

Performance Review Body Annex III – Safety Report

The 2021 monitoring consists of six reports:

1. PRB Monitoring Report 2021
2. Traffic light system for environmental performance
3. Annex I – Member States' factsheets
4. Annex II – Member States' detailed analysis for experts
5. **Annex III – Safety report**
6. Annex IV – Investments report

October 2022

TABLE OF CONTENTS

1	ABOUT THE DOCUMENT	3
1.1	<i>Background.....</i>	3
1.2	<i>Overview of safety KPIs and associated targets for RP3</i>	4
1.3	<i>Safety performance review</i>	6
1.4	<i>Verification process of Effectiveness of Safety Management.....</i>	7
1.5	<i>COVID-19</i>	8
2	SAFETY PERFORMANCE ANALYSIS.....	9
2.1	<i>ANS-related accidents and serious incidents.....</i>	9
2.2	<i>Effectiveness of Safety Management for ANSPs</i>	11
2.3	<i>Safety Performance Indicators.....</i>	13
3	NETWORK MANAGER	21
3.1	<i>Effectiveness of Safety Management – Network Manager.....</i>	22
3.2	<i>Over-deliveries</i>	22
3.3	<i>Top risks in the Network.....</i>	22
4	SUMMARY OF OBSERVATIONS.....	23

1 ABOUT THE DOCUMENT

- 1 The PRB Monitoring Report 2021 examines the performance of air navigation services (ANSs) in Member States of the Single European Sky (SES). The SES area comprises EU Member States, Norway, and Switzerland (hereafter defined as Member States).
- 2 The PRB Annual Monitoring Report 2021 is complemented by one additional report and four annexes to the Union-wide report with a detailed analysis of performance at local levels:
 - Traffic light system for environmental performance (produced by the PRB);
 - Annex I – Member States’ factsheets (produced by the PRB);
 - Annex II – Member States’ detailed analysis for experts (produced by Eurocontrol);
 - Annex III – Safety report (this document); and
 - Annex IV – Investments report (produced by the PRB).
- 3 This “Annex III – Safety Report” provides a detailed review of air navigation services’ and network functions’ safety performance in 2021. It uses data submitted by Member States and the Network Manager subject to the provisions of the SES performance scheme in RP3 (as laid down in Article 1 of Commission Implementing Regulation (EU) 2019/317).¹ Therefore, it covers the 27 EU Member States, Norway, and Switzerland.
- 4 This Annex was prepared by the European Union Aviation Safety Agency (EASA) in support to the Performance Review Body (PRB) of the Single European Sky (SES).
- 5 The first section provides an introduction to the safety KPA and a brief reminder of the safety key performance indicators (SKPIs) and associated RP3 targets as well as the safety performance indicators (SPIs). It also describes the process and methods used to collect data from various sources in order to create the review of safety performance in later sections.
- 6 The second section presents and analyses in detail the achieved performance in the SKPIs and SPIs during 2021. It also provides a comparison of safety performance against targets where applicable.
- 7 The third section provides an assessment of the SKPIs and PIs applicable to the Network Manager’s network functions during 2021.
- 8 The fourth and final section provides a summary of the safety performance achieved and observations regarding performance in 2021.

1.1 Background

- 9 The performance and charging scheme was created to improve the European air transport system in four key performance areas: safety, environment, capacity, and cost-efficiency. Commission Regulation (EU) 691/2010 established the principles of the scheme and the provisions of initial implementation during RP1, which ran from 2012 to 2014.² RP1 was considered a transitional period of three years, during which the key performance area of safety was limited to SPIs that were used for monitoring purposes only i.e. no target setting was involved.
- 10 Commission Regulation (EU) No 390/2013 aimed at improving the performance and charging scheme for RP2 (2015 – 2019). In particular, it introduced additional SKPIs with associated targets that were defined in Commission Implementing Decision 2014/132/EU.
- 11 For RP3 (2020 – 2024) the legal framework was again revised through Commission Regulation (EU) 2019/317. The new performance and charging scheme’s safety KPA was streamlined based on an EASA report authored by a working group of experts who aimed to reduce the safety reporting burden while maintaining effective safety performance monitoring. In addition, EASA produced supporting material for the implementation and measurement of the SKPIs.³

¹ Commission Implementing Regulation (EU) 2019/317 laying down a performance and charging scheme in the single European sky.

² Commission Regulation (EU) 691/2010 laying down a performance scheme for air navigation services and network functions and amending Regulation (EC) No 2096/2005 laying down common requirements for the provision of air navigation services.

³ EASA RP3 Safety Supporting materials (Parts A, B, C): https://webgate.ec.europa.eu/eusinglesky/sites/default/files/rp3_safety_-_supporting_material_part_b_skpi_spi_final.pdf.

- 12 Commission Implementing Regulation (EU) 2019/317 promulgated a single SKPI for RP3, namely the Effectiveness of Safety Management (EoS_M), which applies to ANSPs. Because of the pandemic, the EC revised the RP3 targets in Commission Implementing Decision 2021/891/EU; the targets for EoS_M remain the same as those defined before the pandemic in Commission Implementing Decision (EU) 2019/903.

1.2 Overview of safety KPIs and associated targets for RP3

- 13 A single SKPI is used to set targets for ANSPs for RP3 by Commission Implementing Regulation (EU) 2019/317: The **Effectiveness of Safety Management**. At a service provision level, the EoS_M measures an air navigation service provider's ability to manage an effective Safety Management System (SMS). The EoS_M SKPI was developed based on the CANSO Standard of Excellence measurement tool, which is based on the SMS framework of ICAO. It was adapted to meet the needs of the performance and charging scheme and to reflect modern safety management approaches.
- 14 The EoS_M considers five management objectives of a Safety Management System: Safety Policy and Objectives, Safety Risk Management, Safety Assurance, Safety Promotion and Safety Culture and measures the level of maturity for each of these objectives between level A and D (D being the best). The maturity is determined by assessing questionnaires that ANSPs complete and submit to their NSAs for verification.⁴
- 15 The performance and charging scheme introduced five additional SPIs which are for monitoring purposes only i.e. do not have associated targets that ANSPs must achieve. These are as follows:
- SPI1a: **rate of runway incursions (RIs) with a safety impact at Member State level**. SPI1a captures the total number of RIs with a safety impact that occurred at regulated airports in a Member State divided by the total number of IFR and VFR airport movements. It includes

all RIs that have been reported under Commission Regulation (EU) No 376/2014 irrespective of the main contributor of the occurrence i.e. individuals, air operators, aerodromes, or ANSPs. As such, this indicator is aggregated at Member State and Union-wide levels.

- SPI1b: **rate of separation minima infringements (SMIs) at Member State level**. SPI1b captures the total number of separation minima infringements with a safety impact that occurred within the airspace of all air traffic service units in a Member State. It is calculated as the total number of SMIs with a safety impact that occurred in a Member State's airspace divided by the total number of controlled IFR flight hours within the respective airspace. It includes all SMIs that were reported under Commission Regulation (EU) No 376/2014 irrespective of the main contributor of the occurrence i.e. airspace users, or ANSPs. As such, this indicator is aggregated at Member State and Union-wide levels.
- SPI1c: **rate runway incursions with ATS/CNS contribution at local (airport) level**. SPI1c is calculated as the total number of RIs with a safety impact that have any contribution from air traffic or CNS services at a specific airport divided by the total number of IFR and VFR movements at that airport.⁵ It includes only a subset of RIs that have been reported under Commission Regulation (EU) No 376/2014 i.e. only those RIs which an ANSP was identified as having a direct or indirect contribution in causing. This indicator aims to capture trends in RIs that are under the influence of the ATC provider at the airport concerned and thus is aggregated at the airport level only.
- SPI1d: **rate of separation minima infringements with ATS/CNS contribution at ANSP level**. SPI1d is calculated as the total number of SMIs with a safety impact that have any contribution from air traffic or CNS services divided by the total number of controlled IFR flight hours within the air navigation service provider's controlled airspace. It includes only a subset of SMIs that has been reported under

⁴ https://webgate.ec.europa.eu/eusinglesky/sites/default/files/rp3_safety_-_supporting_material_part_c_skpi_spi_final.pdf.

⁵ Occurrences with safety impact should be understood as those occurrences that may represent a risk to aviation. The way to identify these types of occurrences is using the safety risk grade red or amber in the European Risk Classification Scheme (ERCS) matrix when applied to SMIs and RIs, and the ground severity classification A, B, or C after applying the risk analysis tool (RAT) to SMIs and RIs with ATS/CNS contribution.

Commission Regulation (EU) No 376/2014 i.e. only those SMIs which an ANSP was identified as having a direct or indirect contribution in causing. This indicator captures all SMIs that occurred in the airspace where an ANSP provides its ATC services and thus is aggregated at the ANSP level.

- **SPI2: Application by the ANSPs of automated safety data recording systems.** SPI2 captures whether or not ANSPs use automated safety data recording tools to improve the gathering of occurrence data (SMI and RIs) and analysis by the organisations' SMS.

wide targets for the EoSM SKPI as defined in Implementing Decision 2021/891/EU.⁶

- 16 An overview of all SKPIs and SPIs used in RP3 is presented in Table 1. Table 2 shows the Union-

SKPI	Target level
Effectiveness of Safety Management (EoSM) for ANSPs	Union-wide and local
SPIs	
Rate of runway incursions (RIs) with a safety impact at State level	None
Rate of separation minima infringements (SMIs) at State level	None
Rate runway incursions (RIs) with ATS/CNS contribution at local (airport) level.	None
Rate of separation minima incursions (SMIs) with ATS/CNS contribution occurred under control of an ANSP	None
Application by the ANSPs of automated safety data recording systems where available, which shall include, as a minimum monitoring of SMIs and RIs.	None

Table 1 – List of the safety KPIs and PIs applicable in RP3.

Effectiveness of Safety Management (EoSM)		2020	2021	2022	2023	2024
ANSP level	Union-wide target for Safety Risk Management Objective					D
	Union-wide target for all other MOS ⁷					C

Table 2 – RP3 target for EoSM. The target is set for the last year of RP3 only.

⁶ Commission Implementing Decision of 2 June 2021 setting revised Union-wide performance targets for the air traffic management network for the third reference period (2020-2024) and repealing Implementing Decision (EU) 2019/903 (2021/891/EU).

⁷ EoSM contains five management objectives: safety policy and objectives, safety risk management, safety assurance, safety promotion and safety culture. Safety risk management is targeted separately while the other four management objectives are targeted as a group.

1.3 Safety performance review

- 17 The safety performance review is based on data submitted by Member States. Through their NSAs, ANSPs submit Performance Monitoring Reports (PMRs) to the European Commission (EC) by the 1st June of each year. This enables EASA and the PRB to monitor Member States' safety performance against their performance plans and targets. ANSPs are also required to annually complete and submit EoS questionnaires to their NSA for verification. This is done before NSAs submit their PMRs, and it provides the European Commission with verified EoS data. NSAs summarised verified EoS data in their final PMRs.
- 18 In order to facilitate the monitoring tasks of Member States, the Performance Review Unit (PRU) of Eurocontrol and EASA provided them with a template that asked for all the data needed to enable a comprehensive safety performance review.
- 19 These templates, together with the PMRs, were assessed by the PRB, PRU, and EASA resulting in the preparation of this annex.

Data sources to populate performance indicators

- 20 Two main data sources were used to gather safety data concerning the EoS SKPI. These two sources are:
 - Questionnaires that were completed by ANSPs and the Network Manager concerning their EoS. Member States submitted the completed verified questionnaires at the ANSP level. EASA did not verify ANSP responses to the questionnaires as this was the responsibility of NSAs who have oversight authority. The NSA verification process relied on cross-referencing evidence that is reported with the results of ANSPs' oversight activities. However, EASA did verify the NM's responses as oversight authority.
 - SPI1a, SPI1b, SPI1c, SPI1d, and SPI2 were computed using information gathered from the submitted PMRs. This data was taken directly from what Member States reported in their PMRs without further verification against the occurrences reported in the European Central

Repository (ECR), as foreseen by the RP3 safety supporting material.

- 21 For the calculation of the indicators related to SMLs and RIs (SPI1a, SPI1b, SPI1c, and SPI1d), RP3 safety supporting material requires that occurrences data reported in the ECR under Commission Regulation (EU) 376/2014 is used. ANSPs and NSAs should ensure that the information provided through the ECR reporting contains the information needed to compute the performance indicators for monitoring SMLs and RIs. EASA would extract the information needed to calculate the SPIs which are then sent to Member States for verification and elaboration in their PMRs.
- 22 However, this year EASA could not extract data from the ECR containing all needed information to compute the SPIs, and therefore the SPI data was not sent to Member States for verification. A significant part of occurrences extracted from ECR had not encoded information on severity and risk, as required to compute the SPIs. Member States had to extract the occurrences from their own national databases with no further involvement from EASA.
- 23 For the calculation of the indicators related to SMLs and RIs (SPI1a, SPI1b, SPI1c, and SPI1d), the occurrences that should be used in the computation of the different rates are only those that have a "safety impact". Whether an occurrence has a safety impact or not should be determined by NSAs using the common European Risk Classification Scheme (ERCS), and by ANSPs using the severity classification using the Risk Analysis Tool (RAT).⁸ This information was barely found encoded in the ECR's occurrences.
- 24 Nevertheless, the delegated act that regulates the application of ERCS is entering into force as from 1st January 2023, so the application of it was voluntary during 2021. ANSP's use of the RAT was close to 100% at the end of RP2, but its use is not mandated in RP3. Because EASA has not been able to verify the data submitted, this report relies on the correct application of the ERCS and RAT by NSAs and ANSPs, respectively, in order to report the SMLs and RIs that have a safety effect.
- 25 It is likely that some are not applying the ERCS and RAT resulting in greater subjectivity in ANSP and

⁸ See EASA RP3 Safety supporting materials Part B (https://webgate.ec.europa.eu/eusinglesky/sites/default/files/rp3_safety_-_supporting_material_part_b_skpi_spi_final.pdf).

NSA interpretations of what constitutes an occurrence that had a safety impact. Nevertheless, this does not invalidate the analysis, but it should be taken into consideration when interpreting the data. At least one Member State (Sweden) declared that it was not able to identify occurrences that had a safety effect. In future years of RP3, Member States should ensure that both, the RAT severity and the ERCS risk score, are encoded for each occurrence to allow EASA to compute independently the SPIs. Otherwise, they will have to extract and submit the occurrences used in the computation of the SPIs themselves.

Exposure data

26 The indicators for monitoring the SPIs related to occurrences are normalised using the following exposure data:

- RIs are normalised by the number of IFR and VFR movements at an airport. It is calculated as the sum of take-offs and landings performed under IFR and VFR rules at an airport. NSAs included these figures in their PMRs.
- SMIs are normalised by the number of controlled flight hours in the controlled airspace of an ANSP. It is measured as hours of flight under IFR rules that are under the separation control of ANSPs. The Network Manager is best placed to consistently report this for European ANSPs. Since some ANSPs provide cross-border services, the measure of flight hours is based on two different measure-

ments depending on the indicator. The indicator in paragraph (b) of Section 1 of Commission Implementing Regulation (EU) 2019/317 is calculated using flight hours within the Member States' boundaries, while the indicator in paragraph (d) of Section 1 of the same regulation is calculated using flight hours controlled by a given ANSP.

1.4 Verification process of Effectiveness of Safety Management

- 27 The EoSM indicator is measured by the verified responses to questionnaires completed by ANSPs, which results in a double metric: a numerical score and a maturity level.⁹ Each question is scored between 0 and 100 (100 being the best) and the maturity level is measured between level A and D (D being the best). Table 3 provides a brief description of the requirements to reach each maturity level. ANSPs select the maturity level that best describes their organisation and provide evidence along with a justification in support of the level selected.
- 28 NSAs verify the evidence submitted and cross-check it with the results of their oversight processes. If necessary, the level of maturity and score is corrected based on the oversight activities. The resulting maturity levels and score are submitted to EASA and to the EC in the PMRs. The scoring and levels should be determined in accordance with the supporting material published in the ESSKY web portal (EASA RP3 safety supporting materials Parts A¹⁰, B¹¹, C¹²).

Level A - Informal Arrangements	Level B - Defined	Level C - Managed	Level D - Assured
SMS processes and/or requirements have not been agreed at the organisation level; they are either not routinely undertaken or depend on the individual assigned to the task.	SMS processes and/or requirements are defined but not yet fully implemented, documented or consistently applied.	SMS processes and/or requirements are fully documented and consistently applied.	Evidence is available to provide confidence that SMS processes and/or requirements are being applied appropriately and are delivering positive, measurable results.

Table 3 – Generic principles for each implementation level.

⁹ 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.

¹⁰ https://webgate.ec.europa.eu/eusinglesky/sites/default/files/rp3_safety_-_supporting_material_part_a_skpi_spi_final.pdf.

¹¹ https://webgate.ec.europa.eu/eusinglesky/sites/default/files/rp3_safety_-_supporting_material_part_b_skpi_spi_final.pdf.

¹² https://webgate.ec.europa.eu/eusinglesky/sites/default/files/rp3_safety_-_supporting_material_part_c_skpi_spi_final.pdf.

1.5 COVID-19

- 29 The COVID-19 pandemic has continued affecting profoundly the aviation sector in 2021, for a second year. Not only did it continue with travel restrictions and reduced air travel demand, with the associated impact on the revenues of airlines, ANSPs, and airports, but it also maintained other recently new hygiene and safety standards, and possibly altered passenger behaviour.
- 30 2021 experienced some lifting of the restrictive measures of 2020. IFR movements in 2021 increased with respect to 2020 by approximately 22%, but was still below 2019 levels by around 49%. In total, 6.2 million flights operated in 2021 compared with 10.8 million in 2019. This traffic drop led to less congested aerodromes and airspace which benefitted safety performance in terms of reducing the number of accidents, serious incidents, and occurrences compared to 2019.
- 31 The pandemic negatively impacted other aspects of airline, ANSPs, and airport operations with potential safety consequences i.e. severely impacting resources, both economic and human, dedicated to safe operations. For example, lack of practice of pilots and controllers due to fewer flights could have safety implications. EASA has published a Review of Aviation Safety Issues Arising from the COVID-19 Pandemic, and the latest version was published in April 2021.¹³
- 32 This annex does not intend to scrutinise the effects of these factors, but seeks to highlight the main effects that may have impacted the safety performance of ANSPs in 2021.

¹³ <https://www.easa.europa.eu/downloads/127172/en>.

2 SAFETY PERFORMANCE ANALYSIS

- Rate of accidents and serious incidents remained at similar level as in 2021.
- 17 ANSPs out of 36 achieved the EoS targets on all management objectives for RP3 in 2021.
- Ten ANSPs reported using some form of automated safety data recording systems for SMLs, with three of them using them for RI too.

2.1 ANS-related accidents and serious incidents

33 This section presents a review of ANS-related accidents and serious incidents, as defined by ICAO Annex 13, covering the 10-year period from 2012 to 2021. The scope of the review includes commercial air transport (CAT) fixed-wing aeroplanes above 2,250 kg maximum take-off mass and covers the 27 EU Member States, Norway, and Switzerland. The data uses information from EASA's Occurrence Database.¹⁴

34 This analysis is not required by the Commission Implementing Regulation (EU) 2019/317 since it is not one of the SKPI or SPIs, but it brings added value to the performance review of safety as it provides an overview of the ANS related accidents and serious incidents at Union-wide level.¹⁵

35 '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 the 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.

36 Figure 1 (next page) shows the number of accidents and serious incidents per year that are related to the provision of ANS, alongside a rate of accidents and serious incidents calculated using the number of flight hours performed within the SES area. In the ten-year period analysed, most of

the ANS-related accidents reported were non-fatal (54 out of 56). The last fatal accident was in 2012 when two accidents were reported.

37 The data shows the rate of accidents and serious incidents reached a minimum in 2021 with fluctuations around a plateau in recent years. The absolute number of accidents has remained low for the entire period, with a maximum of 11 in 2014 and a minimum of one in 2017. In 2021, two ATM-related accidents were recorded (all without fatalities). These accidents were both related to turbulence encounters. This observation is also reflected in other reporting of aviation system safety such as the European CAT accident rate.¹⁶

38 Figure 2 (next page) shows the number of accidents and serious incidents with a contribution by ANSs per year alongside a rate of accidents and serious incidents calculated using the number of flight hours performed within the EU. The rate of accidents and incidents is a more appropriate metric to directly measure the performance of the ANSs safety system, and it shows a remarkable safety record. The data shows a decreasing trend in the rate of accidents and serious incidents since 2011 with a plateau reached in the last five years. The accidents and serious incidents reflected in Figure 2 (next page) were all non-fatal in that period.

39 In 2021, the controlled flight hours were still reduced from the 2019 level due to the COVID-19 pandemic. However, and despite the low number of accidents and serious incidents, the rate remained approximately constant. Four serious incidents were registered in 2021 related to several causes: Question Nautical Height (QNH) read-back error, unsafe ATC clearance, mid-air encounter

¹⁴ The EASA's occurrence database collects accidents and serious incidents reported to EASA by Accident Investigation Authorities worldwide and 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).

¹⁵ 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.

¹⁶ <https://www.easa.europa.eu/document-library/general-publications/annual-safety-review-2021>.

with the traffic collision avoidance system (TCAS) triggered, and near collision with a ground vehicle on the runway (RWY).

- 40 This suggests that, overall, safety issues with ANS contribution have improved since the introduction of the performance and charging regulation,

even though there is no evidence of a causal effect. This observation should thus be taken cautiously due to the low number of events considered. It could be concluded that ANSPs are acceptably managing the safety risks that directly relate to the services provided.

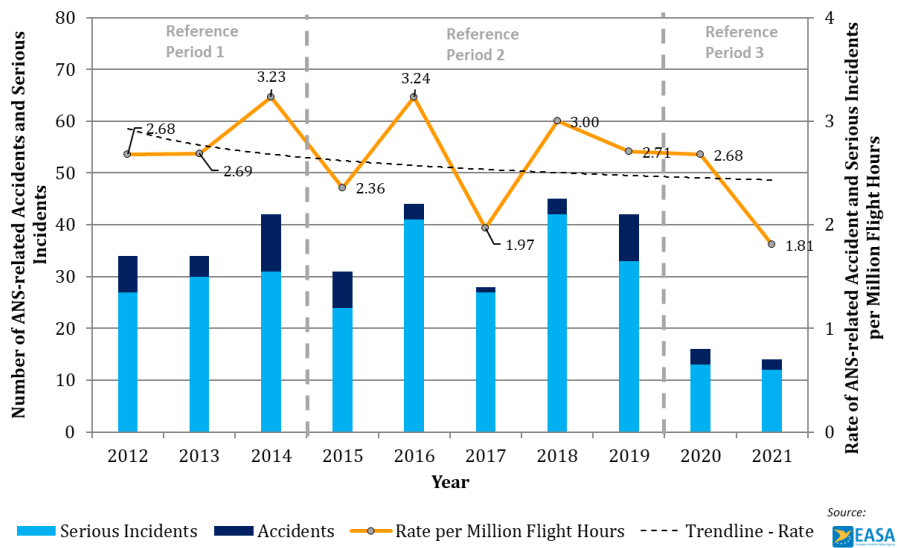


Figure 1 – ANS-related accidents and serious incidents (2012-2021).

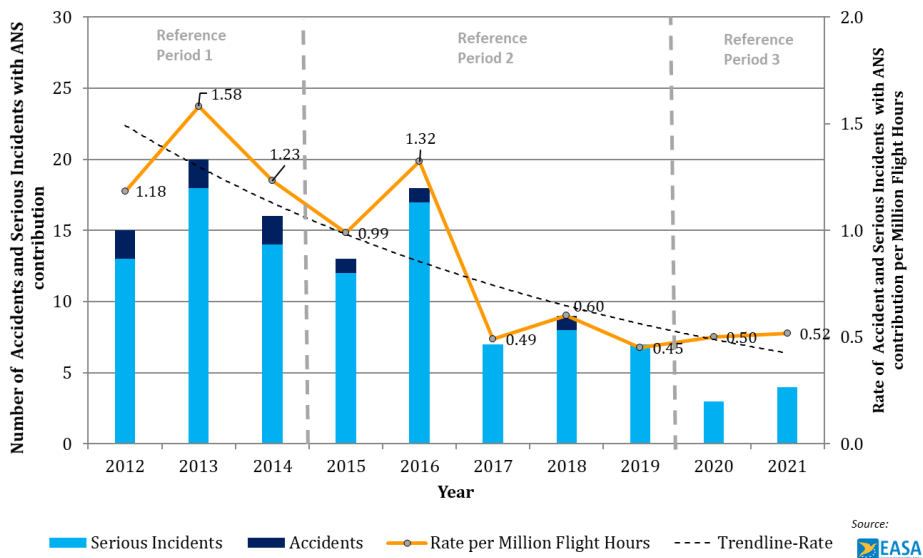


Figure 2 – ANS contribution accidents and serious incidents (2012-2021).

41 Figure 3 shows that the proportion of occurrences with ANS contribution is lower within ANS-related accidents than within ANS-related serious incidents considering all data since the introduction of the performance scheme. This indicates that ANSs have a lower contribution to the highest severity type of occurrences, i.e. accidents.

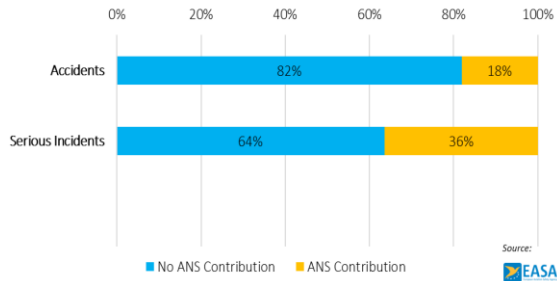


Figure 3 – Proportion of ANS contribution in accidents and serious incidents (2012-2021).

2.2 Effectiveness of Safety Management for ANSPs

42 This section reviews the safety performance as measured by the EoSM SKPI for ANSPs.

43 In RP3 the EoSM for ANSPs is measured using a revised set of questions to determine the minimum level of maturity for each management objective. Furthermore, the levels of maturity were rescaled for RP3. In RP2, they ranged between level A and E whereas the levels now range between A and D

(with level D being the best performance). This means that Level D in 2019 and Level D in 2021 are not equivalent i.e. Level D in RP3 required a higher level of rigour and increased responsibilities under the change management process as contained in the Commission Implementing Regulation (EU) 2017/373.

44 36 ANSPs are included in the scope of the performance scheme in RP3 including MUAC over the airspace of Belgium, Luxembourg, the Netherlands, and Germany. Between 2020 and 2021, five additional ANSPs were added to the performance scheme as part of the update of the Performance Plans (three ANSPs in Sweden and two ANSPs in Poland). In addition to the main en-route ANSPs, there are six ANS providers at terminal or approach airports included, namely FERRONATS in Spain, Port Lotniczy Bydgoszcz and Warmia i Mazury Ltd in Poland, and ACR, ARV - Arvidsjaur and SDATS in Sweden.

45 Figure 4 shows the EoSM results achieved by ANSPs in 2021. The analysis shows that:

- 18 out of 36 ANSPs achieved the 2024 RP3 target level D for safety risk management.
- 29 out of 36 ANSPs achieved the 2024 RP3 target level for all other MOs (the four management objectives other than safety risk management).

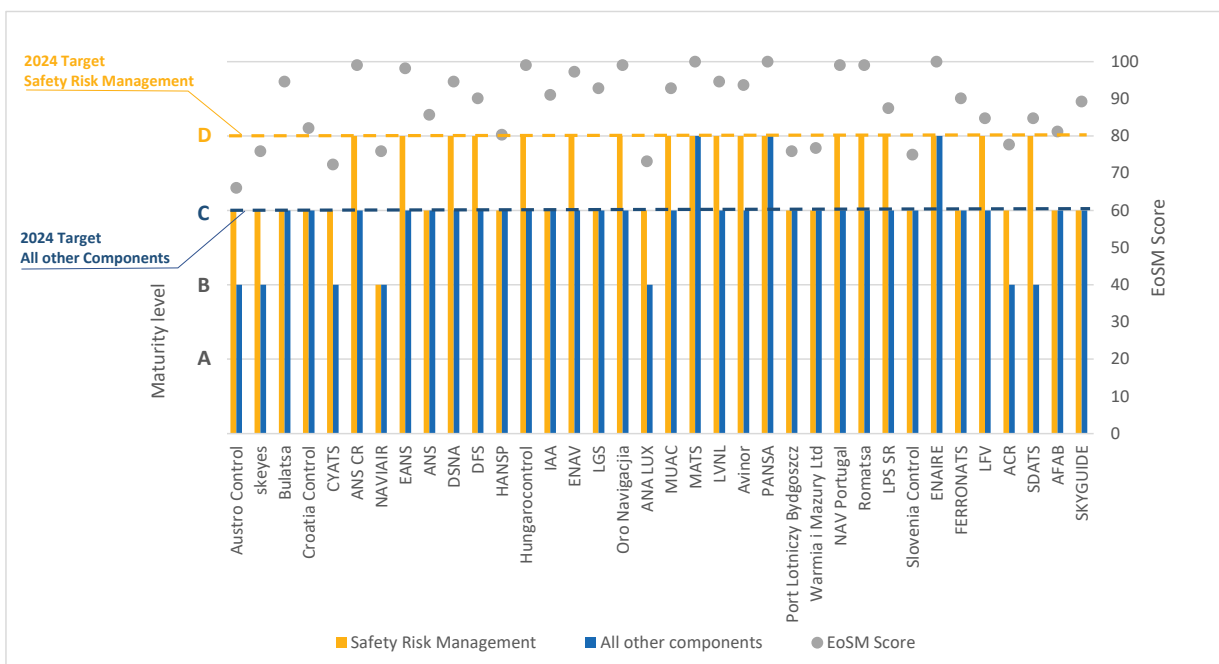


Figure 4 – 2021 ANSP EoSM responses for risk management and other management objectives (MOs). Safety risk management has a target of level D in 2024 and the other MOs have a target level C in 2024.

- 17 out of 36 ANSPs achieved the 2024 EoSM targets on all MOs for RP3.

- 46 The average EoSM score achieved by all ANSPs is 88. The minimum score achieved by an individual ANSP is 66, while the maximum EoSM score is 100, which is already achieved by three ANSPs.
- 47 18 ANSPs reported achieving level D for the safety risk management objective, however EASA standardisation visits showed that not all claims are supported by the evidence. EASA reported that several ANSPs had difficulties in properly implementing the new change management process in Commission Implementing Regulation (EU) 2017/373, which also embeds a risk assessment process.
- 48 Figure 5 shows ANSPs' aggregated responses to the EoSM questionnaire per management objective. It reveals that safety risk management must improve the most to achieve the 2024 target level D (improvement in 43 questions needed). For the other management objectives, safety policy & objectives and safety culture are in need of most improvement to achieve the 2024 target level C (improvement in nine questions needed in each area).

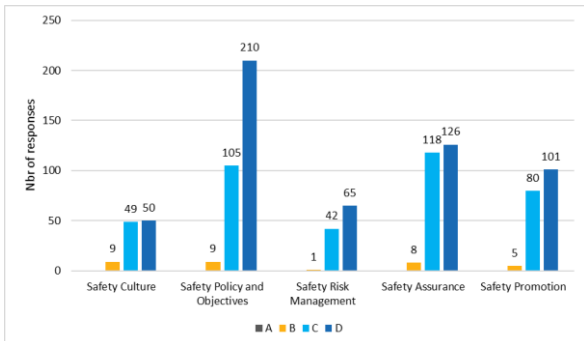


Figure 5 – ANSP's aggregated EoSM responses per management objective. The target response for risk management is level D while it is level C for the other management objectives.

- 49 Figure 6 shows the maturity levels achieved by the ANSPs in each management objective. 18 ANSPs did not reach the target level D for the safety risk management objective, four ANSPs did not reach the safety culture and safety policy & objectives management objectives, five ANSPs did not achieve the assurance management objective, and four ANSPs did not achieve the promotion management objective.

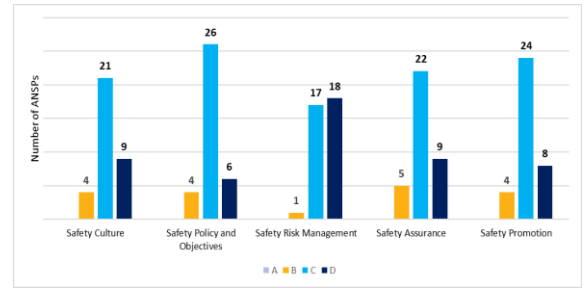


Figure 6 – Number of ANSPs achieving various EoSM levels per objective. The target response for risk management is level D while it is level C for the other management objectives.

- 50 The EoSM questionnaire was supplemented with a new management objective that aimed to capture how ANSPs manage interdependencies and trade-offs between safety and other business objectives i.e. how the organisation assigns and distributes resources to ensure safe provision of ATS. This objective is not targeted in RP3 and not included in the EoSM scoring.
- 51 Figure 7 shows that the majority of ANSPs are at maturity level C for this supplemental management objective. There is room for improvement since four ANSPs are at level B. This is particularly important during and after the pandemic when the pressures to trade-off resources towards other business objectives of the organisation are intensified due to loss of traffic and revenues.

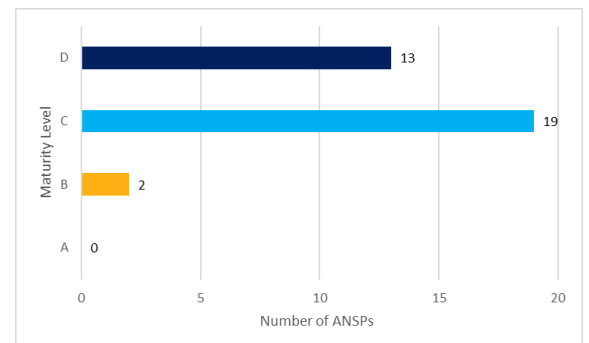


Figure 7 – Number of ANSPs per achieved maturity level in the management of interdependencies management objective.

- 52 Some ANSPs that achieved Level D in safety risk management during RP2 (and were therefore anticipated to achieve Level C in the first year of RP3) are still achieving Level D. These claims are made despite a higher level of rigour required and the increased responsibilities under the change management process as contained in Commission Implementing Regulation (EU) 2017/373, and during the many difficulties encountered during the COVID-19 pandemic. Over the remainder of RP3,

maturity levels will be cross-checked against EASA standardisation data to ensure verification of ANSPs’ responses is completed properly.

- 53 Figure 8 depicts the number of ANSPs that have achieved maturity levels on or above the targets compared with the planned maturity levels in the draft performance plans. For the safety risk management objective, the achieved levels were better than ANSPs planned. 11 ANSPs planned to achieve the safety risk management target in 2021, but 18 ANSPs ended up achieving the targets. The reason why these ANSPs achieved the target and did not plan to is difficult to explain, but they may have been conservative in their plans or the NSA may have applied a more relaxed level of rigor in verifying ANSPs responses.

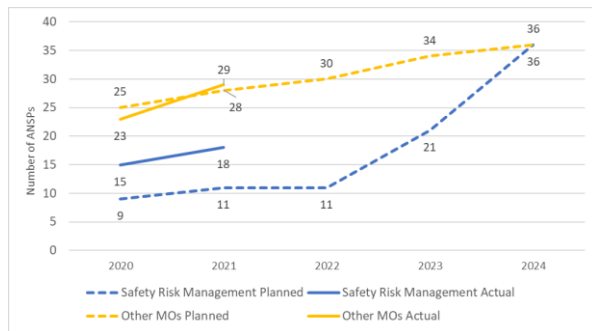


Figure 8 – Planned and actual performance on EoS M - Number of ANSPs on or above targets.

- 54 During the remainder of RP3, the cumulative standardisation data will show which Member States are performing a less rigorous verification of ANSP responses. More comprehensive data will allow assessing the performance per ANSP.

2.3 Safety Performance Indicators

- 55 This section describes the 2021 safety performance as measured by the safety performance indicators as defined in section 1.2.

Rates of separation minima infringement and runway incursion occurrences

- 56 As described in section 1.2, four SPIs are used to capture the rates of separation minima infringements and runway incursions per number of flights hours controlled by ACCs and airport movements respectively at regulated airports. The most informative information that can be derived from these SPIs is the evolution of the metrics across

several years. However, only two years of RP3 are available, and a like for like comparison with respect to previous years is not ideal since the occurrences captured by the SPIs in RP2 were different in scope. In RP2, the number of occurrences monitored included all types of occurrences regardless of the level of associated risk and severity. In RP3, only SMIs and RIs with a safety impact are monitored. In addition, two of the SPIs aim to capture occurrences that have an ATS/CNS contribution and the airports included in the performance plans are also different.

- 57 Furthermore, benchmarking of rates between ANSPs and Member States is not possible since there are additional factors that may influence the results that are unrelated to ANSPs i.e. differences in the reporting culture, differences in interpretation of occurrence definitions, use of different tools, or interpretation of results. The identification of occurrences that have ATM/CNS contribution is not a straightforward exercise and is subject to interpretations and subjective judgement that can differ from one ANSP and NSA to another. The limitations described in section 1.3 must be taken into consideration.

Union-level view

- 58 Table 4 lists the average number of SMIs per 100,000 controlled flight hours in Union-wide airspace and also the average Union-wide number of RIs per 100,000 airport movements. The absolute numbers of each type of occurrences are also provided.

Occurrence	Union-wide Rate ¹⁷	Number of Occurrences
SPI1b: SMI	9.0	692
SPI1a: RI	6.1	569

Table 4 – Union-wide rates of all SMIs and RIs (with safety impact) in 2021.

¹⁷ Number of occurrences of certain type per 100,000 exposure unit, i.e. airport movement in the case of RIs rates or IFR controlled hours in case of SMIs rates.

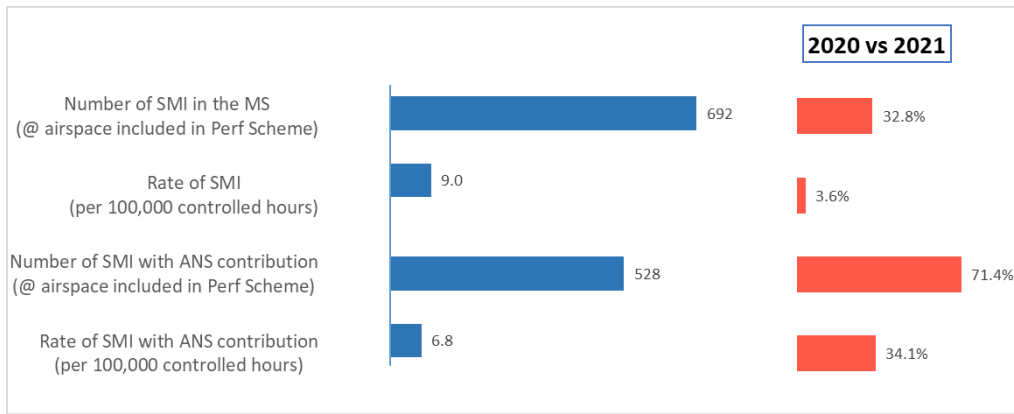


Figure 9 – Number and rates of SMIs with safety impact in the airspace where the Performance Scheme applies aggregated at Union-level in 2021 and their trend when compared with 2020 values. Rates are calculated by 100,000 controlled hours.

- 59 Figure 9 provides an overview of the SMI with safety effect, both in absolute numbers and rates per 100,000 controlled hours in the SES airspace. It includes the indicator that considers the SMI with ANS contribution too (SPId). In addition, the figure shows the trend in 2021 compared with 2020 values.
- 60 The increase in traffic levels in 2021 has naturally resulted in an increase of SMI occurrences of types, namely regardless the factors involved and those with ANS contribution, by 32.8% and 71.45%, respectively. Similarly, the rates have experienced an increase of 3.6% and 34.1%, respectively. The increase of SMI with ANS contribution has experienced greater increase.
- 61 Figure 10 provides an overview of the RI with safety effect, both in absolute numbers and rates per 100,000 movements at the airports included in the Member States Performance Plans. It includes the indicator that considers RIs with ANS contribution too (SP1c). In addition, the figure shows the trend in 2021 compared with 2020 values.

- 62 The increase in traffic levels in 2021 has not resulted in an increase of the indicators of all types of RIs. The rate of RIs of all types and with ANS contribution has decreased by 8.4% and 31.7%, respectively, while only the number of RIs increases (by 6.8%). The number of RIs with ANS contribution decreased by 4.3%.
- 63 With regard SP11c and SP11d (the rates of occurrences, i.e. RIs and SMIs, that only consider occurrences with ANS/CNS contribution), the rates experienced opposite trends. While the rate of SMIs increased by 34.1%, the rate of RI decreased by 31.7%. The values for SMIs and RIs rates were 6.8 and 1.2, respectively. This indicates that ANS and CNS services contributed to greater extent to SMIs than to RIs, and that this effect was more prominent in 2021. In other words, ANSPs have greater influence and managerial control of ensuring separation between aircraft in the airspace than in preventing the incursionary presence of an aircraft, vehicle, or person on the runway of an airport.

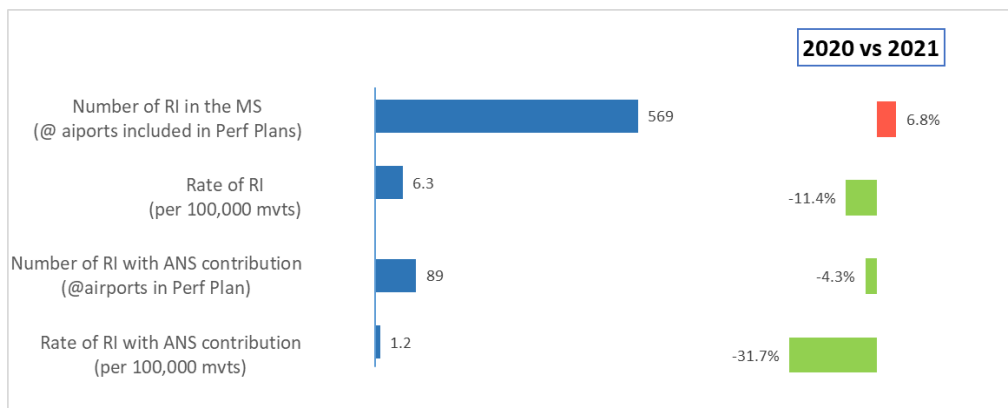


Figure 10 – Number and rates of RIs with safety impact at the airports included in the Performance Plans aggregated at Union-level in 2021 and their trend when compared with 2020 values. Rates are calculated by 100,000 movements at those airports.

Local-level view

- 64 Figure 11 illustrates the rates of SMIs with safety impacts that occurred within the airspace included under the responsibility of each Member State. The rate is reported as the number of occurrences per 100,000 controlled flight hours.
- 65 The highest rate occurred in Luxembourg (43.8). Because the number of controlled hours is very small in its airspace, any small increase in absolute number of occurrences results in very significant changes in the rate, as it has been the case in 2021. Luxembourg has reported training of new ATCOs completed together with a new simulator. ANA (Luxembourgish ANSP) will monitor the ATCO refresher training to make special emphasis on SMI early detection, avoidance and recovery to reduce current rate.
- 66 The Netherlands includes all infringements in MUAC due to unavailability of MUAC data split across the four Member States responsible for the airspace.
- 67 On the opposite side, three Member States (Croatia, Latvia and Lithuania) reported no SMIs within their airspace. Only Bulgaria is missing in the graph as no data was reported.

Sweden declared it was not able to identify occurrences with safety impacts and thus reported all types of SMIs regardless of the associated safety risk. This means that the number of SMIs is higher and not comparable to other Member States.

- 68 Ireland, Lithuania, and Slovenia reported that they use Acceptable Level of Safety Performance (ALoSP) targets in its indicators.
- 69 Several States (Portugal Spain, Slovenia, Croatia, Belgium) reported that SMI is a safety area addressed in their State Safety Plans, and part of monitoring, periodic safety promotion and training efforts.
- 70 Most of States reported the processes established by NSAs to oversee ANSP performance and their safety management system, as a measure to keep control over the SMI indicators. No other specific measures were reported to mitigate associated risks to SMIs.

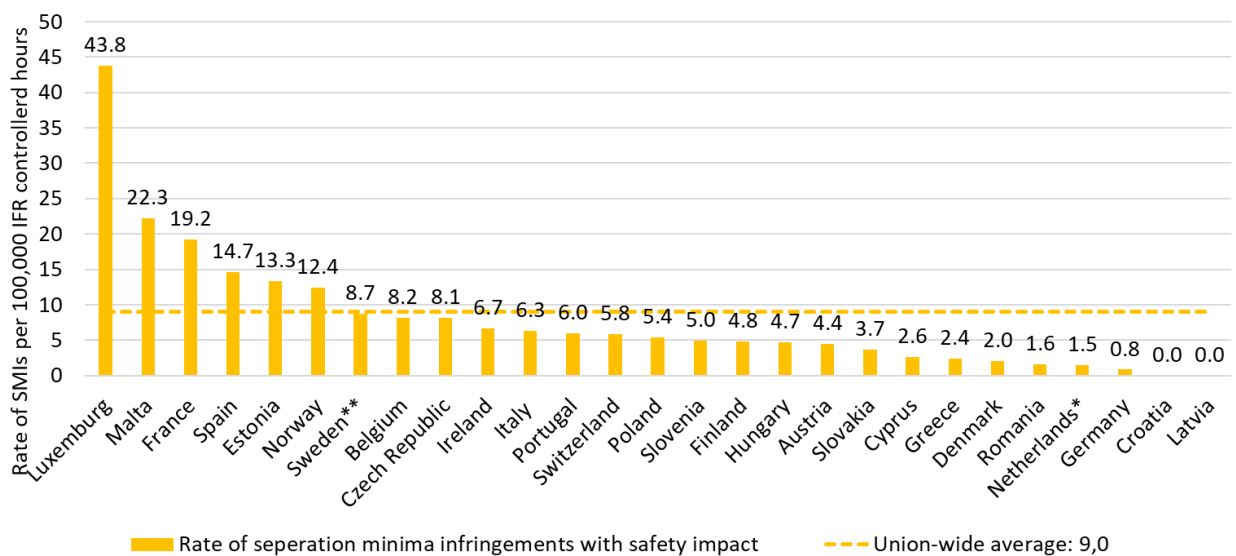


Figure 11 – Rates of separation minima infringements with safety impact by State. *Member State reported that all SMIs in MUAC have been assigned to NL (due to unavailability of MUAC data split over the four States). **Member States reporting all SMIs (not limited to those with safety effects).

- 71 Figure 12 illustrates the rates of RIs with safety impact that occurred at the airports included in the performance plans (grouped by Member State). The rate is reported as the number of occurrences per 100,000 airport movements. The highest rate occurred in Malta (30.77), followed by Sweden (26.8), although Sweden declared it was not able to differentiate occurrences that had a safety impact and therefore reported all types of RIs regardless of the associated safety risk. This means that the number of RIs in Sweden is higher, and so the rate is not comparable to other Member States.
- 72 Some Member States are not shown in the figure. Bulgaria, Cyprus, Croatia, Lithuania, Slovenia and Slovakia did not include any airport in their performance plans and so are not obliged to report RIs.
- 73 Four Member States (Sweden, Norway, Spain, Greece) reported the RIs at all airports within their territory, not exclusively those included in their performance plans, which may explain why three of these Member States show the highest rates in the graph.
- 74 Malta reported that its rate of RIs can be explained due to the increase in General Aviation (GA) traffic in this period still influenced by the COVID pandemic, as the results of RI investigations have

shown. Many of these RIs were located in the airport infrastructure used mainly by GA. Investigations and lessons learnt were disseminated among ATCOs and aerodrome operator.

- 75 Several States (Switzerland, Romania, the Netherlands, Latvia, Estonia and Poland) reported that Local Runway Safety Teams (LRSTs) are established at their airports, and that runway incursions are safety areas addressed in their State Safety Plans, and part of periodic safety promotion efforts. Other specific measures to reduced RI were reported as effective, e.g.:

- The Czech Republic and the Netherlands have implemented stop bars, which have proven to be a very effective mitigating measure.
- Luxembourg has implemented specific measures to reduce involvement of ground vehicles drivers. A continue education and awareness programme of aerodrome drivers has been established, with refresher driver training every five years and a two-year proficiency check. Drivers can voluntarily request simulator training if they want to.
- Specific ATCO training focused on GA traffic has been organised in Malta.
- The Netherlands implements refresher training for ATCOs with special attention for Runway Incursion Hotspots.

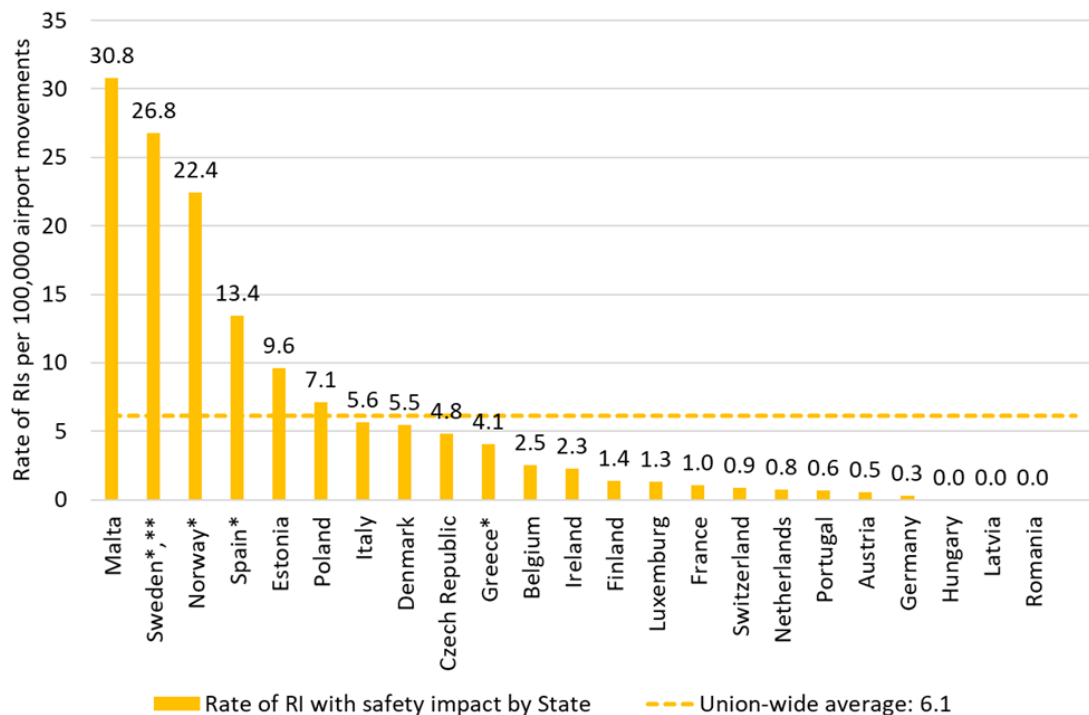


Figure 12 – Rates of runway Incursions with safety impact by State. *Member States reported RIs at all airports (not limited to airports in their performance plans). **Member States reported all RIs (not limited to those with safety effects).

- 76 Figure 13 shows the rates of SMIs and absolute number of SMIs that had an ATS/CNS contribution to the occurrence. The change in the rate value with respect to 2020 is also represented as a percentage. Only 24 ANSPs reported SMIs which had an ATS/CNS contribution.
- 77 The highest rate of SMIs was in LVNL airspace (49.9 SMIs per 100,000 flight hours), which results from the third highest absolute numbers of occurrences (47 SMIs). The rate has also experienced an increase of 31.7% with respect to 2020. LVNL has a good record in the EoS questionnaires having achieved the 2024 safety target in all objectives. Nevertheless, LVNL should not be complacent, and continue assessing occurrences and risk mitigate them according to their SMS, if necessary.
- 78 The highest number of SMIs with ANS contribution occurred in DSNAs's airspace (228), but the high number of controlled hours results in lower

rate (16.7), but which is still above the Union average.

- 79 The rate increased by 32,1 % with respect to 2020. DSNAs should not be complacent, and continue assessing occurrences and risk mitigate them according to their SMS, if necessary.
- 80 Other ANSPs with high rates and that experienced a high increase in 2021 are ANA LUX and Skeyes. For both it is noted that the number of controlled hours is relatively low, hence the sensitivity of the rate to variations in the number of SMIs. Their EoS maturity levels are below target and with room for improvement. Both should monitor carefully SMIs in the next years, while improving the maturity of their SMS to achieve the EoS target, looking into the reasons contributing to this rate and take appropriate mitigating actions, if necessary.

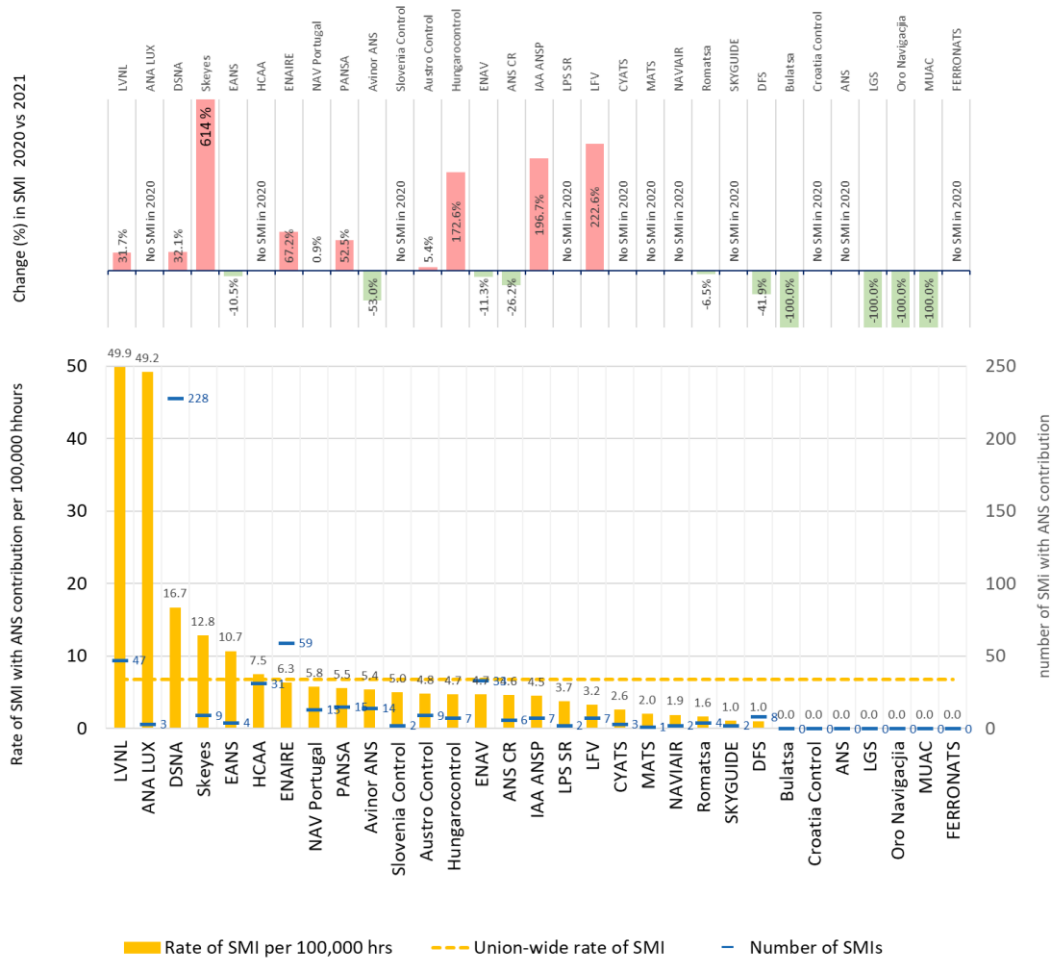


Figure 13 – Rate of separation minima infringements with ATS/CNS contribution by ANSP.

81 Figure 14 depicts the rates of RIs and absolute number of RIs that had an ATS/CNS contribution per airport. Out of 146 airports included in the performance plans, only 41 airports reported RIs that had any ATS/CNS contribution. For better readability, the 105 airports included in the performance and charging scheme that reported no RIs are not shown in the figure. The majority of the 41 airports reported one or two RIs. This makes the rates of runway incursions at airports with a low number of movements very sensitive to the presence of occurrences. For example, within the top ten airports with the highest rates of runway incursions, eight out of ten had fewer than 35,000 airport movements. To illustrate this fact, the airport with the highest rate of runway incursions (EPLL - Lodz-Lublinek) had only 3,076 movements and three RIs.

82 The airport with more than 80,000 movements and the highest rate of RIs at 8.5 per 100,000 movements is LEMG (Málaga) followed by LKPR (Prague) and ENGM (Oslo-Gardermoen) (6.4 per 100,000 movements each one). LEMG uses an automatic recording tool to identify RIs, which may have an effect on the number of reported events. ENAIRE, ANS CR, and Avinor who are responsible for the provision of ANS services at LEMG, LKPR, and ENGM, respectively, have a good record in the EoS questionnaires in managing safety risks (maturity D). Nevertheless, these providers should consider looking into the reasons contributing to these rates and take appropriate mitigating actions, if necessary.

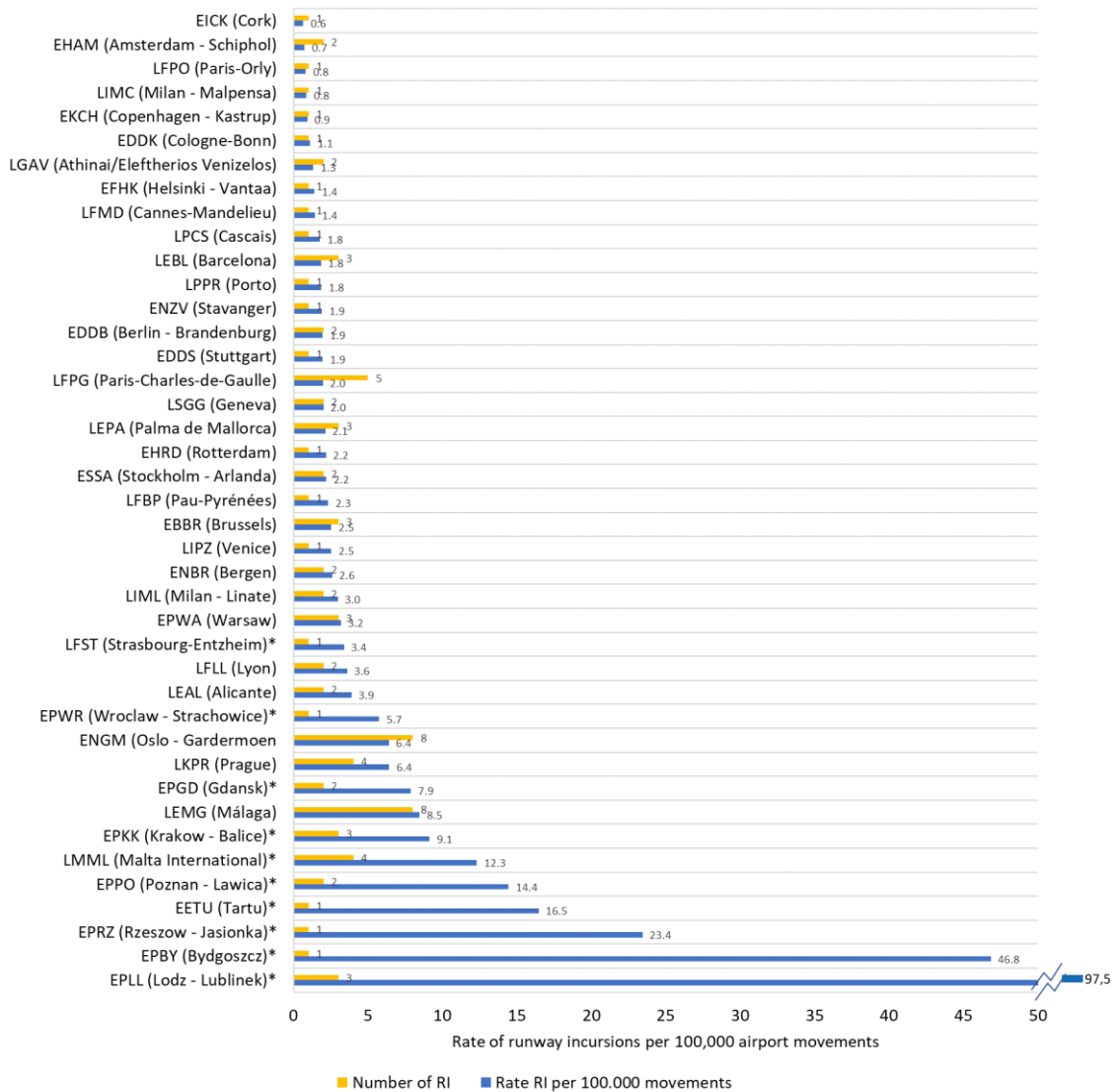


Figure 14 – Rate of runway incursions with ATS/CNS contribution by airport. *Airports with less than 35.000 movements.

- 83 Table 5 provides the changes in the rate of RI with ANS contribution at the top 20 airports with the highest rates values in 2021 when compared with 2020 values of the rate. Most of those airports did not experience any RI with ANS contribution during 2020. Among those that did, EPBY (Bydgoszcz) and LEMG reduced approximately to half the number of RIs, but the rate is still above the average.

Airport	2020 vs 2021
EPLL (Lodz - Lublinek)	No RI in 2020
EPBY (Bydgoszcz)	-50.6%
EPRZ (Rzeszow - Jasionka)	No RI in 2020
EETU (Tartu)	No RI in 2020
EPPO (Poznan - Lawica)	56.5%
LMML (Malta International)	No RI in 2020
EPKK (Krakow - Balice)	23.4%
LEMG (Málaga)	-56.5%
EPGD (Gdansk)	No RI in 2020
LKPR (Prague)	71.7%
ENGM (Oslo – Gardermoen)	100.1%
EPWR (Wroclaw-Strachowice)	No RI in 2020
LEAL (Alicante)	No RI in 2020
LFLL (Lyon)	No RI in 2020
LFST (Strasbourg-Entzheim)	No RI in 2020
EPWA (Warsaw)	No RI in 2020
LIML (Milan - Linate)	No RI in 2020
ENBR (Bergen)	No RI in 2020
LIPZ (Venice)	No RI in 2020
EBBR (Brussels)	No RI in 2020

Table 5 – Changes in the rate of RI with ANS contribution at the top 20 airports with the highest rates in 2021.

Automated Safety Data Recording Systems (ASDRS)

- 84 This SPI captures the use of automated safety data recording systems (ASDRS) for detecting, recording, analysing, or reporting SMIs and RIs by ANSPs.
- 85 Ten ANSPs (Romatsa, Croatia Control, ANS CR, Hungarocontrol, LPS SR, DSNA, LVNL, MUAC, Skyguide, and ENAIRE) reported the use of some type of ASDRS in 2021, which is one more than in 2020. Ireland reported that its ANSP is testing such a system but implementation has not been reported yet. It can be concluded that the use of automated safety data reporting tools is not widely implemented among ANSPs.
- 86 All ten of these ANSPs use automated safety data recording systems to detect SMIs. Two out of these ten (ANS CR, and ENAIRE) collect information on RIs too. BULATSA did not report information this year, but in RP2 reported use of these tools to detect both SMIs and RIs. ENAIRE uses a tool to detect RIs in Málaga, and ANS CR does the same at three airports (Ruzyně, Mošnov, and Tuřany).
- 87 In some cases, the automated safety data recording tool used is the ASMT tool developed by Eurocontrol. Three ANSPs reported using in-house developed tools.
- 88 Among the ANSPs that provided a definition of the events that trigger the automatic detection of events for further analysis, it is observed that the parameters used were not harmonised. This is not surprising as the use of the tool and the associated processes differ among ANSPs.
- 89 For example, four ANSPs (Croatia Control, Hungarocontrol, DSNA, and MUAC) use a vertical separation of 800 feet to trigger SMI events and a horizontal parameter slightly below the standard separation. One ANSP (ANS CR) reported different triggering parameters for the ACC and TWR. Another ANSP (ENAIRE) 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. 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 occurrences recorded that would otherwise be discarded, as they are not genuine occurrences. On the contrary, the use of parameters close to the separation standards aims at capturing as many occurrences as possible and may capture many non-genuine events.
- 90 The ANSPs that use these ASDRS reported that:
- Data captured by the tools is used in support of risk management processes, but serving several purposes and used apparently in different ways. ANSPs mentioned as main uses: general statistics, Hot Spot identification, safety and trends analysis, analysis of occurrences, debriefings, monitoring risks and confirmation hazards are sufficiently mitigated, monitoring of the safety criteria set in the safety assessment of functional system changes and last, but not least, identification

of occurrences. Use of ASDRS for identification of occurrences has been reported only by two ANSPs.

- Data is treated by the dedicated safety expert department which applies just culture principles.
 - Data gathered appears to not always be regularly disseminated within the organisation, but is used in an ad-hoc manner by specific groups upon request or when necessary (e.g. from the use exclusively by the safety expert group or disseminated to specific groups such as system designers). In some other instances, the information is only disseminated within the safety unit of the ANSP. When the ASDRS is fully integrated in the risk assessment processes investigation reports, data is presented regularly in safety reports and publications (e.g. monthly, yearly). Information is shared with the NSA in several cases, but not all.
- No obstacles to use ASDRS are identified for most ANSPs. Some ANSPs reported issues with the definition of safety data (to interpret them properly), how to visualise them to provide a clear and understandable picture, etc. No ANSP reported issues of acceptance of the tools.

⁹¹ The limited implementation does not include a harmonised definition of the events that trigger the capture of occurrences as it may serve different purposes in each ANSP. In addition, even when these tools are implemented, in most cases their use seems to be dedicated to operational analysis (e.g. identification of hotspots) and not to complement occurrence reporting.

3 NETWORK MANAGER

- The NM achieved the target level in two components of the EoSM, Safety Culture and Safety Policy and Objectives, in 2021.
- The NM over delivery indicator increased significantly in 2021 compared to 2020, in line with the increased number of ATFM regulations.

- 92 In accordance with Commission Implementing Regulation (EU) 2019/317, the Network Manager must draw up a Network Performance Plan (NPP) containing performance targets for the NM functions covering all key performance areas, consistent with the Union-wide performance targets.
- 93 The NPP for RP3 was initially submitted on 30th September 2019 following its endorsement by the Network Management Board (NMB). Following PRB comments and also taking into account the different economic and operating context due to the COVID-19 pandemic, a new version was elaborated and submitted for endorsement to the NMB and later approval by the EC.
- 94 The safety key performance indicators included in the NPP are presented in the Table 6 and Table 7.
- 95 These indicators are assessed in terms of the functions and tasks of the Network Manager. However, the distinction between NM activities and other Eurocontrol activities is not always evident, which 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 safety performance targets are performed by the NM and the Network Management Directorate/other Eurocontrol units.
- 96 The safety performance monitoring reported here is based on the NM Annual Report 2021 submitted to the NMB in July 2022 and feedback received from EASA after verifying the EoSM questionnaire, as oversight authority of NM.

Key Performance Indicators	NM Target
EoSM The minimum level of the effectiveness of safety management	Improving its own management system to reach at least Level C in the safety management objectives 'safety culture', 'safety policy and objectives', 'safety assurance', and 'safety promotion' and Level D in the safety management objective 'safety risk management' for its own Safety Management System in line with the RP3 EU-wide targets

Table 6 – NM KPIs in NPP 2020-2024.

NM Performance Indicators		NM Internal Objective
Over-deliveries	The ATFM over-deliveries (OVD) above the capacity limits of a sector declared by the air navigation service provider where ATFM regulations are imposed	Reduction of over-deliveries
Top risks	Top 5 Operational safety risks and priorities	Identification of Network operational safety risks (including for its own operations)

Table 7 – NM PIs in NPP 2020-2024.

3.1 Effectiveness of Safety Management – Network Manager

- 97 The NM applied the questionnaire for the measurement of the EoSM, as it is defined for ATS providers, with slight adaptation of the questionnaire due to NM nature of services. EASA identified the requirements included in the EoSM questionnaire that were not applicable to NM, and applied the adjustments to the questionnaire, in particular in the areas of safety policy and objectives and safety risk management. The EoSM questionnaire for the NM was sent to EASA for verification and justifications provided by NM were cross-checked with the results of the continuous oversight performed by EASA.
- 98 The minimum level achieved for any question related to a Management Objective is the minimum level achieved in all safety areas addressed by each question that are contained in that Component, which is determined by the responses to the EoSM questionnaires.
- 99 Table 8 shows consolidated 2021 EoSM results of NM, after EASA verification. The NM achieved the target level in two components of the EoSM, namely Safety Culture and Safety Policy and Objectives, in 2021. Improvements are expected in the other three components to achieve the targets at the end of RP3.

EoSM component	Maturity
Safety Culture	C
Safety Policy and Objectives	C
Safety Risk Management	C
Safety Assurance	B
Safety Promotion	B

Table 8 – NM’s EoSM achieved levels per objective in 2021. The target for risk management is level D while it is level C for the other management objectives.

- 100 Figure 15 shows the aggregated responses of EoSM questionnaire applied to the NM (marked from Level A to Level D) distributed per each EoSM Component. Three questions with level B are below target in the areas of Safety Assurance and Safety Promotion. Similarly, three questions are at level C in the area of Safety Risk Management, which is the one that requires greater improvement to achieve the target.

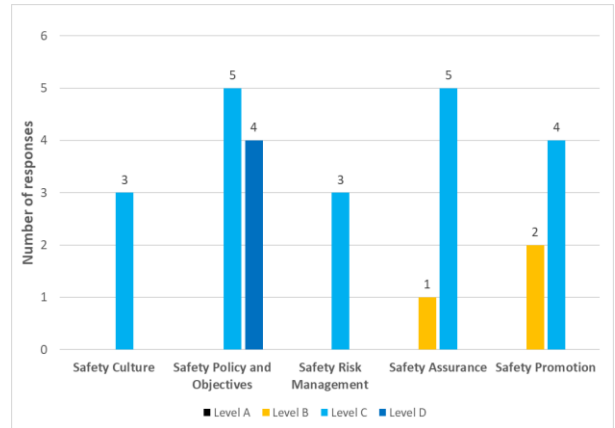


Figure 15 – EoSM’s aggregated EoSM responses per management objective.

3.2 Over-deliveries

- 101 Figure 16 illustrates the evolution of the over-deliveries during RP2 (2015-2019) and the first two years of RP3. The over-delivery indicator decreased significantly in 2020, but increased back to levels of 2016 during 2021 (9.8%). This increase was influenced by the increase in the number of ATFM regulations and the higher proportion of the capacity and staffing regulations (over other types such as industrial actions that tend to result in fewer over-deliveries).

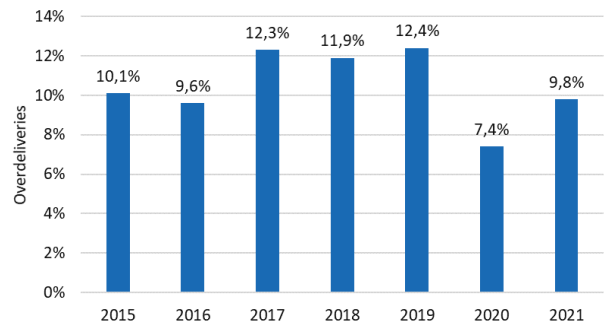


Figure 16 – Over-deliveries indicator (combined ENR and ADR) since the beginning of RP2.

3.3 Top risks in the Network

- 102 The NM identified the top five operational safety priorities for the network. In 2021, these were:
- controller blind spot;
 - flight without transponder or with dysfunctional one;
 - Airborne collision avoidance system (ACAS) Resolution Advisory (RA) not followed;
 - controlled airspace infringement;
 - controller detection of potential RWY conflict.

4 SUMMARY OF OBSERVATIONS

- 103 A summary of observations, conclusions, and recommendations for each section of the report are provided in this section.
- 104 There was no accident registered with ANS-contribution, involving fixed-wing commercial air transport operation airplanes above 2,250 kg MTOW, in 2021. Four serious incidents with ATM-contribution were recorded in 2021. No ANS-related fatal accident has been observed since 2012 and no fatal accident with ANS contribution has been registered in the last 10-year period. In 2021, two ATM-related accidents without fatalities were recorded; all of these related to turbulence encounters.
- 105 The number of accidents and serious incidents in 2021 slightly fell compared with 2020, but well below 2019 due to lower levels of traffic caused by the COVID-19 pandemic. The rates of both accidents and serious incidents were similar to recent years.
- 106 The proportion of events with ANS contribution is significantly smaller in ANS-related accidents than in serious incidents – this has been the case since the start of the performance and charging scheme. This seems to suggest that the safeguards present in the aviation system are effective to prevent accidents when ANS has contributed to the cause of occurrences.
- 107 The analysis of the overall EoSM minimum maturity level achieved by ANSPs in 2021 shows that:
- 18 out of 36 ANSPs already achieved the RP3 target level D for safety risk management. This means that 50% of ANSPs achieved the target in this objective.
 - 29 out of 36 ANSPs already achieved the RP3 target level C or better on all other MOs (the four EoSM objectives other than safety risk management). This means that 80% of ANSPs achieved this target.
 - 17 out of 36 ANSPs achieved the EoSM targets on all MOs for RP3. This means that 47 % of ANSPs has already achieved the target of EoSM as a whole.
- 108 The average EoSM score achieved by all ANSPs is 88. The minimum score achieved by an individual ANSP is 66, while the maximum EoSM score is 100.
- 109 The collective Union-wide analysis of aggregated responses of the EoSM ANSP questionnaire per objective shows that the EoSM objective with many questions that achieved lower maturity levels and therefore needs more improvement is within the safety risk management area.
- 110 The EoSM questionnaire was supplemented with a new objective that aimed to capture how ANSPs managed interdependencies and trade-offs between safety and other business objectives. The majority of ANSPs (19) are at maturity level C, and 13 are at level D, so there is room for improvement to strengthen resilience, particularly given the COVID-19 pandemic. Pressures to trade-off resources towards other business objectives of the organisation due to loss of traffic and revenues are intensified and must be carefully managed.
- 111 The rates of occurrences (SMIs and RIs) at the EU level in 2021 show an average number of 9.0 SMIs per 100,000 controlled flight hours and an average number of 6.1 RIs per 100,000 airport movements. The rate of SMI has slightly increased while the rate of RIs has slightly decreased with respect to 2020. If the aggregation is done at Union level with the occurrences where the ANSP was identified as having a contribution, either direct or indirect, the rates are reduced to 6.8 and 1.2 for SMIs and RIs respectively per 100.000 exposure unit. This shows that ANSPs have greater influence and managerial control of ensuring separation between aircraft in the airspace than in preventing the incursionary presence of an aircraft, vehicle or a person on the runway of an airport. A similar trend is observed in these rates with ANS contribution, i.e. increment of SMI rate and decrement of RI rate.
- 112 At the local level, the following rates of occurrences were monitored:
- Rates of RIs with safety impacts that occurred at the airports of a Member State included in the performance and charging scheme showed a maximum in Malta (30.77 RIs per 100,000 movements), mainly due to the increase of GA traffic, and three Member States (Hungary, Latvia, and Romania) reported no RI at their airports. In addition, Sweden, Norway, and Spain showed the highest rates of RIs but reported RIs at all airports in their territories

(as opposed to those covered by the performance and charging scheme only).

- Rates of SMIs with safety impacts that occurred within the airspace covered by the performance and charging scheme showed the highest rate in Luxembourg (43.8 SMIs per 100,000 controlled flight hours), although it is to be noted that the rate is sensitive to the low number of flight hours in the State. Three Member States (Croatia, Latvia and Lithuania) reported no SMIs within their airspace.
 - Only 41 out of 146 airports reported RI occurrence that had ATS/CNS contributions. The majority of these airports reported one or two RIs, and only a handful of them reported three or more RIs. Within the top ten airports with the highest rates of RIs with ATS/CNS contributions, eight out of ten had fewer than 35,000 airport movements (the low number of airport movements makes the rate of occurrences highly sensitive to the number of occurrences). The airport with greater than 80,000 movements and highest rate of RI occurrences is LEMG (Malaga) (8.5 RIs per 100,000 movements) followed by LKPR (Prague) and ENGM (Oslo-Gardermoen) (6.4 each).
 - Only 24 ANSPs reported SMIs with ATS/CNS contribution while the other ten ANSPs reported no SMIs. The highest rate was experienced by LVNL (49.9 SMIs per 100,000 flight hours), which results from the third highest absolute numbers of occurrences (47 SMIs). It was followed by ANA LUX (49.2), but with only three SMIs, and DSNA (16.7) with the highest number of SMIs (228).
 - Note the highest rate of SMIs was in LVNL airspace (49.9 SMIs per 100,000 flight hours), which results from the third highest absolute numbers of occurrences (47 SMIs). The rate has also experienced the increase of 31.7% with respect to 2020. LVNL has a good record in the EoSM questionnaire having achieved the 2024 safety target in all objectives. Nevertheless, LVNL should not be complacent, and continue assessing occurrences and risk mitigate them according to their SMS, if necessary.
- 113 Ireland, Lithuania and Slovenia reported that they use Acceptable Level of Safety Performance targets in the SMI and RI related indicators.
- 114 For the calculation of the above rates of SMIs and RIs, RP3 Safety supporting material foresees occurrences data reported in the ECR under Regulation (EU) 376/2014. It is recommended to take the appropriate measures to follow the foreseen process for the monitoring report of 2022 in order to ensure better alignment of coherent reported data among ANSPs/States as this was not the case in 2020 and 2021.
- 115 Ten Member States reported that their ANSPs used some type of automated safety data recording system in 2021, which is one more than in 2020. It can be concluded that the use of automated safety data reporting tools is not widely implemented among ANSPs. The limited implementation does not include a harmonised definition of the events that trigger the capture of occurrences as it may serve different purposes in each ANSP. In addition, even when these tools are implemented, in most cases their use seems to be dedicated to operational analysis (e.g. identification of hotspots) and not to always complement occurrence reporting. No ANSP reported issues of acceptance of the tools.
- 116 The NM achieved the target level in two management objectives of the EoSM, namely Safety Culture and Safety Policy and Objectives, in 2021. Improvements are expected in the other three components to achieve the targets at the end of RP3.
- 117 The over-delivery indicator increased back to levels of 2016 during 2021 (9.8%). This increase was influenced by the increase in the number of ATFM regulations and the higher proportion of the capacity and staffing regulations.