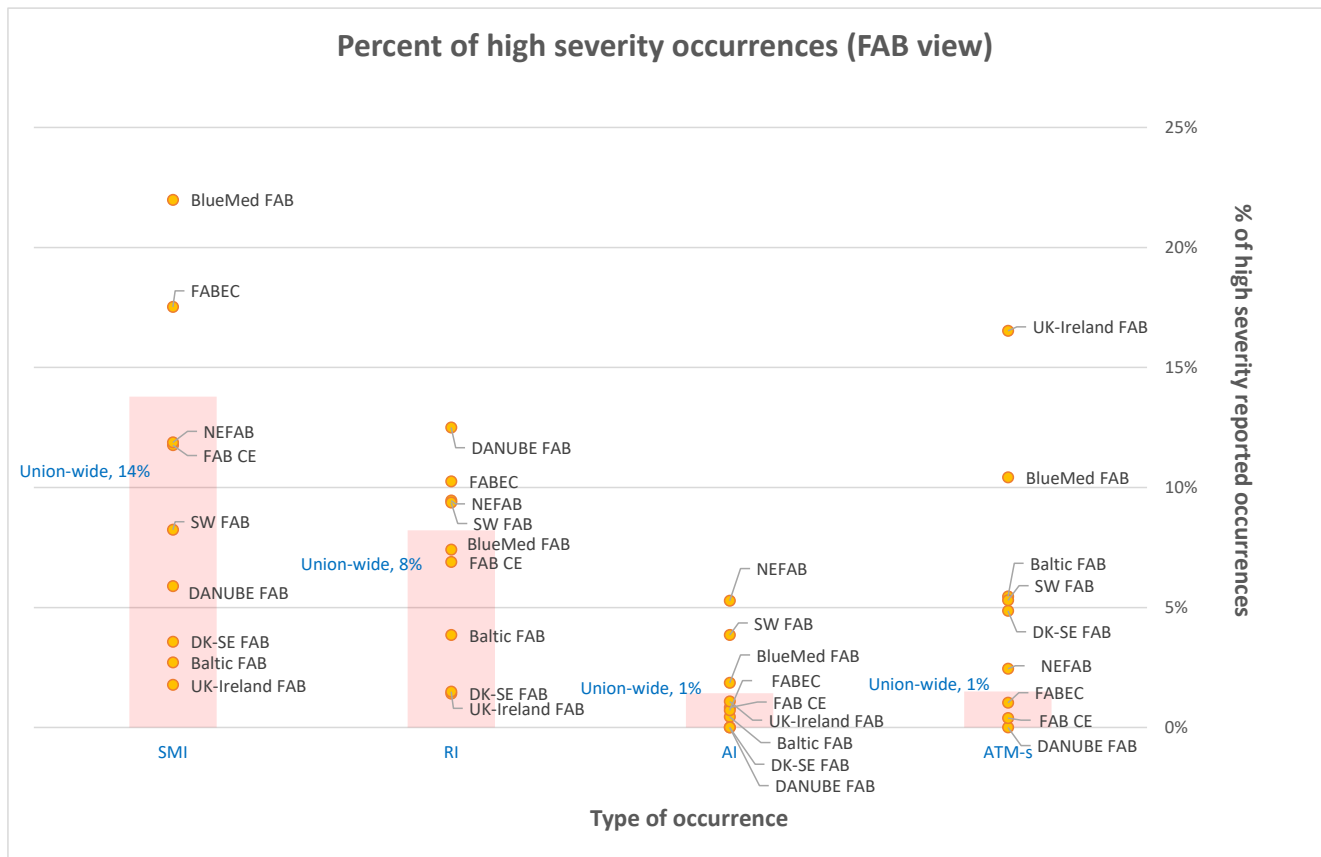


Figure 30: FAB proportion of high severity of reported occurrences vs Union-wide

Occurrence reporting rates per occurrence type

2.3.14 Figure 31, Figure 32, Figure 33, and Figure 34 depict the FAB reporting rates per occurrence type together with the built box plot of reporting rates of Member State (MS) in the SES area. A box plot is a way to describe the distribution of the reporting rates across Member States within the Union at a glance, showing the reporting rates at quartile ranges. The lower, middle and upper line of the rectangular box represents the 25% (first quartile), 50% (median) and 75% (third quartile) percentile respectively of the distribution of reporting rates of the SES States, i.e. 50 % of the Member States reporting rates lay between the upper and the lower limit of the rectangular box. Above the 3rd quartile line, a vertical line is extended up to a point that marks the 91st percentile value of distribution of MS reporting rates. Below the 1st quartile, a vertical line is extended to a point that marks the 9th percentile value of distribution of MS reporting rates. The spacing between the different parts of the box indicate the degree of dispersion (spread) and skewness in the data, e.g. the narrower the box plot limits are, the closer the reporting rates of the 50% of the MS around the middle value are. A symmetric box represents a symmetric distribution of rates around the median.

2.3.15 Figure 31 illustrates the Union-wide box plot of reporting rates of SMIs, normalised with the number of IFR flight hours in the airspace included in the Performance Scheme. The figure depicts the average FAB reporting rate as well. It is worth noting that there is one FAB having higher reporting rates than the 50% box (FABEC) and one has lower rate (DANUBE FAB). Both are the same FABs as observed in the previous report of 2017.

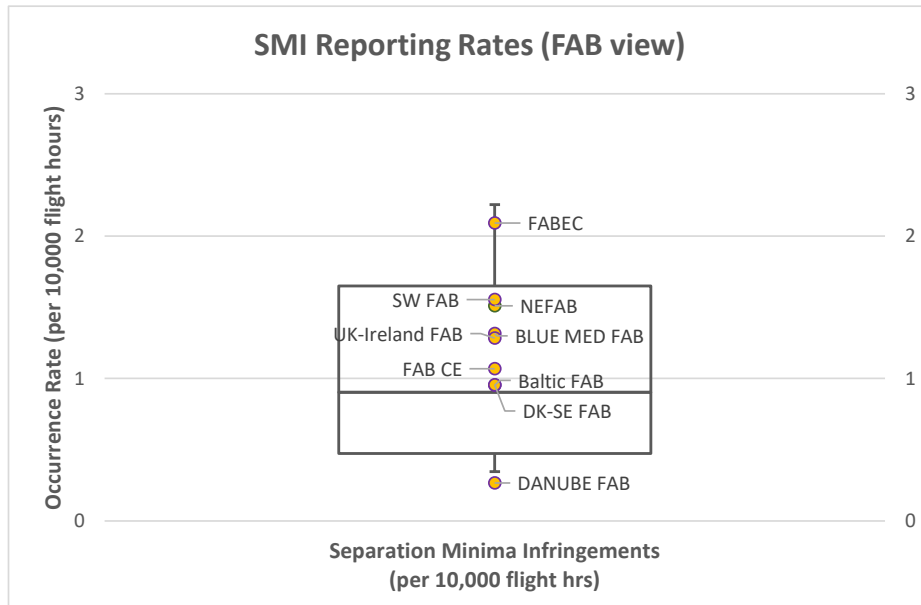


Figure 31: Box plot of Union-wide and FAB reporting rates of SMIs

2.3.16 Figure 32 illustrates the Union-wide box plot of reporting rates of RIs, normalised with the number of IFR movements at airports included in the Performance Scheme. The figure depicts the average FAB reporting rate as well. It is worth noting that up to four FABs have higher reporting rates than the 50% box (FABEC, SW FAB, NEFAB, and BlueMed) and one has lower rate (DANUBE FAB). These are the same FABs as observed in the previous report of 2017.

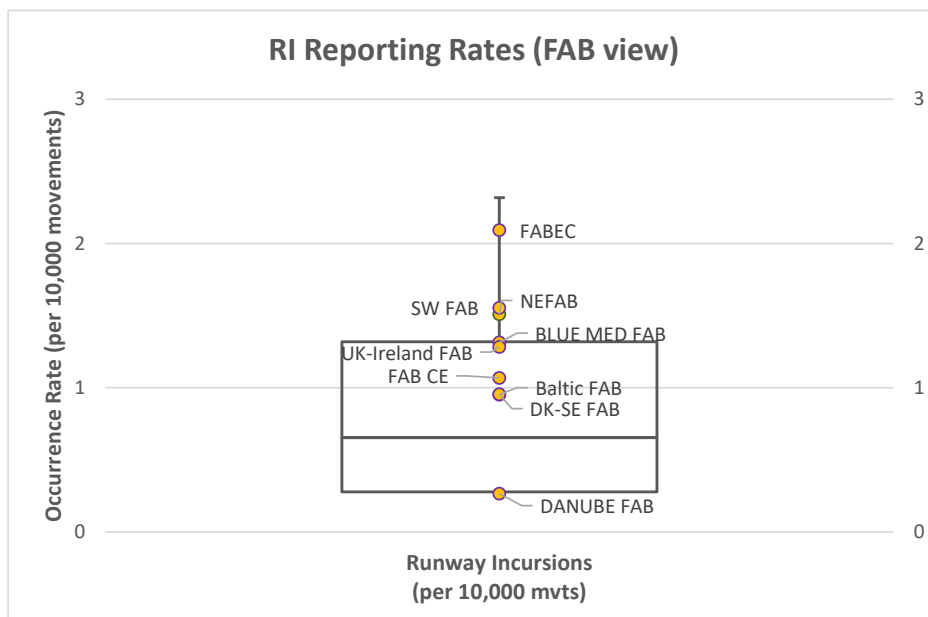


Figure 32: Box plot of Union-wide and FAB reporting rates of RIs

2.3.17 Figure 33 illustrates the Union-wide box plot of reporting rates of AIs, normalised with the number of IFR flight hours in the airspace included in the Performance Scheme. The figure depicts the average FAB reporting rate as well. It is worth noting that two FABs have higher reporting rates than the 50% box (UK-Ireland FAB and NEFAB) and one has lower rate (DANUBE FAB).

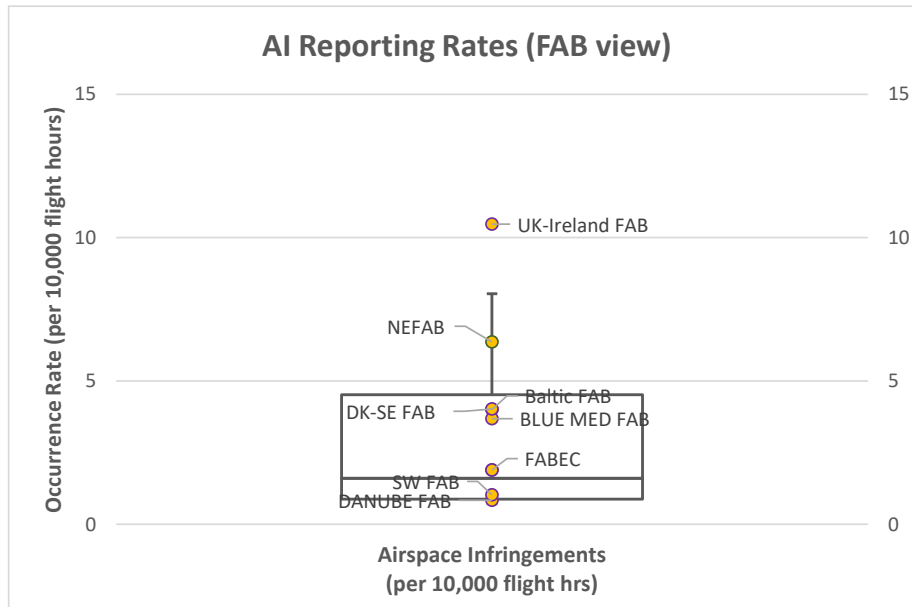


Figure 33: Box plot of Union-wide and FAB reporting rates of AIs

2.3.18 Figure 34 illustrates the Union-wide box plot of reporting rates of ATM-S occurrences, normalised with the number of IFR flight hours in the airspace included in the Performance Scheme. The figure depicts the average FAB reporting rate as well. It is worth noting that three FABs have higher reporting rates than the 50% box (NEFAB, FABEC, and FAB CE) and one has lower rate (UK-Ireland FAB).

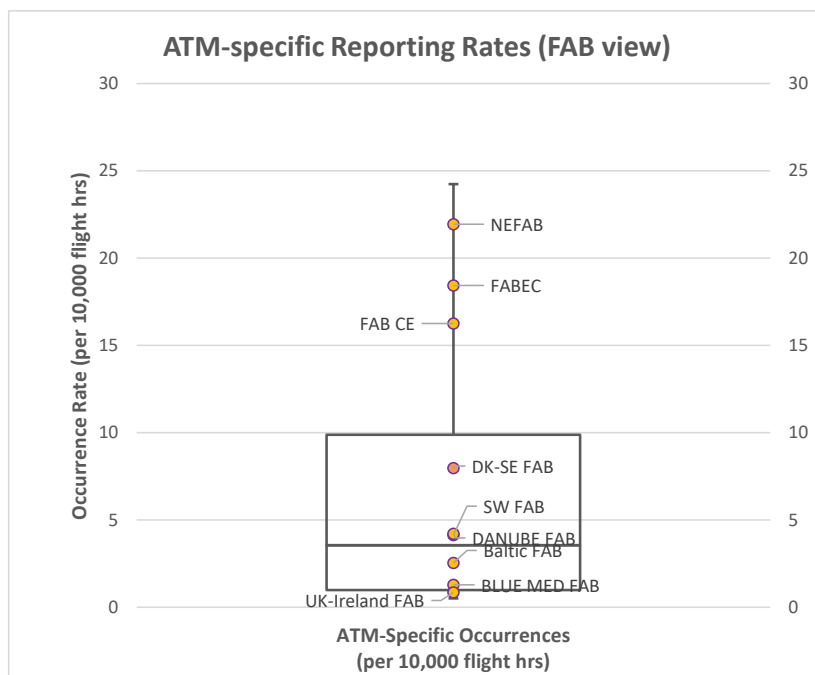


Figure 34: Box plot of Union-wide and FAB reporting rates of ATM-S

2.3.19 A closer look at the four figures shows that the spread of reporting rates of ATM-S is higher than the rest of types of occurrences (wider rectangle box plot), while the spread of SMIs and RIs reporting rates are similar and narrower than the other type of occurrences. This may be an indication that certain occurrence types, i.e. ATM-specific, are potentially analysed less consistently than others across Member States, either because the criteria used by the States/FABs are different or because the method to assign severity and, therefore, consider the event reportable, is applied differently across them, as it may be the case in occurrences with severity classified as D or E, or in AIs (neither of them require the application of RAT). Some States have also reported their change in the criteria

used in considering an occurrence as ATM-s. Certain States consider that only technical failures in the ATM systems that have an effect in the services should be reported as ATM-s occurrence, i.e. the failure of a channel of a two-channels VOR is not considered as an ATM-S event, if the VOR continues to provide the signal. Others make a distinction between internal, meaning under ANSP control, and external systems. It is apparent that the criteria are not harmonised.

- 2.3.20 The expectation is that consistent levels of reporting across Member States and similar safety performance in the provision of the services should lead to concentration of the reporting rates around the median, and the limits of the box plot should get closer. However, in practice, the reporting rates are spread for several factors. Some of these are:
- over-reporting leads to Member States/FABs rates higher than the median and outside of the boxplot, under-reporting leads to the opposite - rates below the median and outside of the boxplot;
 - application of different criteria of what constitutes a “reportable event” could also influence the spread of reporting rate. This is particularly evident in the event ATM-s, where distributions of rates are much wider;
 - different safety performance of the services provided could be a factor as well and, finally,
 - different effectiveness of safety barriers could potentially have an effect (i.e. differences in the effectiveness of safety barriers may lead to experience more frequently a type of occurrences than others).
- 2.3.21 It is worth mentioning also that the use of the selected exposure data for normalisation across Member States may play a role in the variation of rates as well.
- 2.3.22 It is observed that DANUBE FAB shows reporting rates at the lower range in three of four of the graphs. On the contrary, FABEC and NEFAB show reporting rates at the higher range in three of four of the graphs.
- 2.3.23 Union-wide level box plots may be used as a management tool to monitor the evolution of reporting rates during RP2. On the one hand, they can be used to monitor whether the lower reporting rates improve during RP2, so that all the lower reporting rates move into the middle 50%, as defined by the box plot. On the other hand, the plots may determine whether the reporting rates are becoming more consistent as the reference period progresses and the new box plots in the years to come become narrower. When comparing data from 2015, 2016, 2017 and 2018, this has not been observed.

Member States/ANSP Level of Reporting

- 2.3.24 This section summarises the results of Member States submitted analysis of their level of reporting and those of the ANSPs under their jurisdiction. Some Member States failed to provide the requested information in a consistent manner using a combination of quantitative and qualitative analysis of their level of reporting. This seems to be the consequence of a lack of understanding of the requested information in this SPI and its associated AMC/GM. The reports were mainly limited to qualitative analysis of the situation in each State without providing in many circumstances evidence of the statements. However, no major issues related to the reporting levels of the ANSPs were identified by any NSA. On the contrary, most of the States reported good and healthy reporting levels of the ANSPs under their oversight. In addition, the information provided was informative in other aspects such as the implementation of Regulation (EU) 376/2014, the plans some States have to implement and improve occurrence reporting, establishment of Acceptable Level of Safety Performance (ALoSP)/Target Level of Safety (TLS) or some good practices in the way some States analyse and interact with their ANSP.
- 2.3.25 The main observations about the level of reporting analysis reported by the Member States in their 2018 Monitoring Reports can be summarised as follows:
- The level of analysis varies substantially between Member States. A few States did not provide any analysis of their level of occurrence reporting, e.g. Italy, Cyprus, Malta,

Belgium, Germany, Luxemburg, Netherlands, Switzerland and Portugal. Only a few performed a combination of quantitative and qualitative assessment, as indicated by the AMC/GM, such as Bulgaria, Latvia, Norway, Finland, Spain, Ireland, or Estonia, and this making an effort to provide some information that supports the status on the occurrence reporting in the country. The analysis was mostly limited to describe the reporting processes in place, according to Regulation (EU) 376/2014, the establishment of mandatory and voluntary reporting systems and the use of ECCAIRS, the number of events reported in isolation or just anecdotal descriptions of the reporting practices. It is worth noting that some States reported their procedures being under review to comply with the said regulation. Some States reported the use of software tools for collection, storage, submission to ECCAIRs and data analysis as facilitators (e.g. eTOKAI, SPSS, Q-pulse).

- **None of the Member State identified deficiencies in the level of reporting:** neither at State nor ANSP level. In general, Member States reported no issues (“reporting culture is improving at ANSP”, “level and data quality of occurrence reporting is continuously improving”, “the reporting system is well established and accepted”, “the level of reporting from ANSP is remarkably stable”, “level of occurrence reporting is extremely healthy”, etc. are common expressions used in the conclusions of the reports). In line with that, not many actions to improve reporting were identified, although some States indicated improving actions that will be introduced in the near future. For example:
 - Spain plans to carry out regularly awareness campaigns to disseminate safety issues, promote electronic reporting and the implementation of new automated safety recording tools to monitor STCA and TCAS RAs alerts, and collaboration between AESA, VFR pilots, general aviation fields in improving airspace infringements.
 - Greece and France are implementing eTOKAI to automate the reporting of occurrences from the ANSP to the CAA to minimise workload and improve harmonisation.
- Some States described the establishment of a dedicated group at the CAA to analyse safety information and monitoring occurrence trends aiming at identifying and mitigating major safety risks and to discharge State responsibilities. The output of this analysis fed both the safety oversight program and the State Safety Plan. In addition, several States explicitly indicated the occurrence reporting and the ANSP’s SMS processes in this area as essential part of its annual audit programme of the ANSPs to ensure adequate occurrence reporting.
- Bulgaria and Lithuania reported that occurrence reporting figures have been used to establish Acceptable Level of Safety Performance (ALoSP)/Target Level of Safety (TLS) to monitor the safety performance of the ATM/ANS services, and that routinely the level of reporting is monitored against these safety levels.
- In previous reports, the States justified the lack of quantitative analysis because only one ANSP was included in their Performance Plan and no other ANSP was available to compare with or because it was not considered appropriate to benchmarking them. It is worth noting that, nevertheless, the reporting rates are different between Member States, as shown in Figure 31, Figure 32, Figure 33, and Figure 34, and that the distribution of occurrence rates across Member States were elaborated to allow that comparison at European level, rather than within a single State.
- Most of the States reported the use of ECCAIRS and compliance with Regulation (EU) 376/2014, including the issuance of just culture principles in their safety policy. They reported associated occurrence reporting processes linked to the implementation of the said Regulation (EU) 376/2014.
- Some States have identified and justified an increase of level of reporting in certain areas. Croatia has identified a general increase in reporting rates after agreement between CAA and ANSP to report all types of occurrences, not just those that are mandatory. Bulgaria identified an increase of AI rate due to international military exercises in its airspace. France has reported high numbers of ATM-s but with no real direct impact on the safety of the

service, thus risks are maintained under acceptable criteria. Spain explained the increased of all types of events as a consequence of improving level of reporting rather than safety deterioration. Estonia identified significant increase in ATM-s, but with no special concern as they were classified as severity E. Similarly, Finland has experienced increased in RIs events, but no clear individual reasons have been identified although technical solutions such as warning systems are to be implemented shortly. Latvia has reported steadily increase in reporting levels of the ANSP in the RP2 period linked of improvements of reporting culture rather than deficiencies in safety levels.

2.3.26 Lastly, several best practices are extracted from the State reports that may help to improve the level of reporting. These are summarised in the following points:

Best practice to improve level of reporting:

- The use of electronic databases for collection, storage and analysis is common in all States. There are different approaches on what databases and software solutions are used, e.g. local databases, eTOKAI, ECCAIRS/ECR, etc but in all situations the interchange of automatic information is ensured. Compatibility of formats should be ensured by automatic means, allowing flexibility to continue with the use of legacy databases and to comply with regulation Reg (EU) 376/2014, while minimising the use of scarce resources. Special attention and effort should be put to improve usability of the reporting portals to facilitate the task of reporters and avoiding frustration.
- Well established coordination and communication processes, including compatibility between their databases, between Civil Aviation Authority, Aviation Accident Investigation Board (AAIB), and ANSP are essential for a complete and well design reporting, analysis and follow up system. NAAs may be the central point to coordinate the outputs of ANSPs reports and investigation from the AAIBs. NAA may establish a group of experts of different aviation domains that meet regularly to review, analyse, and share information on occurrences including risk assessment and mitigations. Results of this analysis may feed State Safety Plans and the safety oversight programme. In addition, NAAs may receive reports from different stakeholders, and they always should integrate information to analyse. For example, Spain receives a significant amount of reports from airlines and airports that need to be analysed with the information of the ANSP. They have set up regular meetings between the NAA and the ANSP in order to share information and improve the investigation of occurrences with richer information. Estonia has set-up a joint working group to coordinate civil/military analysis and improve coordination to ameliorate the impact of military on the occurrences.
- Easy access to reporting portals (e.g., web, templates to capture occurrences, different level of access, and prefilled mandatory fields that can be changed by the reporter if needed), with fast and user-friendly interfaces will help to easier the collection of reports. For example, dedicated forms for air traffic controllers (ATCOs), Air Traffic Safety Electronics Personnel (ATSEPs), and Aeronautical Information Service (AIS) officers can be built, having most of fields prefilled for easy reporting (e.g., date of reporting, dropdown list of options). Different forms for operational and technical reports can be offered. Different means to collect reports should also be offered: web-based, fax, email, paper reports. In addition, the entry points can be the ANSPs, CAAs, AAIBs.

- Local databases are available and accessible to employees, implementing the appropriate level of security and confidentiality as required. Voluntary and mandatory reporting systems may be integrated, implementing different control access and confidentiality levels, as appropriate, but allowing joint analysis. All reports submitted are subject to analysis and follow up, treating voluntarily reports in the same way as mandatory reports. Feedback to reporters are provided regularly.
- States, NAAs and ANSPs are adopting “Just Culture” principles, embedding these principles in published Safety policies, which are later communicated to all staff through the official channels and training. Engagement of staff in developing and implementing the Just Culture policy and processes increase trust understanding of the safety investigation and the important role of reporting within the achieved safety levels of the industry.
- ANSP’s database that provides feedback from the investigation of reported occurrences to ATCOs, ATSEPs, and other personnel based on a web application and/or email messaging is seen as an excellent tool to reinforce the organisation engagement in safety improvement and in building trust with reporters.
- Stakeholder safety workshops are seen as means to facilitate collaboration nationally and internationally, improving sharing safety data and incident information learning from these data and enable safety performance improvements. They should be encouraged within the States.
- States, NAAs and ANSPs should complete Just Culture training. As part of NAA’s annual audit programme, oversight of occurrence reporting should be included via the continuous monitoring of reports and via the ANPS’s compliance with current legislation on SMS.

Safety Performance by Type of Occurrence

- 2.3.27 This SPI aims at capturing the number of, as a minimum, separation minima infringements, runway incursions, airspace infringements, and ATM-specific occurrences at all ATS units included in the Performance Scheme.
- 2.3.28 The most informative information that can be derived from these safety PIs is linked to the evolution of the metrics across years. However, any trend should be read carefully and not correlate immediately with greater or lower levels of safety of the services as there are additional factors that may influence its evolution, e.g., the level of traffic, improvement/deterioration in the reporting culture, or difference in interpretation of occurrence definitions or applicability within the Performance Scheme. The limitations described in Section 1.6 must be taken into consideration.
- 2.3.29 Table 2 lists the evolution of the total number of occurrences at union-wide level. While the number of SMIs have remained stable, the rest of occurrences, i.e. RIs, AIs, and ATM-s have increased by 14%, 5%, and 6%, respectively, when compared to 2017. The following paragraphs look into the evolutions within the FABs and Member States, which indicate that the trend is not observed similarly in all States.

TYPE OF OCCURRENCE		2015	2016	2017	2018	VARIATION 2016-2017
Reported occurrences Union-wide	SMI	2,290	2,231	2,284	2,294	~ 0 %
	RI	1,024	1,099	940	1,075	↑ +14%
	AI	4,041	4,838	4,620	4,873	↑ +5%
	ATM-S	15,111	14,089	14,664	15,576	↑ +6 %

Table 2: Union-wide number of high and low severity reported occurrences- Year 2018

2.3.30 Figure 35 depicts the number SMI occurrences reported by each FAB in 2018 and the variation of these numbers as a percentage of the figures reported in 2017. It is observed that only FABEC reported a decrease numbers of SMIs by -7%, and the rest of FABs reported increasing numbers of SMIs with percentages ranging from 3% to 54%. The variation of the aggregated numbers of SMIs at EU level has remain almost constant as shown in Table 2.

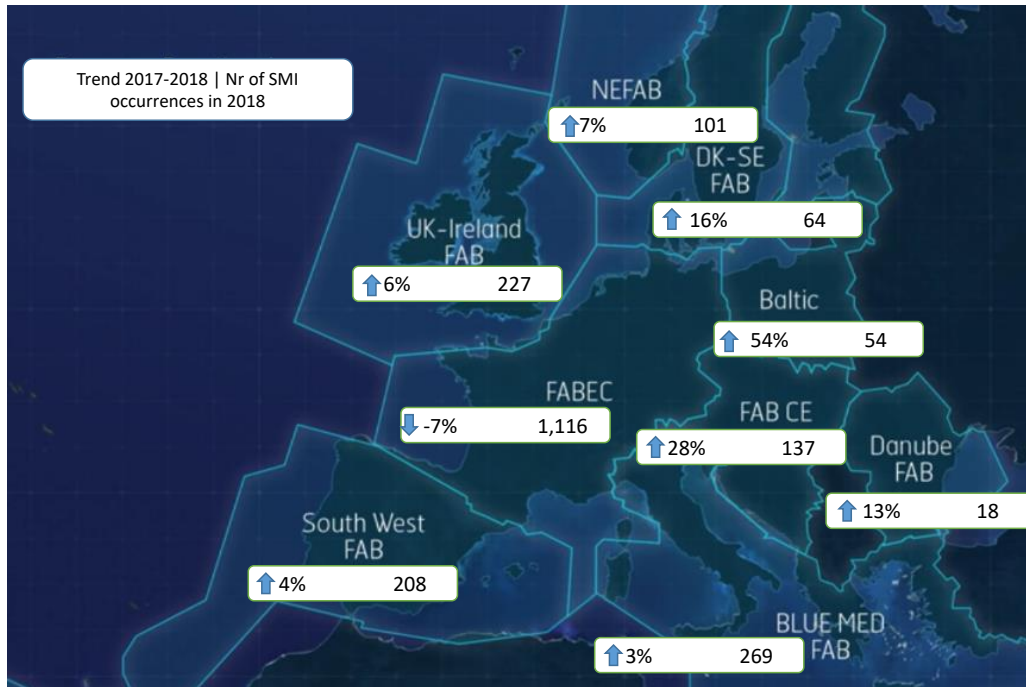


Figure 35: Evolution of number of SMI occurrences reported by FAB in 2018

2.3.31 Figure 36 depicts the number RI occurrences reported by each FAB in 2018 and the evolution of these numbers as a percentage of the figures reported in 2017. It is observed that NEFAB, FABEC, UK-Ireland and Blue-Med FAB have increased the number of RI, respectively. Other FABs have almost no variation in the reported RIs (DK-SE FAB) or have reported decreasing numbers, ranging from -42% by Danube FAB to -15% by FAB CE. The variation of the aggregated numbers of RIs at EU level has increased by 14% as shown in Table 2.

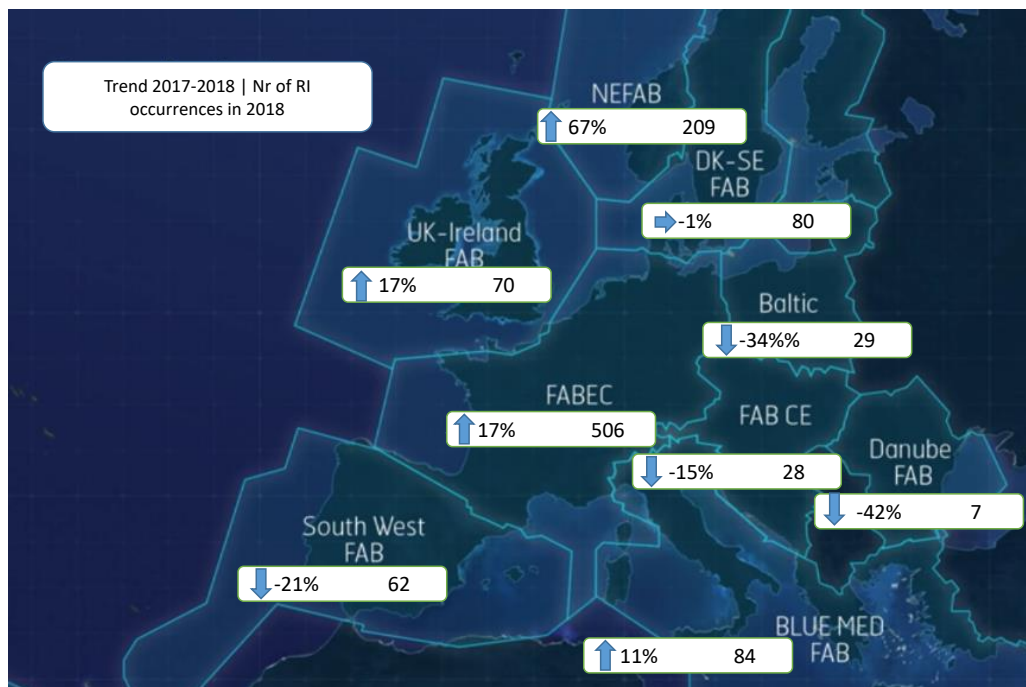


Figure 36: Evolution of number of RI occurrences reported by FAB in 2018

2.3.32 Figure 37 depicts the number AI occurrences reported by each FAB in 2018 and the evolution of these numbers as a percentage of the figures reported in 2017. Baltic, NEFAB, Danube, UK-Ireland, DK-SE FAB, and Blue Med, reported the highest increases in AI occurrences. FAB CE reported the highest decrease in AIs (-52%). The variation of the aggregated numbers of AIs at EU level has increased by 5% as shown in Table 2.

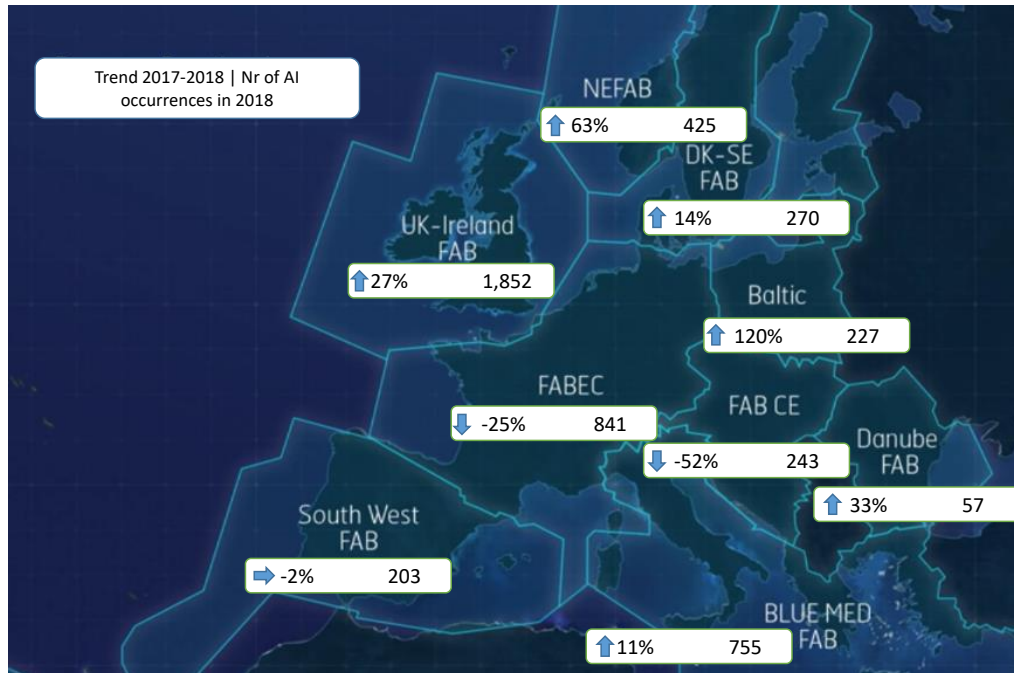


Figure 37: Evolution of number of AI occurrences reported by FAB in 2018

2.3.33 Figure 38 depicts the number ATM-s occurrences reported by each FAB in 2018 and the evolution of these numbers as percentage of figures reported in 2017. FAB CE, NEFAB, Baltic, and SW FAB and Danube FAB reported the highest increases in ATM-s occurrences. On the contrary, DK-SE FAB, UK-Ireland and Blue-Med reported the highest. The variation of the aggregated numbers of ATM-s at EU level increased by 6% as shown in Table 2.

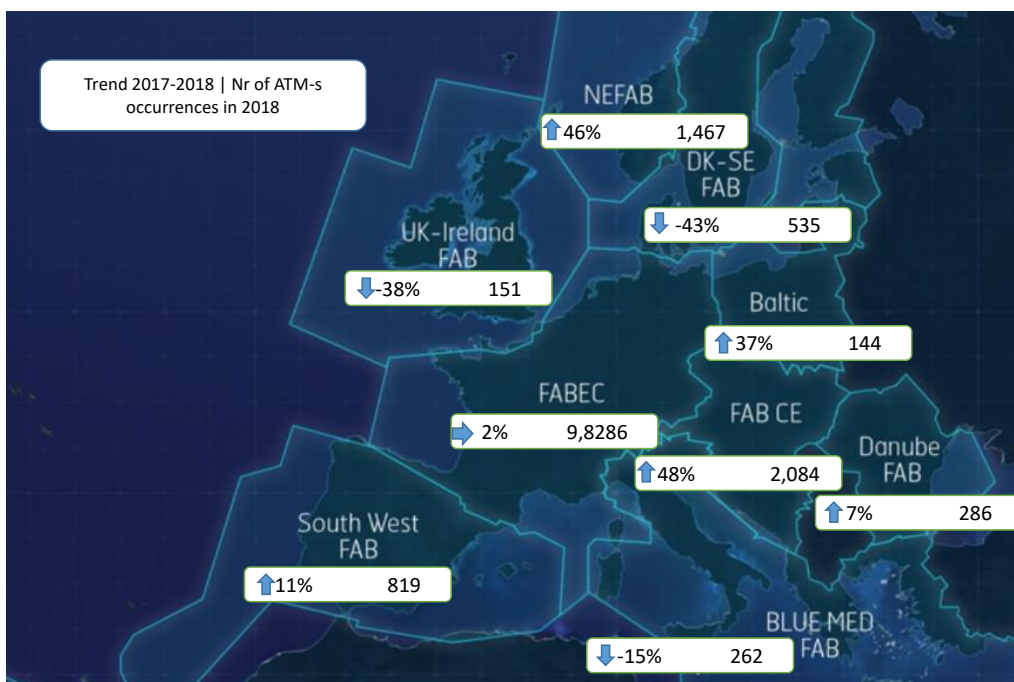


Figure 38: Evolution of number of ATM-s occurrences reported by FAB in 2018

- 2.3.34 The reasons for the evolution in the reported occurrences in each FAB/State may be multiple and, because they have not been identified in the Monitoring Reports, cannot be presently determined with certainty. With regards to the increase in reported occurrences from 2017 to 2018 by some States, the introduction of the Commission Implementing Regulation (EU) 376/2014 in November 2015, may have played a role in improving the reporting culture, although this effect is likely to be small after three years of implementation. This increase is not generally observed across all States. Another factor that may have influenced in the increase of reported occurrences is that the number of airports movements and controlled flight hours have generally increased in most of the States. The movements at the airports included in the SES Performance Scheme and the controlled flight hours in the airspace of Member States during 2018 have increased by approximately 3.2% and 5.3%, respectively.
- 2.3.35 With regard to the decrease in the number of reported occurrences, the reasons may also be multiple. It may be related to an improvement of the safety of the service, but there are caveats related to the data sources and the validation process, as indicated in Section 1.6, which may also have played a role. It has also been observed that there are some issues with the coding of occurrences by the States and the manual intervention in the extraction of occurrences by Eurocontrol. On several occasions States reduced the number of reported occurrences, arguing that some occurrences were outside of the scope of the SES Performance Scheme, with no possibility of verification of the criteria used or whether the criteria were homogeneously applied. A cross-check has been done for verification with occurrences extracted from the ECR, but it also depends on the correctness of the occurrences in the ECR by the States.
- 2.3.36 Nevertheless, some of the substantial variations are of concern and should be closely analysed by local NSAs and ANSPs. It is recommended that local NSAs and ANSPs within those FABs, with material changes in the reported occurrences, investigate further these changes. This is required to determine if the variations are due to either any of above factors, that are related to changes in the reporting culture or criteria, or are the result of a change in the safety risks of their services. The aim should be to further investigate significant increases in one type of occurrences, to determine if they correspond to increases in safety risks (or are acceptable variations), and significant decreases to determine if underreporting happened due to any of the above mentioned reasons. The following list contains the FABs that should look into the highest variations of the reporting occurrences. It is not an exhaustive list and some individual States may also want to review their occurrences and reporting practices to the Scheme too:
- Baltic FAB should look into its increase of SMIs, AIs, and ATM-s; and the decrease of RIs;
 - Blue Med should look into its increase of RIs and AIs and the decrease of ATM-s;
 - Danube should look into its increase of AIs, and the decrease in RIs;
 - DK-SE FAB should look into its decrease of SMIs and AIs, and the decrease in ATM-s;
 - FAB CE should look into its increase of SMIs and ATM-s, and the decrease in AIs;
 - FABEC should look into its increase of RIs, and the decrease in AIs;
 - NEFAB CE should look into its increase of RIs, AIs, and ATM-s;
 - SW FAB should look into the decrease of RIs;
 - UK-IR FAB should look into its increase of RIs and AIs; and the decrease of ATM-s.
- 2.3.37 Figure 39 summarises the distribution of the total number of reported occurrences for each FAB and per type of occurrence. Although it is clear that the total number of reported occurrences varies from FAB to FAB, no conclusion can be drawn on the underlying reasons. Many factors can influence the difference in the absolute numbers, such as differences in traffic levels (movements or flight hours), or differences in complexity of airspace or airfield.

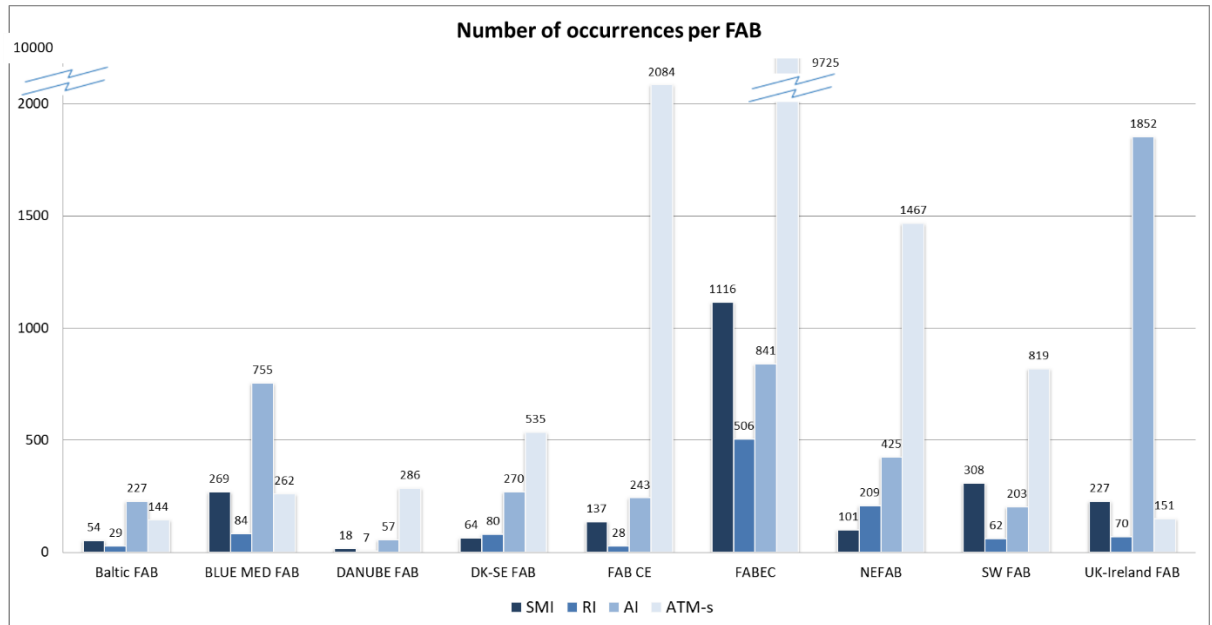


Figure 39: Total number of occurrences per FAB

2.3.38 The next four figures show total the number of occurrences reported by each State. Benchmarking absolute numbers of occurrences should be avoided because of the reasons stated above. This is particularly evident in the ATM-s occurrences where the criteria to report occurrences are not harmonised, as indicated in point 2.3.19.

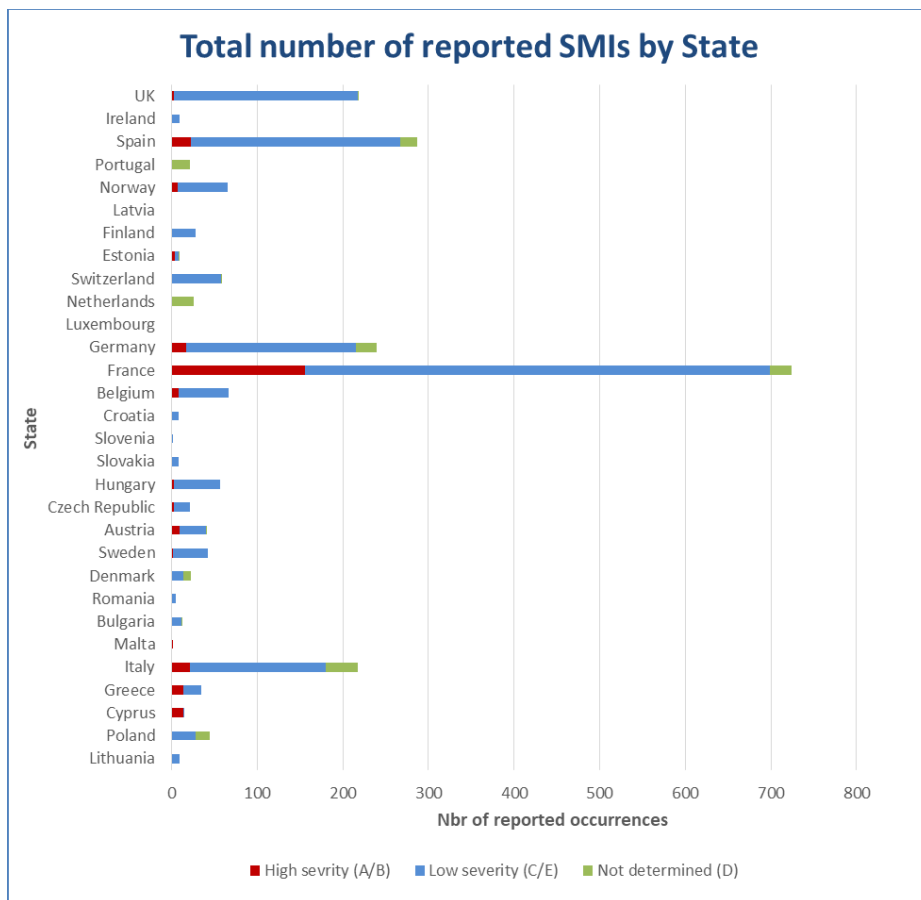


Figure 40: Total number of SMIs per FAB

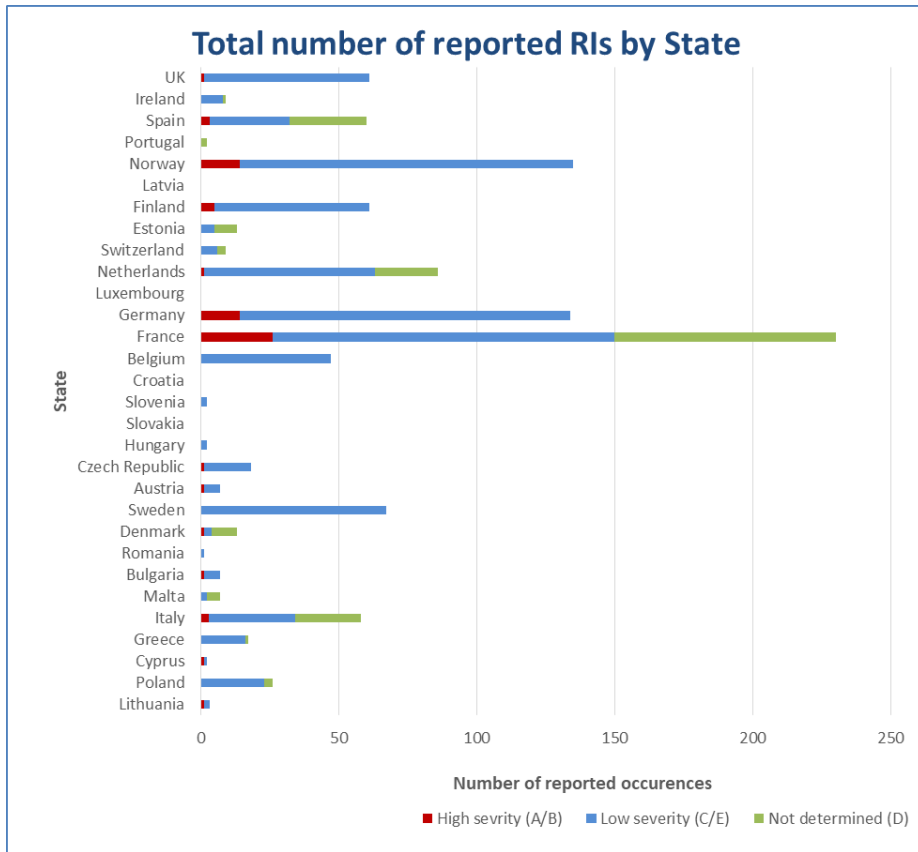


Figure 41: Total number of RIs per FAB

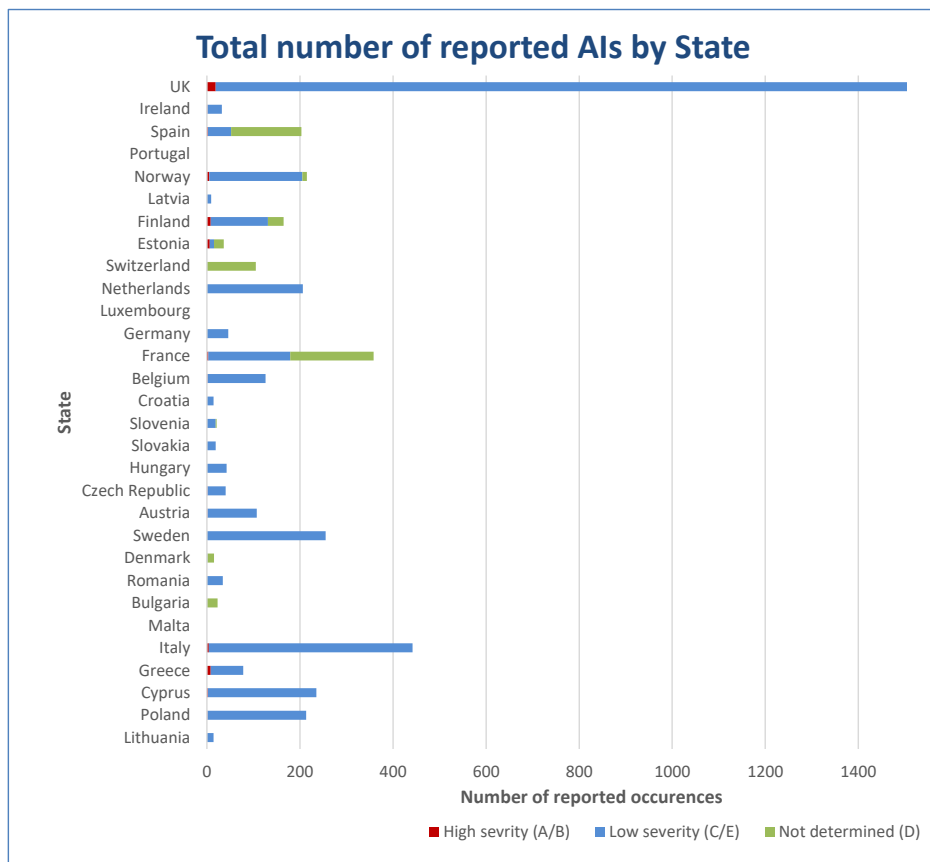


Figure 42: Total number of AIs per FAB

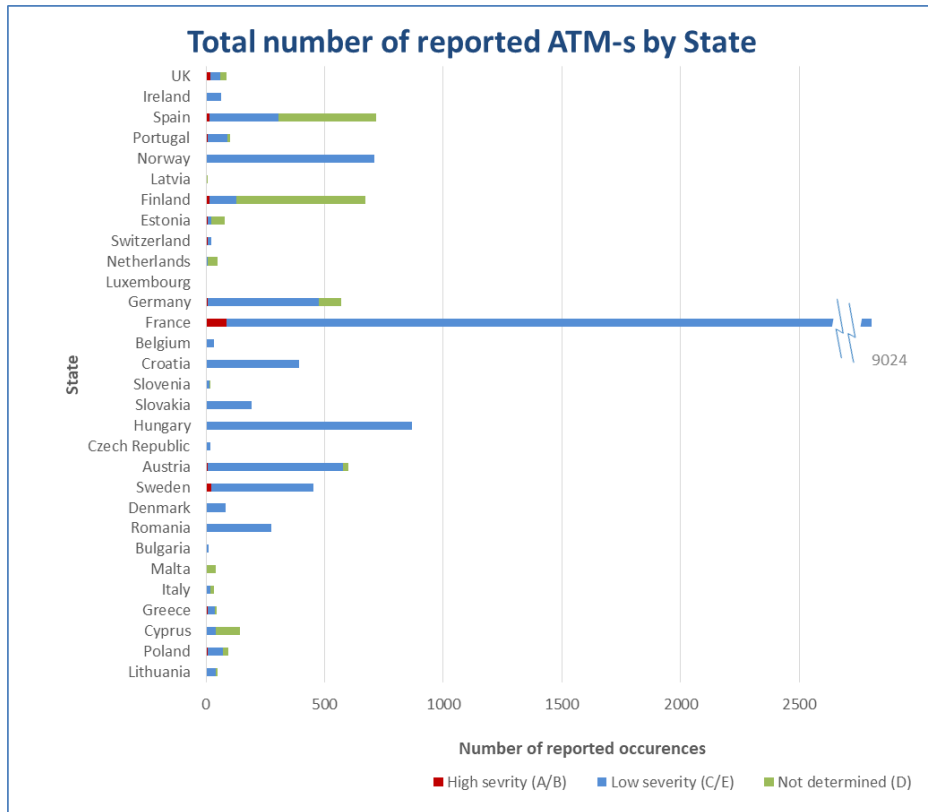


Figure 43: Total number of ATM-S per FAB

3 Network Manager

- 3.1.1 In accordance with Article 6 of Regulation EU 390/2013, the Network Manager shall play a dual role in relation to the performance scheme. On the one hand, it shall support the Commission in the preparation of Union-wide performance targets and monitor and support the achievement of the performance targets by FABs and ANSPs. On the other hand, it shall draw up a Network Performance Plan (NPP) containing performance targets for the NM covering all key performance areas, which are to be consistent with the Union-wide performance targets.
- 3.1.2 The NPP for RP2 was submitted on 13 November 2014 and updated and approved by the Network Management Board (NMB). The European Commission approved the NPP for the second reference period through Commission Implementing Decision (EU) 2016/1373 of 11 August 2016. The safety key performance indicators included in the NPP are the following:

Key Performance Indicators		NM Target
EoSM	The minimum level of the effectiveness of safety management	Improving its own SMS to reach at least 'Level D' in the Management Objectives 'safety policy and objectives', 'safety risk management', 'safety assurance', 'safety promotion' and at least 'Level C' in the Management Objective 'safety culture'.
RAT	The percentage of application of the severity classification based on the Risk Analysis Tool (RAT)	Applying the RAT methodology to all reported ATM specific occurrences with the categories AA (total inability to provide safe ATM services, B (partial inability to provide safe ATM services) and C (ability to provide safe but degraded ATM services).

Table 3: NM KPIs in NPP 2015-19

NM Performance Indicators		NM Internal Objective
Top risks	Top 5 Operational safety risks and priorities	Identification of Network operational safety risks (including for its own operations)

Table 4: NM PIs in NPP 2015-19

- 3.1.3 These indicators are assessed in terms of the functions and tasks of the Network Manager (NM) in accordance with Regulation (EU) 2019/123. However, the distinction between NM's activities and other EUROCONTROL activities not related with the network functions is not always evident, what complicates the evaluation of the degree of accomplishment for some of the targets and objectives of the NM. This is specifically the case for the activities in the area of safety management, where activities to support operational stakeholders to achieve their own safety performance targets are performed both by the NM and by the Network Management Directorate/other EUROCONTROL units.
- 3.1.4 This chapter addresses the results for 2018 on those SES Safety KPIs and targets laid out in the NPP.

3.2 EoSM - NM

- 3.2.1 The EoSM questionnaire for the NM was sent to EASA and justifications provided by NM were cross-checked with the results of the continuous oversight performed by EASA.

EASA Verification of NM EoSM Results

- 3.2.2 Table 5 shows consolidated 2018 EoSM results of the NM.
- 3.2.3 Note that the "Minimum level achieved for all other MOs" value is defined as the minimum level achieved for *Safety Policy and Objectives*, *Safety Risk Management*, *Safety Assurance* and *Safety*

Promotion. The level achieved in each Component is the minimum level achieved in the management objectives that are contained in that Component, which is determined by the responses to the EoSM questionnaires as per AMC3 SKPI of the EASA AMC and GM to ED Decision 2014/035/R.

- 3.2.4 The NM’s EoSM score achieved was 73 based on the verified responses to the questionnaire, which increased from a score of 57 from 2016. It must be highlighted that the ANSP questionnaire is applied with certain reservations as some of the questions are not fully applicable to NM.
- 3.2.5 While significant progress has been recorded in many areas, the continuous oversight carried out by EASA during 2018 still showed that the NMD management system has room for improvement, especially in terms of documents/records management and compliance monitoring. This situation is mainly reflected in a few of the questions linked to the areas of *Safety Policy & Objectives*, *Safety Assurance and Safety Promotion* being rated as effectiveness level C (as shown in Table 5 and Figure 44). *Safety Risk Management* achieved the target level ‘D’, but the other three components are still below target levels.

EoSM COMPONENT	2016
Safety Culture	D
Minimum level achieved for all other MOs	C
<i>Safety Policy & Objectives</i>	C
<i>Safety Risk Management</i>	D
<i>Safety Assurance</i>	C
<i>Safety Promotion</i>	C

Table 5: NM level of EoSM

- 3.2.6 With regards to the component of Safety Culture, the NM had achieved the maturity level D, already above the target level ‘C’.
- 3.2.7 Figure 44 shows how EoSM questionnaire applied to the NM (marked from Level A to Level E) are distributed per each EoSM Component. It can be observed that the majority of lower levels are in area of *Safety Assurance*, which is the one that requires more attention.

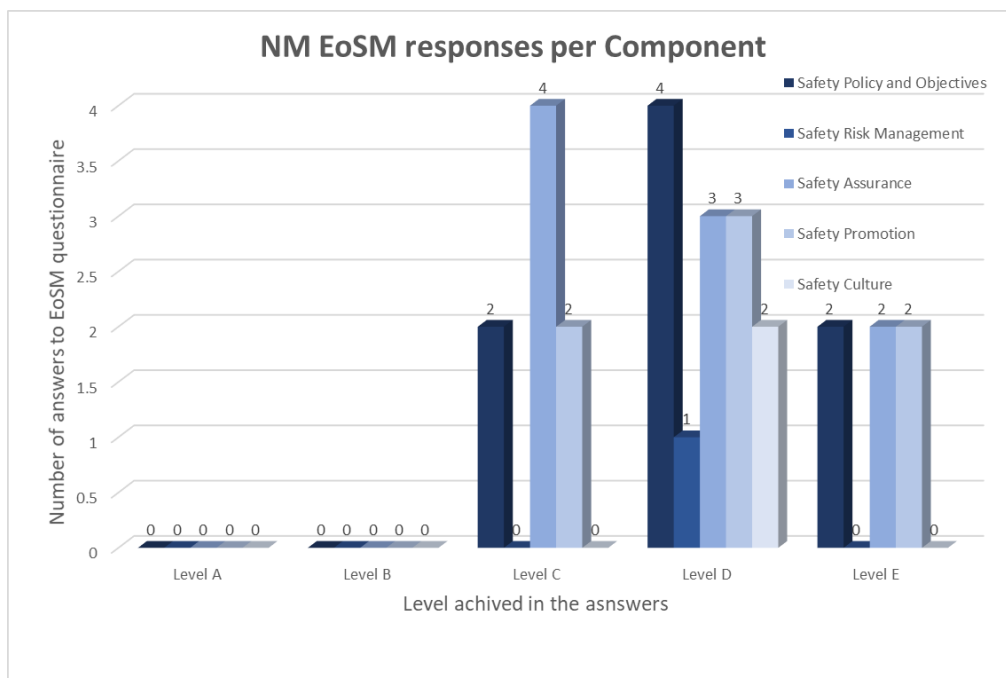


Figure 44: Level of NM answers per Component

3.3 Application of the RAT Methodology - NM

- 3.3.1 The EASA AMC on the RAT methodology application was updated in December 2015 (ED Decision 2015/028/R amending AMC and GM to ED Decision 2014/035/R on the implementation and measurement of S(K)PIs) to consider the network specific type of ATM specific occurrences within the scope of Performance Scheme). In this last update of the AMC, how RAT applies to the NM and a group of ATM-specific occurrences exclusively applicable to the NM were introduced.
- 3.3.2 In the scope of the network functions, those technical events affecting the tactical and real time function that provides traffic prediction, flow monitoring and warnings are the ones to be RAT assessed.
- 3.3.3 The NM reported that it applied severity classification using the RAT methodology to 100% of AA/A, B or C ATM-s occurrences, thus achieving the 2019 target. However, these figures have not been verified by either EASA or EUROCONTROL/DPS (note that NM does not report its occurrences to AST).

RAT APPLICATION	2015	2016	2017	2018	2019
<i>NM ATM-S target</i>	<i>N/A</i>	<i>80%</i>	<i>90%</i>	<i>100%</i>	<i>100%</i>
<i>Actual Value</i>	<i>N/A</i>	<i>100%</i>	<i>100%</i>	<i>100%</i>	

Figure 45: NM results of application of the severity classification (based on RAT)

3.4 Just Culture – NM

- 3.4.1 There is no Union-wide KPI on just culture, thus the NPP submitted by the NM did not include Just Culture as one of the NM S(K)PIs for RP2, in line with the requirement that NM targets should be consistent with the Union-wide performance targets.

4 Summary of Observations

- 4.1.1 The following section lists the key observations and conclusions made after the review of the 2018 FAB Monitoring Reports and verified results of monitoring of S(K)PIs for the 4th year of RP2. It should be noted that there was only one intermediate safety target in 2017 with regard to the application of the RAT methodology to the 80% of occurrences of severity AA/A, B, and C. An analysis of the evolution of the SPIs through the years 2015, 2016, 2017, and 2018 was performed when possible.
- 4.1.2 The safety reporting environment in Europe changed at the end of 2015 with the introduction of the new Occurrence Reporting Scheme for the ANSP and it has to be accepted that RP2 is a transition period to consolidate it. There is the expectation that the reporting of occurrences would increase throughout the years in RP2 with the introduction of Regulation (EU) 376/2014 and the standardisation visits that monitor States compliance with it.
- 4.1.3 In 2018 there was no accident registered with ANS-contribution involving fixed wing commercial air transport operation airplanes above 2,250 kg Maximum Takeoff Weight (MTOW), and the number of serious incidents has reached a minimum in the last 9 years following a decreasing trend. No ANS-related fatal accident has been observed since 2012, and no fatal accident with an ANS contribution has been registered in the last 9 years. In 2018, there were recorded 4 ANS-related accidents without fatalities. The analysis of the ANS-related accidents and serious incidents shows a decreasing trend with small fluctuations within the analysed period.
- 4.1.4 The proportion of events with ANS contribution is significantly smaller in ANS-related accidents than in serious incidents during the last five-year period. This seems to suggest that the barriers present in the aviation system are relatively effective to prevent accidents when the ANS has contributed to trigger the occurrence, and that other aviation risks may not be as well protected by effective barriers as the ANS is.
- 4.1.5 The analysis of the overall EoSM Minimum Maturity Level Achieved by States shows that eleven (11) States out of 30 have already achieved the 2019 target Level C, which is five more than in 2017. There is one State with Level A (Belgium). When excluding Component 5 – *Safety Culture*, which was not verified, there are still 16 States out of 30, approximately 53%, below 2019 target Level C. The average EoSM score by States has increased from 56 in 2015, 60 in 2016, and 63.2 in 2017 to 66 in 2018 which shows an increasing improvement throughout RP2. Overall, the EoSM Management Objectives that need the most improvement at State level are *Safety Policy and Objective and Safety Culture*. On the contrary, the most effective component at State level is *Safety Risk Management*. This has not changed significantly from 2017. There are some concerns that States with lower maturity levels are able to improve until the target set for next year, in particular Hungary and Bulgaria.
- 4.1.6 The analysis of the overall EoSM Minimum Maturity Level Achieved by ANSPs shows that all ANSPs are already at Level C or above for Safety Culture, which is the 2019 target Level, and that 20 ANSPs out of 31, approximately 64.5%, have already achieved the 2019 EoSM target level D for all other MOs (the four EoSM Components other than Safety Culture). When looking at the evolution of performance from 2017 to 2018, it is worth noting that the number of ANSPs that have achieved the target for all other MOs increased from 19 to 20. The average score value achieved by all ANSPs increased from 79 in 2015, and 80 in 2016, 82.1 in 2017 to 83 in 2018 showing an increasing improvement throughout RP2. The trend suggests that ANSPs can achieve the targets set in 2019. There are two ANSPs, PANSA and CYATS, that are required to increase their efforts to improve more significantly their SMS and achieve the target in 2019.
- 4.1.7 Overall, the components that require more attention at ANSP level are *Safety Policy and Objectives, and Safety Assurance and Safety Promotion*. Safety Risk Management is the best handled EoSM Component. At the same time, the major improvements during 2018 have been achieved in Safety Promotion. Interestingly, Safety Culture target has been achieved by all ANSPs, but contrary to the State level, where this component was the one that needs more attention and improvement. This has not significantly changed from 2017.

- 4.1.8 The current definition of the indicator that measures the application of the RAT methodology has led to a situation where the application of the RAT methodology could be mandatory for the ATM Ground and not for the ATM Overall, or vice-versa. Such an approach has the potential to negatively affect the harmonisation of the severity assessment using the RAT methodology.
- 4.1.9 From the Union-wide perspective and taking all occurrences reported collectively into account, targets for 2017 have been achieved for RAT application to all types of occurrences: SM-Ground (97%), SMI-Overall (92%), RI-Ground (81%), RI-Overall (83%), and ATM-specific (95%). The situation in 2018 has deteriorated in comparison of 2017, in particular with regard the application of RI-ground and RI-overall. It is noticeable the improvement observed in the ATM-s occurrences. At the Union level, the number of SMI and RI occurrences that required the application of RAT have increased in both elements where RAT is applied, ground and overall, but in greater proportion in the ground component, which is the one evaluated by the ANSP. In an environment with scarce resources, this is likely the main reason why the percentages of application have decreased, or simply they analysis has been delayed.
- 4.1.10 From the State point of view, the following States failed to achieve the intermediate 2017 target of applying RAT (i.e., 80%) to the SMIs occurrences:
- for both SMI-Ground and SMI-Overall: the Netherlands with 63% and 0% of application, respectively;
 - for SMI-Ground: Hungarocontrol with 62% of application;
 - for SMI-Overall: Poland with 0% of application; and
 - Luxemburg did not provide data in its Monitoring Report, failing to comply with its reporting obligations, and the achievement of the target was not proved for second consecutive year.
- 4.1.11 From the State point of view, the following failed to achieve the intermediate 2017 target of applying RAT (i.e., 80%) to RIs occurrences:
- for both RI-Ground and RI-Overall: France (with 72% and 74% of application, respectively), and the Netherlands (with 11% and 12% of application, respectively);
 - for the RI-Ground: Norway with 75% of application;
 - for the RI-Overall: Poland NSA with 0% of application and Spain NSA with 63% of application; and
 - Luxemburg did not provide data in its Monitoring Report, failing to comply with its reporting obligations, and the achievement of the target was not proved for second consecutive year.
- 4.1.12 From the State point of view, the following failed to achieve the intermediate 2017 target of applying RAT (i.e., 80%) to ATM-s occurrences:
- for the ATM-s Norway and Spain ANSPs with 78% and 68% of application, respectively; and
 - Luxemburg did not provide data in its Monitoring Report, failing to comply with its reporting obligations, and the achievement of the target was not proved for second consecutive year.
- 4.1.13 Ten (10) States have reported that their ANSPs were using some type of automated safety occurrences recording systems in 2018. Out of these States, nine of them collect information about SMIs, whilst one collects information on both SMIs and RIs. Ireland has reported that their ANSPs are testing such a system and implementation will be effective in the next years. This limited implementation does not include a harmonised definition of the events that trigger the capture of occurrences, as it may serve to different purposes for each ANSP. In addition, the use of the tool seems to aim at operational analysis and not to complement occurrence reporting.
- 4.1.14 At Union-wide level, the percentages of high severity occurrences over the total reported occurrences by SES Member States are 14% and 8% for SMIs and RIs, respectively, while show figures of 1% and 1% for AIs and ATM-S, respectively. This difference may be the result that SMI and RI occurrences bear

higher severity than AIs or ATM-s or that the assessment of severity of certain type of occurrences were biased by the analysts towards less/higher severe categories, or even a combination of both.

4.1.15 The reported occurrences at the EU level show different trends in 2018 with respect to 2017: while the number of SMIs has remained almost the same (in 2017 it increased by 2%), the reported number of RIs, AIs, and ATM-s occurrences have both increased by 14%, 5% and 6%, respectively (in 2017 the trends were -14%, -5%, and +4%). The reasons for the evolution in each FAB/State may be multiple and cannot be presently determined with certainty. Factors such as the introduction of Regulation (EU) 376/2014 in November 2015, the increase in the number of airports movements and controlled flight hours, issues with the coding of occurrences by the States (e.g. changes in criteria to report ATM-s occurrences) or the manual intervention in the extraction of occurrences from databases may have played a role in the variation of reported occurrences. Nevertheless, substantial increase, and similarly substantial decrease, is of concern and should be closely analysed by local NSAs and ANSPs. In particular:

- Baltic FAB should look into its increase of SMIs, AIs, and ATM-s;
- Blue Med should look into its increase of RIs and AIs;
- Danube should look into its increase of AIs;
- DK-SE FAB should look into its decrease of SMIs and AIs;
- FAB CE should look into its increase of SMIs and ATM-s;
- FABEC should look into its increase of RIs;
- NEFAB CE should look into its increase of RIs, AIs, and ATM-s;
- UK-IR FAB should look into its increase of RIs and AIs.

4.1.16 The EoSM results for the NM shows that the 2019 target has been achieved for the *Safety Culture* component. With regard all other components, *Safety Risk Management* is at the level of the 2019 target (level “D”) while the other two components, are at level “C” and need improvements to achieve the target level “D” at the end of the RP2. The component that requires more attention at is *Safety Assurance*. Current maturity levels and progress observed in previous years suggest that the NM will achieve the targets at the end of RP2. For RAT applicability, NM has reported 100% application of RAT to all ATM-s occurrences falling under the Performance Scheme, but these data have not been verified.

Annex I. Endnotes

-
- i Decision 2015/028/R of 17 December 2015 of the Executive Director of the Agency amending Decision 2014/035/R of 16 December 2014 ‘AMC and GM for the implementation and measurement of safety (Key) Performance Indicators (S(K)PIs)’ — Issue 2, Amendment 1.
- ii Commission Implementing Decision of 11 March 2014 setting the Union-wide performance targets for the air traffic management network and alert thresholds for the second reference period 2015-19 (2014/132/EU)
- iii The values for ATM Ground and ATM Overall scores of the application of RAT for the ATM-specific occurrences are identical, as there are no difference between ground and overall component in the method. The two targets for ATM-s ground and overall are effectively one single target.
- iv Decision 2014/035/R of 16 December 2014 of the Executive Director of the Agency adopting Acceptable Means of Compliance and Guidance Material for point 1 of Section 2 of Annex I to Regulation (EU) No 390/2013 and repealing Decision 2011/017/R of the Executive Director of the Agency of 16 December 2011 — ‘AMC and GM for the implementation and measurement of safety (Key) Performance Indicators (S(K)PIs)’ — Issue 2.
- v Decision 2015/028/R of 17 December 2015 of the Executive Director of the Agency amending Decision 2014/035/R of 16 December 2014 ‘AMC and GM for the implementation and measurement of safety (Key) Performance Indicators (S(K)PIs)’ — Issue 2, Amendment 1.
- vi The content of these questionnaires is provided in Appendix 1 to AMC2 SKPI and Appendix 1 to AMC3 SKPI of ED Decision 2014/035/R.
- vii ED Decision 2014/035/R - [http://easa.europa.eu/system/files/dfu/ED Decision 2014-035-R.pdf](http://easa.europa.eu/system/files/dfu/ED_Decision_2014-035-R.pdf)
- viii <http://www.easa.europa.eu/document-library/acceptable-means-of-compliance-and-guidance-materials/amcgm-skpi-issue-2-amendment>
- ix The content of these questionnaires is provided in Appendix 1 to AMC9 SKPI and Appendix 1 to AMC10 SKPI of ED Decision 2014/035/R.
- x The Regulation does not provide any indication of how Member States and their providers are expected to determine the severity of the reported occurrences.
- xi The EASA’s occurrence database collects accidents and serious incidents reported to EASA by Accident Investigation Authorities world-wide and which is augmented by other information collected by EASA. It captures the following: Accidents & serious incidents within EASA Member States (all mass categories), accidents to aircraft with MTOM > 2250kg (worldwide); serious incidents to aircraft with MTOM > 5700kg (worldwide).
- xii Note that the final investigation reports for some accidents and incidents may be delayed more than two years, particularly when the investigation is complex. This may have an impact on the update of some graphics in future publications, or with respect some graphics of past publications. In addition, the scope of the review may be changed in future reports depending on the added value for reviewing the ANS safety performance and on the improvement in data granularity and data quality.
- xiii See EASA Annual Safety Review 2019 (<https://www.easa.europa.eu/document-library/general-publications/annual-safety-review-2019>).
- xiv Three accidents in 2016, one accident in 2017 and four accidents in 2018.
- xv Note that an accident may be coded using more than one occurrence category either because several occurrence types are pertinent to the event or due to the presence of several events in the same occurrence report.
- xvi The occurrences are also coded with a category “ATM/ANS”, which in general terms, indicates that, either directly or indirectly, ATM/ANS had a contribution in that occurrence. This number is reported in the graph as individual category, but embedded in the colour coded of the other categories, indicating that concurrently occur with other types of occurrence description, such as mid-air collision or runway incursion, for instance.