![EASA - European Aviation Safety Agency logo]

States' implementation report

EPAS 2017-2021

States' implementation report
Based on EPAS 2017-2021

European Aviation Safety Agency, 9 February 2018

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I. EXECUTIVE SUMMARY

This EPAS report aims at providing an overview of how the EPAS actions owned by the States are being implemented. It highlights areas where possible difficulties lay and brings up issues (in an aggregated way) and good concrete practices which could serve as examples for other States. This report's compilation is voluntary on the part of EASA. It responds to an effort to monitor EPAS implementation by collecting all relevant information provided by States in one document, useful for the stakeholders and enticing for the general reader alike.

In 2017, **forty-four** States received a questionnaire with a request to provide the status of the implementation of the actions they own in EPAS 2017-2021[1]. **Twenty four** States replied, using a new on-line survey tool. This represents a slight improvement in the response rate from last year. During 2018 a Regional Plan based on EPAS is being developed. Therefore, in the future, the reporting mechanism will be extended to the entire ICAO EUR/NAT region.

Compared to the last conducted survey, the questions were made clearer, so EASA could assess more objectively the degree of progress in each action. With this aim, section 1 in the summary (chapter V of this report) provides such assessment and classifies EPAS actions into: 'advanced', 'reasonable' and 'slow' in terms of progress towards implementation of actions. Where the implementation rate by States raised certain issues, we named this category 'question mark'. Overall, a good indication of the implementation rate in the States which answered our survey is shown. However, steady work remains to be done in general in 10 member States tasks (MSTs).

With the benefit of this background, EASA is proposing a number of initiatives: maintaining an updated list of EPAS contact points, organising the first of a series of workshops on reviewing the monitoring and reporting mechanisms, foster a continuous facilitation and support offered by the EASA EPAS team to those States which experience difficulties with certain actions, aspects or did not provide any feedback on the status of EPAS in their States, introduce the concept of EPAS 'Champion States' which are more privileged to provide 'know how' support to other States, promoting onsite assessments to gauge on the level of implementation of EPAS and guide on ways ahead if required (particularly important when EPAS becomes binding with the introduction of the new Basic Regulation).

Finally, this report includes, in chapter V (page 75) an overlook on the rate of implementation of actions in the main risk areas, a comprehensive list of all the States' material referred or attached during this reporting exercise, as well as a list of actions envisaged to be tackled by EASA and the States for the next EPAS reporting cycle.

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[1] On the 16 of February 2018, EASA published an updated new edition of the EPAS 2018-2022 (find **here**).

II.   RECEIVED STATE'S REPORTS

EPAS implementation in 2017 encompasses the ICAO European Region States on a voluntary basis as shown in figure 3. Therefore, a total of **forty-four** States have received in mid-July 2017 the request to provide the status of the implementation of the actions they own in the EPAS 2017-2021.

The graph below shows data on participation to the questionnaire and a comparison with the previous year.
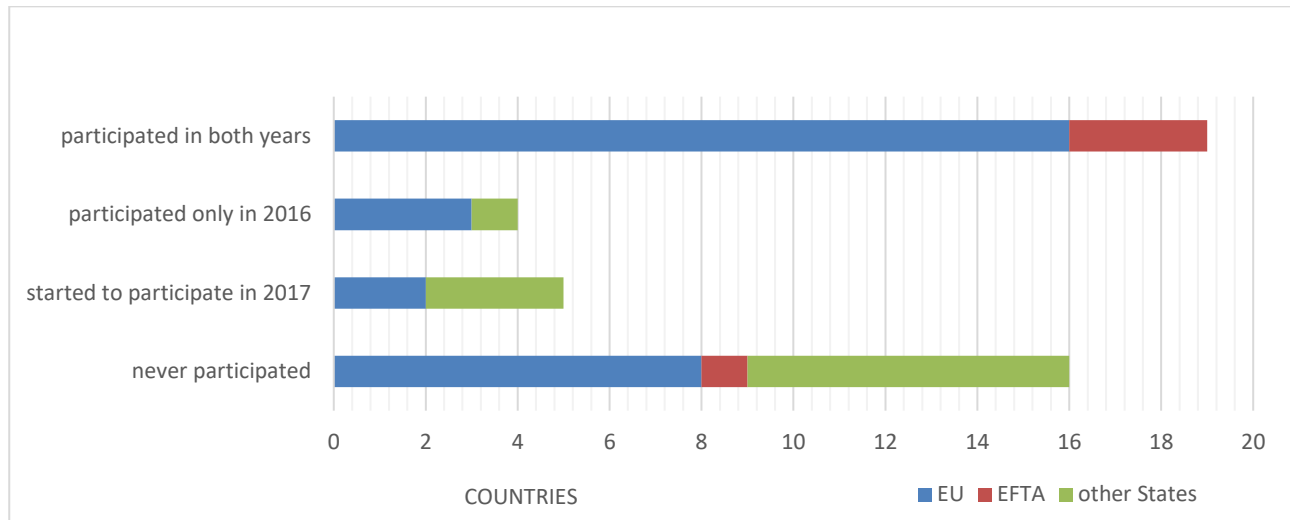
Figure 1 States participating to the EPAS questionnaire in 2016 and 2017
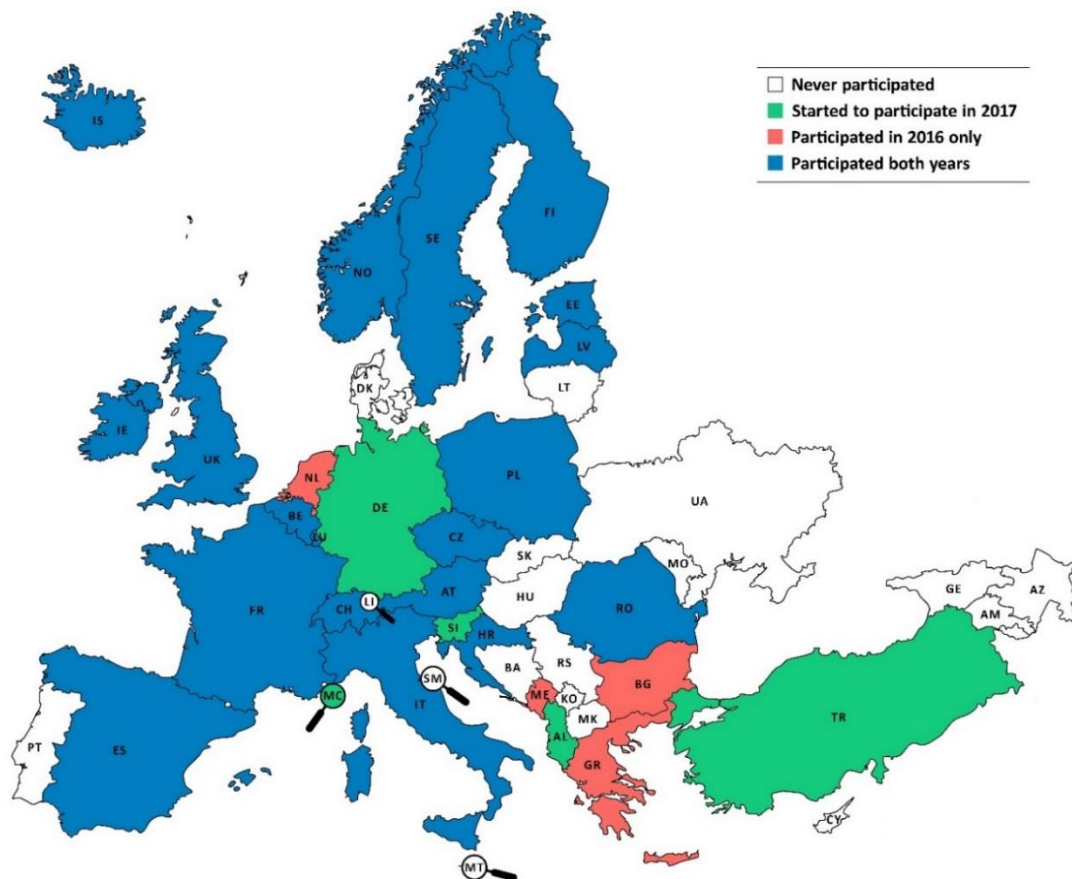
Figure 2 Countries which participated to the EPAS questionnaire in 2016 and 2017

Acknowledgements

EASA is responsible for the follow up of the implementation of EPAS actions within the States. With this report, EASA is summarising the work done by the States in mitigating common safety risks across Europe, as well as providing an overall assessment of the continuous implementation of EPAS actions. EASA also identifies possible areas for improvement and working out solutions cooperatively. Moreover, it prepares the grounds for the implementation of the new Basic Regulation.

In 2017, during a period of 4 months, EASA received **twenty-four** answers, out of the possible **forty-four**, which indicates a slight improvement compared to 2016.

EASA would like to thank sincerely all the States that reported in 2017 (shown on the right) and therefore showed their renovated commitment to this activity. EASA kindly encourages the States that could not send a report to do so in the future or continuously liaise with EASA in order to assess their situation and grant the necessary support. This is especially for the few States which sent their report in 2016, but did not participate for this edition.

Portugal provided its new State Safety Plan 2018 on the 15th of January 2018. We encourage other States to follow the same initiative and/or complete the EPAS questionnaire throughout 2018.

States that sent a report to EASA in 2017

BE	AL	CZ
EE	FI	RO
HR	FR	IE
IT	NO	UK
PL	AT	ES
CH	SE	IS
LU	SI	DE
LV	TR	MC
	PT	

States requested to complete the EPAS questionnaire in 2017

Thirty-two EASA States (EU and EFTA) and **twelve** other States have voluntarily committed to apply the EPAS, as shown below. Thus, they were all forwarded the EPAS questionnaire in 2017 for completion:
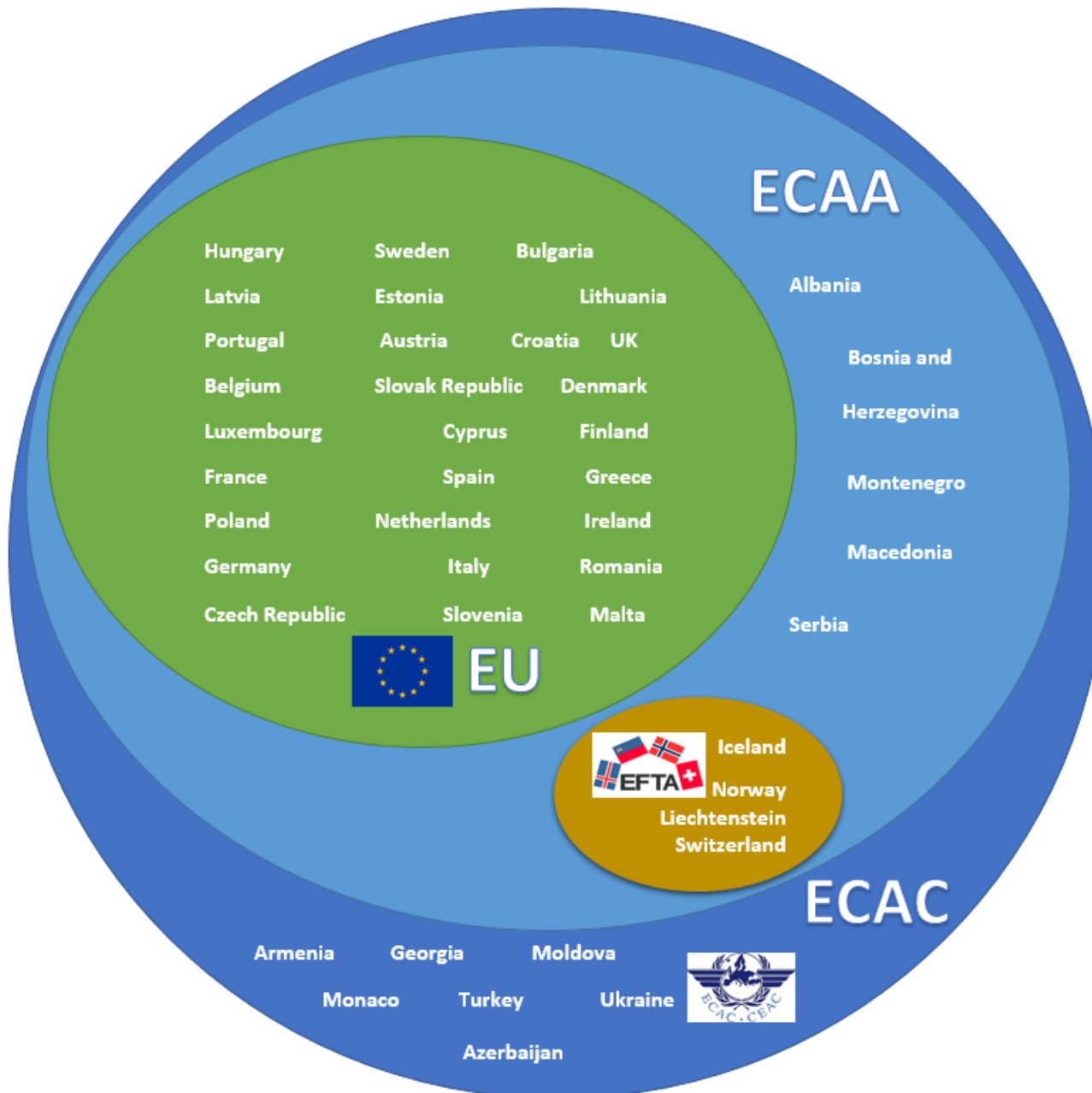
Figure 3 States applying EPAS

III. EPAS IMPLEMENTATION STATUS REQUESTS COORDINATION

1.1. CHANGES IN THE APPROACH

1.1.1. Use of the 'EU survey' tool

As anticipated in the SM TeB meeting held in May 2017, a new reporting method was employed with the launch of the EPAS 2017-2021 action implementation survey using the European Commission 'EU Survey' platform. States could see the questionnaire and submit answers and attachments as evidence by accessing this link - **here**. The questionnaire will remain open throughout 2018 and States are welcome to update or complete it.

Thanks to this new approach, States can enjoy more flexibility such as: access to the questions in a more user friendly fashion, download or upload documents (when and if applicable) to show as evidence or when requested in the questionnaire, save a draft of the answers without submitting, log out at any point during the course of the work, and continue working later on the answers, export the completed survey to a variety of formats, etc. In general, States did not encounter issues with this way of providing feedback. Although in very few cases the extraction of the questions to other formats yielded an unformatted file to work with. On the other side of the spectrum, dealing with 24 replies to the survey, it has been proved much easier for the EASA EPAS team with the new tool. Likewise, all the contact details of those State responsible to provide feedback could be downloaded with the click of a button.

The 'EU Survey' tool is hosted on a secure EU Commission server. States are able to access the supplied information anytime. They could ask us to open it again in case they need to update it or perhaps realised a mistake (as it was the case during this exercise for a small number of States). EASA is at hand to provide technical support with the tool.

1.1.2. Refocusing the EPAS questions

The EPAS questionnaire in 2017 was mostly based on the one used in 2016. However, this year's questions were revisited and reformulated for the sake of condensing and focusing on the key information sought and making them clearer, as far as the kind of replies expected.

Some questions prompted for additional contextual information that would help to streamline on the situation for each action as well as across all States. Likewise, some other questions enquired on the reasons why certain aspects were not conducted in an effort to underline the importance of the action and analyse or bring up cases and trends where preventive actions could have been taken even if no negative event occurred. Where relevant, for some questions links, relevant sites/reports were provided (e.g. on EASA Safety Promotion, European Action Plan for Airspace Infringement Risk Reduction, etc.) to help States to frame the concrete EPAS action context. In parallel, most actions had a reference to documents outlining guidance, tips and examples towards the action's implementation.

After collecting the initial and main bulk of answers, a review was performed during part of September and October for consistency, clarifications and, in a few cases, to prompt the States that did not answer to some questions for a reply in the best of their capabilities.

1.1.3. EPAS contact points

Towards mid-2017, a review of the list of contacts for EPAS was made. Given the fact that EPAS was an almost constant theme at SM Teb meetings, the EPAS team proposed to make attendees to these meetings the default EPAS channel contacts (at least for communication and coordination purposes), unless stated

otherwise by the States. Hence 2018, EASA manages an up to date list which is open to modification anytime that is required by the States.

1.2. CONSIDERATIONS FOR THE FUTURE

1.2.1. SM Teb specific workshop on actions

While all the feedback received is very valuable and insightful, it was observed the interpretation of the questions formulated, the intended target scope for the question and the detail to be provided in the answers, varied at times: from States that do a lot and provide a lot of evidence and explanations (i.e. showing as the most advanced States with the implementation of EPAS) to the ones providing a more succinct or no answer, which leaves room for interpretation regarding the effective level of implementation of the actions in these States.

An envisaged way of improving the return of information on EPAS implementation, and for States to reflect in a better manner on their situation, is the organisation of a workshop on how to improve the survey's actions and its questions in a cooperative way. The aim of the workshop would be to analyse the level of clarity of the actions (in terms of expectations and objectives), the relevance of the survey questions and to discuss monitoring mechanism for States so that they would be able to provide a clear status on each of the actions.

1.2.2. 'Champion States'

A number of States are very active and quite advanced across the board on many of the actions in the EPAS. There are also cases where States are more advanced on some actions and less on others. With this backdrop, the EASA EPAS team is considering the option of organising the so-called volunteer 'Champion States'. This would mean that the States that are strong on specific areas could support other less advanced States or the ones that are in the initial stages of EPAS implementation. This is more relevant as many States do not contemplate cooperation with neighbouring States on EPAS areas, as revealed by the answers to the relevant EPAS questions. The 'Champion States' initiative would enable more action facilitation across States and keep the EPAS plan more active.

This initiative would be held in parallel to the regular workshops and regular activities set up by EASA such as the EPAS workshop (in January 2018 during the SM Teb meeting) or future EPAS questionnaires, specific guidance sessions, possible onsite assessments, etc., to the countries that request it.

1.2.3. EASA active support

The EASA EPAS team is in a privileged position overlooking the end outcome of the EPAS implementation process amongst all the States concerned. This is why EASA encourages and strives States to report difficulties or limitations in confidence, so EASA can best channel and help them to steer support in the appropriate path (e.g. clarifying the problematic action), provide appropriate interpretation for the States with different backgrounds, sharing information/best practices or putting resources from more advanced States in contact with the ones that request it, to name a few of the options considered.

1.2.4. EASA onsite assessments

EASA carried out EPAS/SSP on-site assessments on the **thirty two** EASA Member States during **2015** and **2016** with the occasion of the programmed standardisation visits to the NAAs. Only observations were raised on EPAS/SSP status during these inspections.

The main conclusions that were derived from the review of the selected SSP elements were the following:

- Most States completed an SSP gap analysis and submitted that to either ICAO or the Agency. However, an SSP implementation plan was not available in all cases.
- More than half of the visited States formally identified an accountable executive as well as an organisation in charge of leading the SSP development. However, evidence of a functioning coordination mechanism at State level was not available in many cases.
- In most of the States, there was no evidence of a documented safety risk management process at State level or safety performance indicators and associated targets.
- Key personnel is not trained in SSP concepts or has only received an initial course: evidence of a comprehensive training policy or programme was missing in most cases.
- More than half of the States were able to show examples of how safety information is being communicated and shared with service providers.

IV.   GLOBAL ASSESSMENT OF INDIVIDUAL ACTIONS

Taking as an input the replies received from the States, this part of the report provides an assessment of the implementation of the Member States tasks (MSTs) as published in the **EPAS 2017 - 2021**.

In some actions, in addition to an assessment and examples from using some of the States' answers, maps and graphs are included, providing a summary of results. In some areas, the maps encompass a subject common to various EPAS actions. In other areas, they are specific to a concrete EPAS action.

Chapter One: Systemic Issues

1.1. Safety Management

1.1.1. MST.001 - Member States to give priority to the work on State Safety Programmes (SSP)

Action title	Objective	Activity sector	Owner	Deliverable/ date
Member States to give priority to the work on SSPs	Make SSPs consistently available in Europe in compliance with the GASP objectives.	ALL	MS	SSP established / continuous
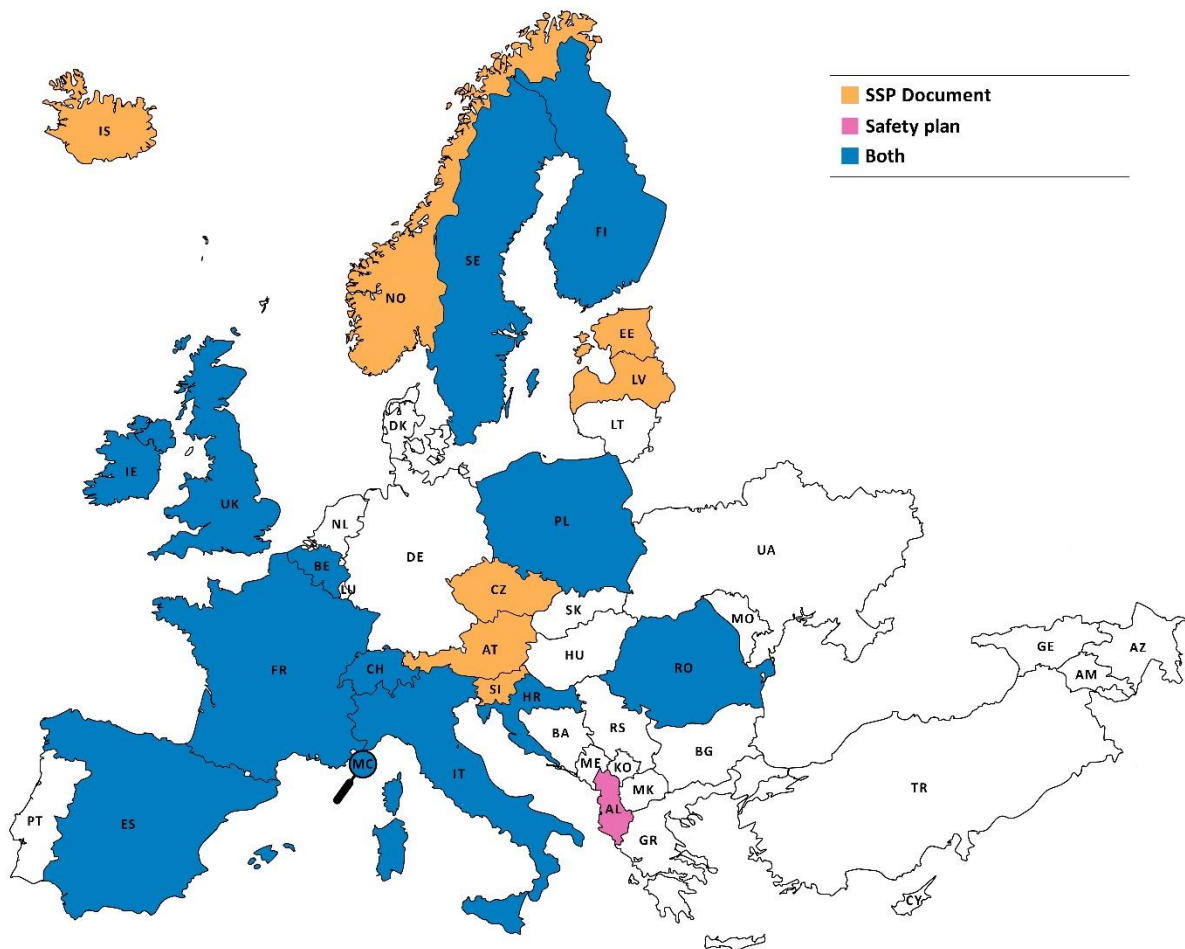
Figure 4 Countries which gave priority work on State Safety Programmes in 2017
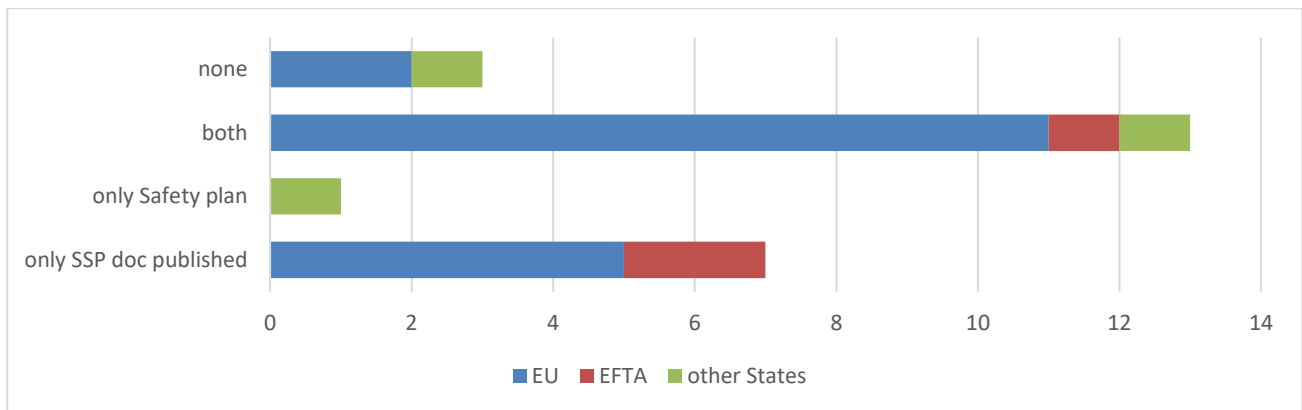
Figure 5 Actions took by the countries to address this MST in 2017

SSP gap analysis completion

All the States that replied, except **two**, have completed or updated their SSP gap analysis. From the **two** that did not do so, **Monaco** was waiting for the adoption of a new Civil Aviation bill by the end of 2017. The **other** State partially replied by saying that it did its gap analysis, but without providing further details. The overall proportion of completed SSP gap analysis is very high.

SSP gap analysis submission to iSTARs

Twenty one States have submitted their latest version of their gap analysis through the ICAO iSTARs: **Belgium, Albania, Czech Republic, Estonia, Finland, Romania, Croatia, France, Ireland, Italy, the UK, Poland, Austria, Spain, Switzerland, Iceland, Luxembourg, Slovenia, Germany, Turkey** and **Monaco**.

Three States did not do so and did not provide further explanations on the reason behind it. Out of these, **two** had replied having an SSP and **one** only had a partial SSP. **One** additional State indicated not yet having an SSP. The proportion of submission of SSP gap analysis in ICAO iSTARs is high.

SSP gap analysis update in ICAO iSTARs

Nine States updated their gap analysis during 2017: **France, Romania, Turkey, Belgium, Ireland, Estonia, Slovenia, Albania** and **Germany**. **Eight** States updated it during 2016: **Italy, Czech Republic, the UK, Croatia, Finland, Iceland, Spain** and **Luxembourg** and out of these, the **UK** was updating its gap analysis during 2017 and Luxembourg submitted its gap analysis via the USOAP continuous reporting tool. **Five** States (**Norway, Austria, Sweden, Switzerland** and **Poland**) updated their gap analysis during or before 2015 (the earliest one State in 2011). **One** State initiated a project in this respect and **another** State did not conduct any gap analysis yet.

SSP implementation plan

The implementation plan is a working tool to manage the implementation of the SSP and a follow-on step after conducting/updating an SSP gap analysis. In **fourteen** States the implementation plan was quoted as not existing. In **six** of them (**France**, **Sweden**, **Croatia**, **Spain**, **Austria** and the **UK**) no implementation plan formally exists given the advanced stage of their SSP. In **three** of these States (**Switzerland**, **Iceland** and **Finland**), it is constantly under review.

For details on the implementation plans of those States that kindly provided them (**Belgium, Albania, Romania, Turkey, Finland** and **Ireland**), please refer to section 4 in page 79.

Approved SSP document

The following **twenty one** States have an officially approved SSP document in their country: **France, Monaco, Romania, Italy, Czech Republic,** the **UK, Turkey, Belgium, Norway, Austria, Sweden, Croatia, Finland, Ireland, Estonia, Slovenia, Switzerland, Iceland, Poland** and **Spain**. Only **three** States replied as not having it.

Twenty States provided evidence by pointing to a link on their authority's web page or submitted an actual copy within the questionnaire (for a link see page 79, section 4 in chapter V-Summary). **One** State replied as having a SSP document, but did not provide a link/copy. Additionally, **two** States provided their draft SSP, (i.e. not yet considered by them as implemented), namely: the **Czech Republic** and **Slovenia**.

Safety Plan at national level or a similar document

Fourteen States replied positively to having a Safety Plan (mostly multiannual) at the national level, including the **UK** stating as having a series of articles which can be found (**here**) and **Slovenia** that mentioned that their SSP document and their national plan are the same document.

Nine States replied not having a national Safety Plan or similar. Out of them, **three** stated that they were working on it, including **two** States that added that their national plan was scheduled to be published by the end of 2017, and **another** State that intends to update its national plan once its SSP becomes officialised at the national level.

Three States that do not have a national Safety Plan, have, however, an SSP document. It is worth noting that **two** States that do not have an SSP document, neither have a Safety Plan at the national level, nor a business plan or national action plan which could set a basis.

Safety Plan evidence-based by linking actions to strategic safety priorities (e.g. through safety risk portfolios or another similar process).

Eleven States replied positively about having a Safety Plan based on evidence by linking actions to strategic safety priorities, through safety risk portfolios or similar (**France, Monaco, Romania, the UK, Belgium, Sweden, Croatia, Finland, Ireland, Switzerland** and **Spain**). From these, **five** States provided examples of their safety risk portfolios and **two** States did not provide explanations or evidence of their approach. However, **two** States explained that they were adopting a different and improved methodology (**Switzerland** and **Spain**).

Eleven States replied negatively about having such safety plan. However, **four** States are considering taking this path or similar (**Norway, Iceland, Albania and Germany**), and the last **two** declared being in an early stage of drafting their safety plans.

As an example, **Italy** signals that for the time being, the actions that included in the ENAC Safety Plan are defined by the ENAC Safety Board and that they take into account many sources of safety data, including reports stored in the Mandatory Occurrence Reporting System.

Besides these **eleven** States, **Turkey** reported that thanks to the collaborative 'horizon-scanning' work with industry, they were better placed for a pro-active approach to future risk identification and management. **Poland** replied their strategic safety priorities are identified in its plan.

1.1.2. MST.002 – Promotion of safety management system

Action title	Objective	Activity sector	Owner	Deliverable/ date
Promotion of safety management system	Encourage implementation of safety promotion material developed by ESSI Teams (ECAST, EHEST and EGAST[2]) and SMICG.	ALL/HF	MS	Best practice/ continuous

Promotion of SMS material developed by EASA or SMICG

Seventeen States actively promoted SMS material developed by the EASA and SMICG: **France, Romania, Italy, Czech Republic, the UK, Turkey, Belgium, Sweden, Croatia, Finland, Ireland, Slovenia, Iceland, Poland, Spain, Latvia** and **Luxembourg**. **One** State acknowledged that the material from ESSI was not used by them, **another** State added that they do so in the cases where they supplement their own SMS promotion and guidance material and **another** State reported that the EHEST/ECAST was promoted and numerous actions have been implemented since 2009. This represents a good proportion amongst the replying States.

Estonia replied that promoting material was well familiar to them (e.g. SMICG SMS material for small organisations). However, they planned to widen the scope of the SMS promotion material. **Two** States replied that they do not promote SMS material systematically, although **one** of them reported that they included a link to EASA's and SMICG's web pages on their State's authority website.

Another State declared they did not promote any material yet, but they had plans to analyse the best approach starting November 2017. Their plans included discussions about the means for dissemination of the material. They foresaw, at one point, to include aero clubs and other General Aviation associations joining meetings, as they are considered an important part of safety promotion activities in the country.

Two more States replied negatively about promoting any type of material.

Amongst the **seventeen** States that actively promoted SMS material, a fairly wide range of documents was quoted:

- SMICG:
  - Safety Management Evaluation Tool
  - SMICG - 10 things you should know about SMS
  - Guidance for Senior Managers, SMICG - SMS for small organisations
  - SMS Evaluation tool and guidance on safety performance measurement and risk-based decision making
  - How to Support a Successful SSP and SMS Implementation - Recommendations for Regulators
- EASA:
  - Specific safety information (e.g. Safety Leaflets) derived from previous ECAST and CAG/TEB (former EHEST)
  - Newsletters
  - Safety Management System for CAMO and Part 145 organisations, promoted through EASA's Safety Promotion Network (SPN)

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[2] The ESSI is now integrated into various collaborative and analysis groups (CAGs). These groups support the implementation of safety risk management at EU level, therefore providing input to EPAS.

- Other means:
  - ICAO - Safety Management Manual (SMM)
  - EC guidance material for the promotion of Occurrence Reporting according to the Regulation 376/2014.

One **State** gave as example their authority for developing their own material.

Some States mentioned that they translated some of the material mentioned above to their own country's language for better outreach. **One** State replied that they purposely divulged the material in a dedicated annual seminar. The **one** State that reported to plan considering promotion as of November 2017, mentioned also that they intend to refer to safety promotion documents on FDM and RE from EASA. **Estonia** answered that promoted familiar SMS material for small organisations, including the SMICG taxonomy papers, safety performance related papers and SMICG SMS evaluation tool.

Promotion of SMS material

Links to the documents on the State's authority's website, as well as presentations, working groups/workshops with the industry on safety issues, SMS or AOC seminars (to name a few) for different aviation branches, are some of the most common methods across States (quoted in one respect or all by **sixteen** States: **France, Romania, Italy, Czech Republic, the UK, Belgium, Sweden, Croatia, Finland, Ireland, Slovenia, Poland, Spain, Luxembourg** and **Latvia**. The same SMS promotion products linked to the State's authorities' websites are also distributed during industry conferences and, in a few cases, directly by inspectors during organisational visits (e.g. SMS audits).

Others ways to promote SMS include:

- In **France**, SMS managers were informed of the available material during different meetings with the DGAC's representatives, including during specific SMS audits.
- **Sweden** conducts flight inspector training /SMS training courses for the industry.
- Preparing and sending purposely booklets, guidance materials and more to operators, association and industry in general (**Turkey, Croatia, Finland** and **Iceland**). For example, in the case of **Finland**, the tools and guidance material that are relevant in their SMS-functions, were send to the stakeholders.
- In **Belgium, Finland, Ireland, Iceland** and **Germany** it was common to send direct emails to stakeholders or specific sectors, for instance small numbers of operators: CAT Helicopter.
- Preparation and issuance of flight safety bulletins, posters, leaflets, and other graphical material (**Sweden, Slovenia**)

Estonia addressed specifically new service providers (when they begin operating) or existing ones in the oversight process. **Poland** specifically conducted the promotion of the SMICG material, such as: SMS evaluation tool and SSP assessment tool (being translated to the country's language), amongst all approved training organisations (ATOs). This is part of the State' multiannual national Safety Plan. Interestingly, they configured the SSP assessment tool as a 'manual' on how to build the SSP in that State (the gap analysis for it was finalised).

Five States did not provide an answer on this point.

Reception of products by audience

Best received:

Amongst the best received material, the following are mentioned by the States:

- ICAO Safety Management Manual (SMM) (**Italy**)
- SMICG guidance for senior managers (**UK**)
- SMICG SMS guidance for small organisations (**UK**)
- SMICG documents on SMS/SSP and EGAST documents (**Turkey** and **Belgium**)
- Phased approach for implementation (**Sweden**)
- Thematic safety leaflets (**Ireland**)
- EC leaflets for the promotion of Occurrence Reporting according to the Regulation 376/2014 (**Slovenia**)

Finland quoted all the examples below during forums in order to disseminate this material or communicate its message:

- SMS seminars
- The national FDM forum
- Regulatory briefings for stakeholders
- Refresher seminar in aviation medicine
- FSTD events
- Refresher course for flight examiners
- Authority's aviation events
- Airworthiness seminar
- Helicopter safety day

Finland illustrated as a good way to go organising safety seminars and stakeholder events (at least held once a year in their State). It was found as the most popular way to promote since it enables direct interaction and discussion between authority and stakeholders.

Poland pointed out the need amongst training providers to have a tool that could be more focused on smaller organisations, whereas **Croatia** mentioned that the SMS for small organisations (presumably the SMICG guidance) was very well received.

Sweden detailed that many of its stakeholders were working to enhance effective SPIs. They pointed out that forthcoming set of standardised SPIs (via NoA) and related precursors, combined with integrated tools from ECCAIRS, would enhance this approach.

Least well received:

Only **Sweden** and **Ireland** referred to the least well received material. Actually, both said that SMS evaluations tool is the least popular amongst industry due to its complexity and high workload to complete as it is regarded a tool for so-called 'complex' organisations.

The States that did not address the question on which promotion material is the most/least popular by their audience, alleged mainly two reasons: the authorities did not promote any material and the State had no means for checking its reception or had not initiated any steps towards it.

Identification of possible gaps in terms of SMS promotion/training

From the **eleven** States that answered as having such process, the range of options related is very broad:

- In the case of **Romania, Iceland, Turkey** and **Sweden** the gap identification is derived from either the State's applicable SSP implementation plan, oversight or continuous action review. None of these **four** States replied having an SMS promotion/training gap identification process per se. In the case

of **Sweden**, the review of actions could have had the potential to feed a risk register for assessment of future areas of safety promotion.

- **Sweden** quoted two research projects in action (during 2016-2017) in its State: one to assess the effects of crew and new business models (NBM), the other to develop a tool to collect related data (survey tool).
- The **UK** brought up the role of the UK SMS Programme Lead to review promotion and guidance material and determine whether there are gaps or if further material is needed.
- **Belgium** reported on the internal and external processes they have in place. Internally, they mentioned a process for training of technical personnel on SMS. Individual training plans would contain initial and recurrent training. Externally, the State promoted the benefits of SMS to managers by means of the SMICG documents.
- **Finland** reported having a formal process to fill the external gap, consisting in evaluating the need for stakeholders SMS training/promotion needs with performance and risk-based management operations. This was described in FASP 2017, in which also the performance of the parts of the stakeholders` SMS were evaluated. **Finland** also reviewed systemic threats, including gaps in SMS knowledge, competence or functionality and assessed their related risk scenarios.
- **Austria** reported that the Effectiveness of Safety Management (EoSM) is used as an SKPI.
- **Switzerland** has been using FOCA SMS Assessment Tool.
- **Finland** mentioned another good way to determine gaps: via regular seminars (like SMS-seminar once a year), FDM forums and other meetings (discussions and feedback) or, like the case of **Ireland**, via training course evaluation forms.
- **Switzerland** published ([**here**](#)) 'Guidance Material/Information (GM/INFO)' and 'GM/INFO Certification Leaflets (CL)' on relevant topics. The aim of these documents is to help operators to prepare the necessary documentation and certificates, to define procedures and training courses, and adapt the Operations Manual system accordingly. Workshops for ATOs were organised and this material was purposely used in this case ([**here**](#)).
- **Poland** included direct questions within internal leisure pilot licenses (LPL) procedures (based on control checklists) while auditing or controlling ATO' concerning safety promotion matters, especially such as occurrence, and all the safety information reporting in accordance with Just Culture principles.
- **Germany** replied as not having a process to identify gaps in the SMS promotion and training and that they were looking into JAA TO´s offer to identify training gaps.

Two States did not consider having a process even though they were in continuous coordination via regular meetings and oversight activities or safety committees. **Eleven** States replied as not having a process in place to identify any gaps in terms of SMS promotion/training.

Means to measure the effectiveness of the promoted material/delivered training

In at least **five** cases, the level of SMS maturity, as related to the integration of promotion material in their SMSs, is assessed during specific SMS audits (**France**, the **UK**, **Monaco**, **Ireland** and **Switzerland**). In some replies, it is pointed out that this aspect cannot objectively be measured. In the case of **Sweden,** the means to measure the effectiveness of the promoted material/delivered training was connected to the authority's risk registered with a cross-reference to the MSTs from EPAS. Out of these, **two** States quoted that the SMS Assessment Tool/level of assessment provided SMS maturity levels (**Luxembourg** and **Switzerland**). **Luxembourg** added that in their experience, the success of a State's SMS promotion efforts largely depends on the organisation's day-to-day safety culture.

Also in **three** cases (the **UK**, **Belgium** and **Finland**) training effectiveness was measured through course feedback. The **UK** outlined that feedback is sought specifically focusing on the practical application of safety management rather than just the theory. In the case of **Finland**, a short Webropol-survey (**here**) was used and in **Belgium**, a specific email address was configured to collect all feedback and comments on safety promotion material. Then, results are analysed and used when planning the next event. **Belgium** also used its regular safety bulletin to include a request for feedback.

Fifteen States replied as not having any means to measure the effectiveness of the promoted material/delivered training.

Own developed SMS promotion material

Seven States responded that they develop parallel and locally prepared promotion material. **Five** pointed to their websites (**France, Romania, Czech Republic, the UK** and **Switzerland**), and **three** developed various training material (**Italy, Austria** and **Slovenia**), including SSP training, SMS and risk management promotion/training. In addition, **UK** produced information on topics such as Safety Initiatives and Resources, Working with Industry, Safety Management Systems. Additionally, **Austria** published regular informational letters to support relevant personnel (for e.g. 'ministerial safety bulletin'). Except **two** States, all the States that answered positively to the question on locally produced SMS promotion material voluntarily attached evidence to the EPAS questionnaire.

Ten States expressed that they did not developed their own promotion material. Amongst them, **Germany** stated that its SMS implementation team would tackle this task during the summer of 2018. **Another** State remarked that the material they had from other sources was considered appropriate and **three** States planned to issue bulletins in the following year.

Delivery of such material

From the remaining **fourteen** States, the methods used are the following ones:

- Through website publication: many concurred as being the most common source of dissemination of the training (**France, Romania, Italy, Czech Republic, the UK, Croatia, Slovenia, Switzerland, Finland** and **Spain**). In the case of **Finland,** they even ran blogs with stakeholders, one on safety management (e.g. including risk management point of view). Also, Finland translated and posted links to some of the **UK** material (e.g. SMS guidance both for small and large organisations).
- Training initiatives: **Austria** and **Croatia**
- Workshops or seminars: **Croatia, Sweden, Finland** and **Czech Republic**. For example, **Sweden** organised a safety promotion seminar (consisting in four parts: compliance, management of change, SMS effectiveness and feedback from oversight experiences).
- Safety or risk management campaign bulletins (**Poland** & **Finland**)
- By mailing to the targeted audience (**Croatia** and **Finland**). In the case of **Finland**, they asked for information about the ATOs that completed the SMS Evaluation Tool.
- Distribution of printed material at airports, flight schools, or its availability at the CAA's offices, etc. (**Croatia, Slovenia** and **Switzerland**)

Finland explained two interesting initiatives:

- A draft version of guidance material for risk management. The material was done for the Trafi inspector`s own use and it was tested in oversight activities and audits. Based on the experiences collected, a material was developed for the stakeholders.
- a two years research project together with Trafi staff and an external research institution. During the project, two ideas were developed: a risk management process and methods for integrating the

different kinds of safety information into a risk picture. The TITO process ('Tiedosta toimenpiteisiin'– 'Knowledge to action') and the results were documented in detail, including lots of useful material for the stakeholder's safety risk management. The final report is titled: TITO-project (Risk-Guided Safety Management Process for a National Transport Safety Agency) and it is available (**here**).

Logically, the same **ten** countries that responded as not developing their own material, answered negatively to the question on its delivery.

1.1.3. MST.003 – Member States should set up a regular dialogue with their national aircraft operators on flight data monitoring programmes

Action title	Objective	Activity sector	Owner	Deliverable/ date
Member States should set up a regular dialogue with their national aircraft operators on flight data monitoring programmes	MS should set up a regular dialogue with their national aircraft operators on FDM programmes, with the objectives of: • promoting the operational safety benefits of FDM; • fostering an open dialogue on FDM programmes that take place in the framework of just culture; and • encouraging operators to include and further develop FDM events relevant for the prevention of RE, MAC, CFIT and LOC-I, or other issues identified by the SSP.	CAT	MS	Report on activities performed to promote FDM/continuous

Dedicated channel for dialogue with your aircraft operators on FDM matters

Fourteen States set up a dedicated channel (**France, Czech Republic, the UK, Turkey, Belgium, Austria, Sweden, Croatia, Finland, Estonia, Switzerland, Iceland, Spain** and **Latvia**), while **four** recognised that they had plans to do so (**Italy, Romania, Slovenia** and **Ireland**). **One** State answered negatively to having a dedicated dialogue, but replied that they it changed into audits of operators that are required to have FDM. **Five** States admitted not having any dialogue at all. **Croatia** pointed out that the dialogue on FDM started with AOC holders.

It is interesting the **Irish** way ahead when facing this issue. Due to the low number of operators applying FDM in the country, the State's authority decided that a dedicated FDM channel/forum would be ineffective and instead, it pooled resources with the **UK's** CAA (Functional Airspace Block partner). This position is quoted as being subject to on-going review as the number of affected operator's would increase.

From the countries having set up a regular dialogue with their operators, **two** States had bi-annual discussions on FDM matters during meetings of national flight safety officers and/or other relevant responsible managers (**France** and **Switzerland**). In the case of **Switzerland**, objectives were set within the 'just culture' framework. Other mechanisms include: FDM and risk management methodologies, FDM safety issues in general, information sharing concerning EAFDM/EOFDM outputs. The **UK** and **Turkey** had meetings with operators applying FDM.

The **Czech Republic** reported holding a regular dialogue with operators for the support of their FDM programmes within the continuous surveillance of the fulfilment of the safety management related requirements. The same State stressed that CAT operators, using the aeroplanes with the MCTOM exceeding 27 000 kg located in the country, had fully established, implemented and maintained FDM programmes

within their accident prevention and flight safety programmes. **One** AOC holder in the **Czech Republic**, operating aircraft with MCTOM below 27.000 kg, established and maintained an FDM programme on a voluntary basis.

The lack of resources is cited by at least **three** States (out of the **five** replying as not having a dialogue), adding that not all operators are concerned by FDM. Therefore, it would seem that they have no immediate plans to comply with EPAS action MST.003.

Details on dialogue channels and other activities in 2016/2017

Out of the **fourteen** States that set up a dedicated channel, **ten** States organised activities (some starting in 2017 and others during 2016 with follow-up in 2017). These activities are:

- Flight safety officers meeting, where half a day was dedicated to FDM, with the participation of an EASA representative (**France**)
- Workshops on machine learning and SQL databases to promote the FDM activities (the **UK**)
- FDM forums with aircraft operators to promote benefits and share experiences (yearly since 2016) in at least five States (**Belgium**, the **UK, Sweden, Finland** and **Spain**). In **Belgium,** in the first edition of the forum, the Terms of Reference and Confidentiality Agreement were established. The second FDM meeting with operators, in the same State, was focused on sharing experiences on unstabilised approaches (LOC-I).
- A workshop about how to use FDM to monitor crew fatigue in **Latvia**. Operators and the CAA presented different topics, some of them of a quite technical nature, based on academic research and identifying the correlation of experience and fatigue in flight crew.
- **Five** CAAs organised national FDM operators meetings (in one case twice a year). In some cases, this encounter was maintained in an informal manner, but in other cases (**Austria**) this had just been established. In **Finland,** the national Air Navigation Service Provider also took part in this forum, as well as AIB and military aviation whenever invited. Communication via email was also established.
- In **Finland**, the multiannual national safety plan included an action item, based on EPAS MST.003 action. They planned to continuously support the operators in using FDM systems, as part of their safety management, to enable the confidential dialogue and the sharing of safety information between industry stakeholders and the country's CAA.
- The **UK's** CAA was fairly active in the FDM area and intended to continue so. The initiatives included:
  - FDM specialists presenting FDM modules for CAA International (for Airworthiness and FOI courses)
  - The national Flight Safety Committee Flight Safety Officer course
  - Multiple FDM modules to the national universities
- One very good and complete example came from **Ireland** and it included its CAA and Industry Safety Managers Consultation Group that meets annually, where FDM is part of its agenda. Equally, the **Irish** CAA participated in the EAFDM Coordination Group. In parallel, it conducted annual high-level reviews with Operators on Annual Safety Performance. This allowed identifying key risk areas for the operators which were monitored under the SMS/FDM. On-going operator occurrence reporting reviews (i.e. monthly) were conducted which are supposed to include SMS/FDM information as appropriate. In addition, the FDM programme was audited during the oversight audit of the Safety Management System. Typically, the operators of the FDM programme collect and analyse events (including corrective actions) and provide trend analysis of higher risk events. Some operators in that State were working on developing target levels for certain high-risk events. The information was normally summarised in a regular aggregated report (e.g. quarterly or annually).

The same State's SSP contained a specific action to encourage operators to use the EAFDM 'Developing standardised FDM-based indicators' and they also issued EAFDM guidance on precursors to the RE, LOC-I, CFIT promoted areas during oversight activities.

- **Slovenia** reported that plans to work with aircraft operators to promote and define EAFDM events relevant for preventing RE, MAC, CFIT and/or LOC-I and use the guidance developed by EAFDM.

- In **Estonia**, the dialogue was quoted as simply based on big enough operators that already have FDM as part of their work, sending the State's authority reports and suggestions on FDM data.

- **Latvia** replied that the dialogue took place during audits on FDM or ad-hoc meetings. Equally, FDM monitoring outputs fed into the occurrence reporting system in the case of relevant information.

- **Croatia** gave information about the initial letter for intention sent to the two main national AOC holders regarding the plans for a FDM forum and the need to set common indicators. However, they noted an issue with the capabilities of the fleet of these two operators (too small) and covered such different operations to allow for data comparisons and derivation of common indicators. Furthermore, a contact with a neighbouring State's CAA was made about establishing an FDM forum on a regional level.

- On a different side of the spectrum, **Iceland** established regular meetings with the four operators in the country that fall under the FDM requirements. The meetings were made with the purpose of gathering information and promoting the material developed by EAFDM. The main group issue was to understand and implement a new document named 'Developing standardised FDM-based indicators' and to draft a document for the 'Authority Oversight of FDM'. The areas of RE, MAC, CFIT and LOC-I were considered as part of this work too.

Issues to set up a dialogue

Only **three** States reported not encountering any issues or limitations in setting up this dialogue (**France, Czech Republic** and **Slovenia**). The States that actually described certain limitations quoted them as:

- Challenges with FDM manpower coming from industry to support forums and other initiatives
- Significant differences between major airlines and business jet operators when discussing FDM programmes
- Lack of methods to share and use data correctly leading to SPI precursors (**two** States agree on this aspect)
- Lack of resources: both time and staff-wise
- Confidentiality and data protection (quoted by **two** States)
- Having to deal with different FDM software and systems
- Data usage in the correct manner

Resource pooling / cooperation with other States

Cooperation not considered:

Sixteen States did not consider setting up resource pooling with partner countries on cooperation with FDM. This represented a high rate and perhaps an aspect deserving closer consideration.

Cooperation as part of international working groups:

A **few** States that considered their participation in different forums, catered for such cooperation. For instance:

- **Two** States (**Finland** and the **UK**) declared that they took part in the EAFDM-group (which published guidance in setting up FDM forums)

- **Finland** declared also that supported ICAO in the ICAO EUR Regional Expert Safety Team on FDM (IE-REST FDM-group)

    Cooperation in place:

Three States (the **UK**, **Croatia** and **Slovenia**) reported interacting with other States. For e.g. **Croatia** cooperates with Montenegro. In the case of **Slovenia**, they cooperated with States that have similar aircraft types in the AOCs under their oversight. **Austria** observed that this cooperation was subject to availability of the staff. **Sweden** plans to establish contact with **Finland**.

Benefits/challenges of dialogue with their national aircraft operators on flight data monitoring programmes

Most of the States that answered positively to cooperation on FDM, agreed that the inherent benefits were:

- Obtaining a wider understanding of FDM
- Identifying common approaches/common SPIs and sharing experiences/good practices on FDM
- More information sources of data were obtained and the sharing process of the competencies/resources between the two agencies was seen as a great benefit for a more effective oversight. This was considered valuable for gaining know-how on some subjects.
- Sharing of the FDM analyst's techniques and the investigation of incidents were pointed as two areas of enhancement.

One State did not consider pooling with other States because they alleged data protection regulations and showed reluctance to share internal/confidential safety information on the operator´s side.

What else could be done to support Member States' regular dialogue with their national aircraft operators on flight data monitoring programmes?

Sixteen States did not elaborate further on this question, representing a very high proportion of those that answered. **Eight** States suggested more actions could be adopted (**Austria, Sweden, Finland, Ireland, Slovenia, Iceland, Spain** and **Luxembourg**). The actions they suggested were:

- Conduct of workshops and tools for sharing/analysis data
- Promotion of the guidance document published by EAFDM (as pointed by **one** State)
- Elements from the 'Good Practice' documents to be elevated to regulatory type documents (e.g. as Guidance Material).
- Further development of guidance material on new safety issues and indicators from Data4Safety, Safe Clouds and national FDM forums. **Ireland** pointed out that more guidance should be put in place on FDM for small operators (pooling of data, access to more qualitative information). The same State commented on the safety management process, where they observed that there is a lack of harmonised procedures for FDM data retention. The data retention strategy could aim at providing the greatest safety benefits practicable from the available data. However, they pointed out that various practices, used by different FDM-users due to different FDM-agreements between the operator and their personnel, do not always lead to the best possible situation.
- **Ireland** remarked as well that EASA should develop the best way to harmonise the principal elements and practices of operators FDM programmes in order to improve safety and the level playing field for the operators and the pilots from different companies and under different FDM agreements.
- **Ireland** also recommended assigning a focused oversight and a safety promotion task for the States. These could use the guidance material developed by EAFDM and ensure their sufficient

implementation in their CAA activities, such as safety promotion and FDM-oversight. Those guidance materials could include documents such as the 'Guidance for National Aviation Authorities on setting up a national FDM forum' (version 2, edition 2017), 'Developing standardized FDM based indicators' (version 2, edition 2017) and 'Good Practice on the oversight of FDM programmes' (version 1, edition 2017).

Luxembourg observed that the guidance provided in the document published by EAFDM was very helpful and detailed, but it does not replace the resources needed to do some active promotion. **Germany** informed on the initiative to establish in the future a national forum on flight data monitoring.

Monitoring of significant operational risks

Checking the FDM programmes of State's aircraft operators, so operational risks identified in State's SSPs could be monitored with FDM.

Not checking FDM programmes:

Nine States declared that they did not check FDM programmes from national operators. Some cited issues such as:

- Lack of resources (as mentioned by **two** States, one of them pointed this on both operator's and authority's side)
- No risks were identified in their SSP (as mentioned by **two** States)
- States' SSP was adopted too recently and it was considered premature to make this requirement (as mentioned by **two** States)
- The FDM forum was set up too recently (mentioned in **one** case)

One State reported that the focus on operational risk areas was done by the operators and discussed in the FDM meetings. They recognised not checking operational risks identified in their State's SSP due to this reason.

FOCA was working on defining the ALoSP and once this is defined and in a more mature phase of implementation, they plan to check these operational risks with the operators.

Planning to check FDM programmes:

Four States considered this aspect in their plans. **France** explained that the risks related to the approach phase, such as RE and CFIT, were pretty well covered by the FDM analysis within French airlines, but there was still room for improvement on the subject of LOC-I precursors. **Romania** mentioned that this FDM programme was going to be linked with standard oversight activities and **Italy** acknowledged that there was an action in their national plan connected to this aspect and the MST.003 action in EPAS. **Another** State planned to organise regular meetings with air operators on FDM issues and to encourage operators to include in FDM the operational risks they identified. **Germany** outlined that their OPS inspectors were going to check if operators took note of the SSP safety priorities and if this was reflected in the FDM analysis.

Checking FDM programmes:

From the **ten** States (**the UK, Turkey, Belgium, Austria, Sweden, Finland, Ireland, Iceland, Luxembourg** and **Latvia**) that did check this programme, **six** specified that it was done through their audit/oversight/surveillance process. **Turkey** considered that there is a risk derived from FDM data and added it in their SSP. The **UK** was doing this activity during AOC inspections based on the flight operations inspector's discretion. However, **one** of the States recognised that there was still room for improvement for the identification of LOC-I precursors.

Belgium encouraged operators to include EAFDM and EPAS events relevant for the prevention of RE, MAC, LOC-I, CFIT and so on in their FDM programmes. In **Sweden**, the EPAS and their risk register were used to select issues with the highest risk and for these issues they planned to seek precursors during FDM forums. In **Latvia**, operators submitted their SPI targets to the authority bi-annually. Some of the targets were FDM based and covered issues identified in SSP.

Ireland was particularly active in this respect. It informed that the FDM programmes were reviewed in all affected national AOC holders to confirm that they were monitoring all the key risk areas identified in the State Safety Plan, which included RE, MAC, CFIT, LOC-I, RI and Safety of Ground Operations. The results of this review also established the needs for continuous monitoring of the FDM and the **Irish** CAA developed a specific audit checklist for this purpose.

One quite interesting case was that of **Finland.** It combined this check as part of the oversight function in audits, but also, in FDM-forums, where the operators were presenting their analysis results including national SPIs. The Authority was also presented in Safety Review Board meetings of national airlines as an observer. The State's national multiannual safety plan contained actions on FDM. The first objective of the actions was to include the national safety indicators in operators' FDM programmes where applicable. The deliverable was that the safety performance indicator data to be taken into account in FDM events to the extent that this data could be derived from the FDM data.

The objective of the other action was to support the safety management of national aviation and of the FDM operators through comprehensive and systematic utilisation of FDM data. The deliverable was a national FDM review template that was developed during 2017 and afterwards, used continuously.

Chapter Two: Operational issues – CAT Aeroplanes

2.1. Aircraft Upset (LOC-I)

2.1.1. MST.004 - Include Loss of Control In Flight in national State Safety Programmes

Action title	Objective	Activity sector	Owner	Deliverable/ date
Include Loss of Control In Flight in national State Safety Programmes	Loss of control in flight shall be addressed by the MS on their SSPs. This will include, as a minimum, agreeing on a set of actions and measuring their effectiveness.	CAT/HF	MS	SSP established/ continuous
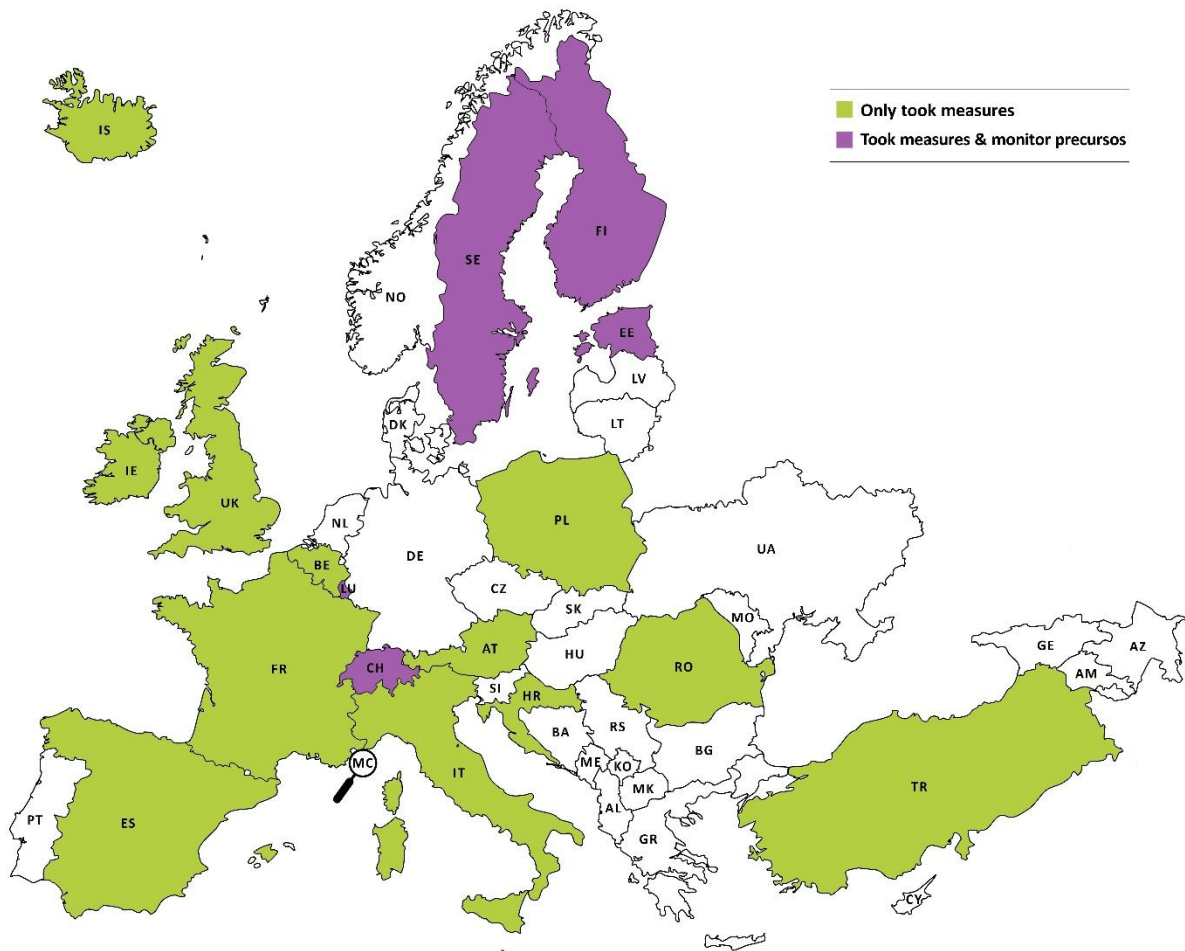
Figure 6 Countries which included Loss of Control In Flight in their national State Safety Programmes
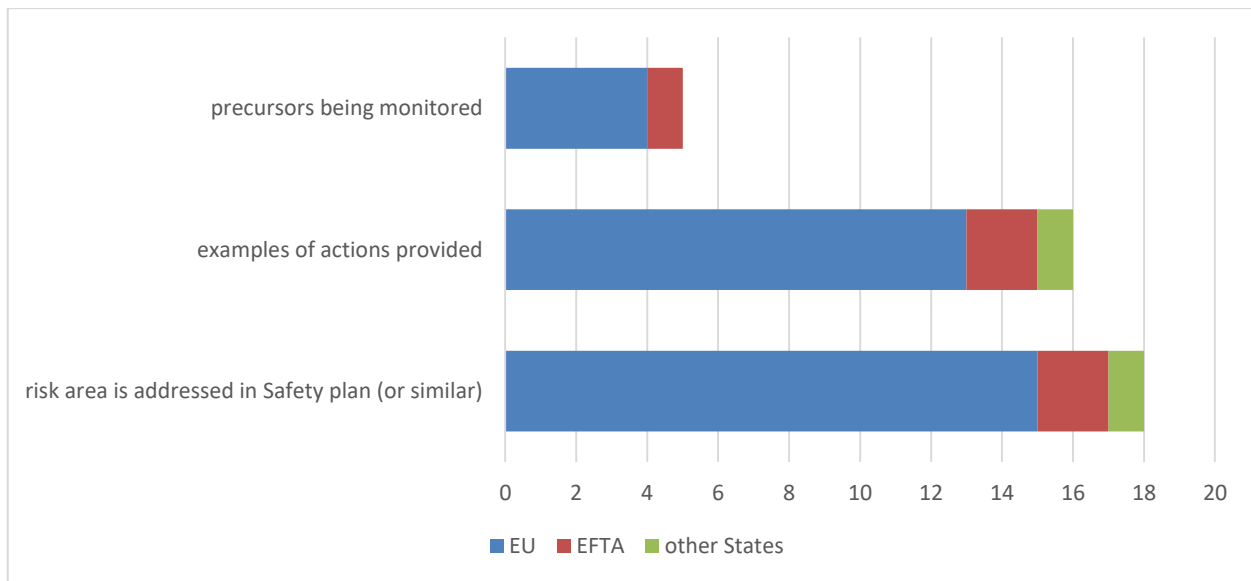
Figure 7 Actions took by the countries to address this MST in 2017

The **majority** of the States addressed the issue of loss of control in flight and included it in their national State Safety Programmes. Their actions include activities such as monitoring the number of occurrences and approaching case-by-case in order to mitigate the risks (**Estonia, Iceland** and **Croatia**), establishing safety performance indicators and FDM precursors for identified risk areas (**Turkey** and **Finland**) and promoting different safety actions through symposiums (**France**), seminars (**Sweden**) or flight crew training (**Ireland**). For the optimisation of pilot performance, **UK** identified the next specific areas where the flight safety needs to be enhanced: human factors in automation and flight path management, non-technical pilot skills and crew supply chain in flight operations. **Belgium** developed a three-step plan in order to mitigate the risk of loss of control in flight: the prevention of collision with animals (bird and wildlife strikes), the development and assessment of the procedures to follow in the case of laser interference and the implementation and active monitoring of LOC-I precursor measures (unstabilised approaches) at aircraft operators during **Belgian** FDM forum. Moreover, **Italy** suggested a plan composed of six actions: the recognition of similar actions already performed by other CAAs, the SPI identification derived from Safety Data (e.g. Mandatory Occurrence Reports - MOR), the collection of Safety Data, the analysis of Safety Data collected, and the identification of mitigation measures and the evaluation of their effectiveness. Although **many** countries took actions for this problem and others plan to include it in their safety plans, there are four countries (**Monaco, Czech Republic, Norway** and **Austria**) which did not consider the loss of control in flight-relevant for their activity.

Fourteen countries identified their main factors that contribute to the loss of control in flight risk in their area:

- **France**: high altitude flights, loss of control during go-around, difficulty to analyse the equipment faults which may lead to an upset;
- **Italy**: personnel task performance events, training on equipment or aircraft, abrupt manoeuvre;
- **UK**: human performance, adverse environmental conditions, technical failures;
- **Turkey**: excessive roll in approach, excessive roll in climb, excessive pitch;
- **Belgium**: dangerous weather conditions, deviations from flight path, bird and wildlife strikes, laser interference;
- **Austria**: weather and wake turbulence;
- **Sweden**: de-/anti-Icing procedures, component failure followed by crew incapable to resolve, identify and fly, CRM;

- **Croatia**: WX (turbulence, wake vortex, wind shear, thunderstorm, lightning strike), weight and balance (W&B) errors and over speed or low-speed event;
- **Ireland**: unstable approach, high-speed warnings, including at high altitude (e.g. due to environmental factors), crew performance (e.g. handling, procedural errors);
- **Estonia**: flap/slat over speed, aircraft weight and balance errors, de-icing and anti-icing errors;
- **Slovenia**: unstabilised approaches, abnormal State of the aircraft (speed), stick shaker activation;
- **Switzerland**: human performance limitations (deviations from parameters from insufficient monitoring of as speed, bank/roll and pitch), weather affecting speed, bank/roll and pitch and incorrect configuration of aircraft due to lack of information;
- **Spain**: aircraft upset, aircraft handling, weather and environmental encounters;
- **Latvia**: General Aviation;
- **Luxembourg**: cargo moving/shifting during flight, weight and balance issues due to wrong loading, technical de-icing system.

New precursors have been monitored in **three** States: CRM training in **Sweden**, technical de-icing system in **Luxembourg** and a lot more in **Switzerland**: aeroplane buffet/stall, deviation bank/roll, deviation in intended airspeed, deviation pitch, aeroplane' spin, aeroplane' spiral dive, helicopter inadequate rotor rpm, helicopter settling with power/vortex ring, helicopter-mast bumping, damage to aircraft (helicopter), helicopter dynamic roll-over, helicopter-loss of tail rotor effectiveness (LTE), cargo smoke, fumes and fire, aircraft in flight fire, weight/balance calculations, baggage distribution not matching documentation, cargo not matching documentation, baggage loading/unloading, cargo loading/unloading, cargo exceeds storage compartment limitations, baggage exceeds storage compartment limitations, baggage unsecured with shift, baggage unsecured without shift, cargo secure with shift, cargo unsecured without shift, passenger boarding, take-off-with previous damage, icing conditions encounter, aircraft in flight fire and fire.

The last topic of this operational issue is about the mechanisms the States put in place, how are they being implemented by the affected service providers and what are the States' methods for measuring their effectiveness. **Some** of the States focused on promoting activities such as creating safety promotion material (**France**), organising FDM working groups and sharing public awareness material (**Turkey**), organising open discussions (**Belgium**) and publishing awareness material on stall recovery (**Slovenia**). The **UK** established the Pilot Performance Programme which covers the areas of LOC-i and CFIT and it was working on the implementation of the Upset Recovery training. **Switzerland, Ireland** and **Sweden** focused on realizing training too. When asked about the methods to check how service providers implement the previously mentioned mechanisms, **eight** countries mentioned the standard oversight inspections, audits and meetings with service providers. The **UK** highlighted the importance of close collaboration with the industry. On the effectiveness matter, a lot of countries identified difficulties to monitor the value of the safety indicators attached to the safety actions. In **Croatia** an alert line was established in order to mitigate and control the risk.

2.2. Runway safety

2.2.1. MST.007 - Include runway excursions in national State Safety Programmes

Action title	Objective	Activity sector	Owner	Deliverable/ date
Include runway excursions in national State Safety Programmes	REs should be addressed by the MS on their SSPs in close cooperation with the aircraft operators, ATC, airport operators and pilot representatives. This will include, as a minimum, agreeing on a set of actions and measuring their effectiveness.	CAT/HF	MS	SSP established/ continuous.
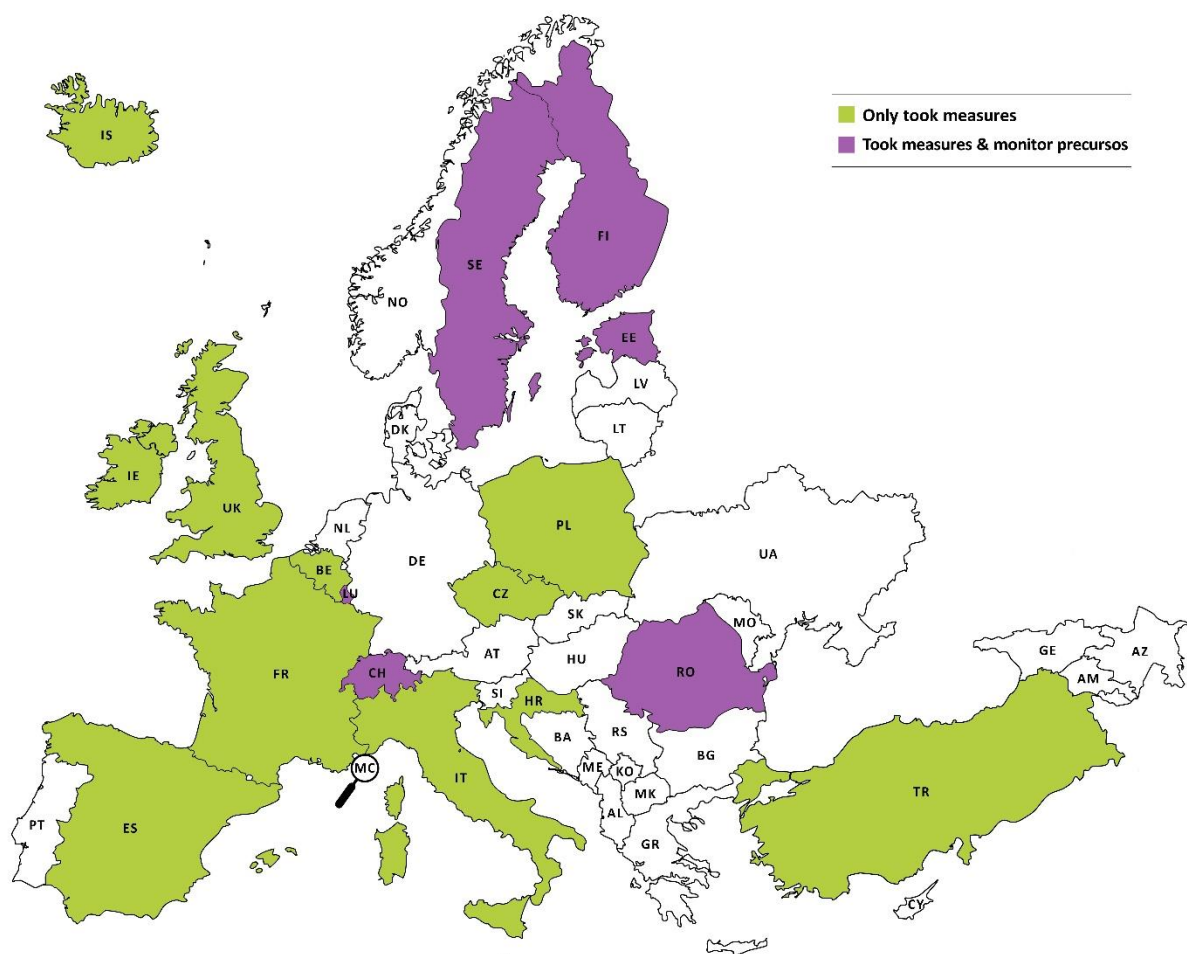
Figure 8 Countries which included runway excursions in their national State Safety Programmes

Figure 9 Actions took by the countries to address this MST in 2017

Nineteen countries addressed the RE topic in their Safety Plan at a national level and more States were going to include it in the near future. **Most** of them assessed this issue through their Risk Management Process and followed the EAPPRE. **Sweden** was focusing on the safety promotion seminars, while **Belgium** was collaborating with the aircraft operators on defining FDM events relevant for RE prevention. The States identified the main factors which contribute to the RE risk and the most significant were: unstabilised approaches, abnormal landings (heavy/bounced/baulked), weather and environmental encounters, insufficient approach preparation, wind shear and weight and balance issues due to wrong loading. In order to mitigate the risks, **fourteen** countries addressed the EAPPRE (**The Czech Republic** and **Switzerland**), oversight the organisations (e.g. **Germany, Slovenia, Ireland, Sweden, Austria**) and disseminated safety information through workshops and training (**Turkey, UK, Belgium, Sweden, Ireland**). Except for **Switzerland** and **Luxembourg**, the States did not identify new precursors compared to previous years.

The affected service providers were being supervised through continuous SMS oversight and inspections in **ten** States (**Poland, Switzerland, Poland, Ireland, Latvia, Finland, Sweden, Belgium, Turkey,** and **France**). The **UK** monitored the implementation through aerodrome and ATM audits (**Austria** was going to perform this action too). **Sweden** organised flight safety seminars and runway safety teams. **Sixteen** countries identified methods to measure their effectiveness: most of them monitored the numbers and the rates of reported occurrences, **three** of them did not measure it yet, two of them oversaw the safety indicator (**Romania** and **Belgium**), two of them followed the MORs of the organisations (**Ireland** and **UK**) and in **Croatia** an alert line was created.

EAPPRE - European Plan for the Prevention of Runway Excursions

Fourteen States addressed EAPPRE in their Safety Plan and more were working on adding it in the future, but there were **two** countries which did not consider its implementation relevant. The EAPPRE recommendations were monitored through oversight activities in the majority of these countries.
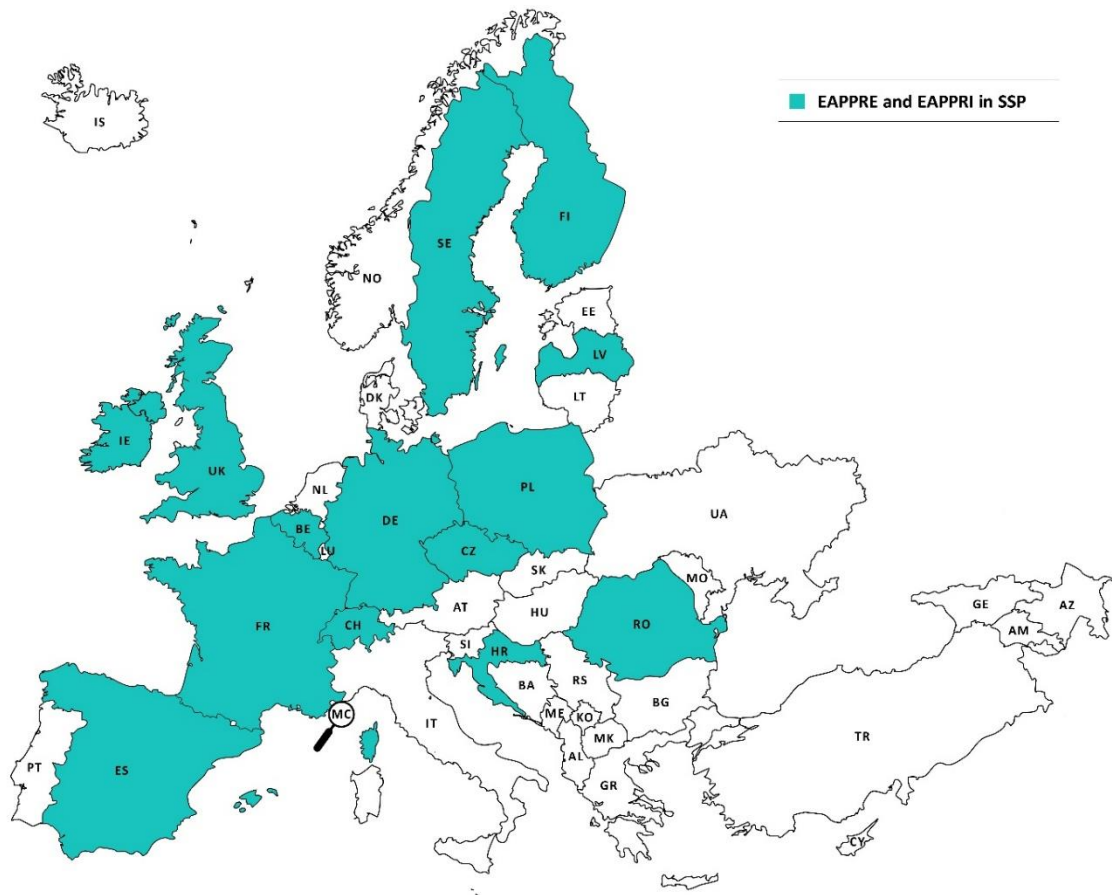
Figure 10 Countries which addressed EAPPRE and EAPPRI in their Safety Plan
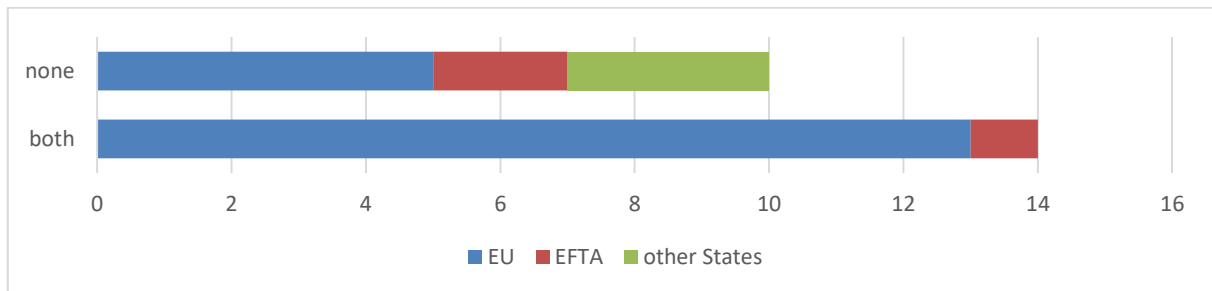
Figure 11 Countries which addressed EAPPRE or/and EAPPRI in their Safety Plan

SAF11 Prevent Runway Excursions - correlations with EUROCONTROL's / SESAR JU'S European Master Plan Level 3

This risk area is also monitored by EUROCONTROL and its results were published in the European Master Plan Level 3 Implementation Report (**here**).

2.2.2. MST.014 – Include runway incursions in national State Safety Programmes

| Action title	Objective	Activity sector	Owner	Deliverable/ date
Include runway incursions in national State Safety Programmes	RIs should be addressed by the MS on their SSPs. This will include, as a minimum, agreeing on a set of actions and measuring their effectiveness. MS should implement actions suggested by the European Action Plan for the Prevention of Runway Incursions.	CAT/GA/HF	MS	SSP established/ continuous
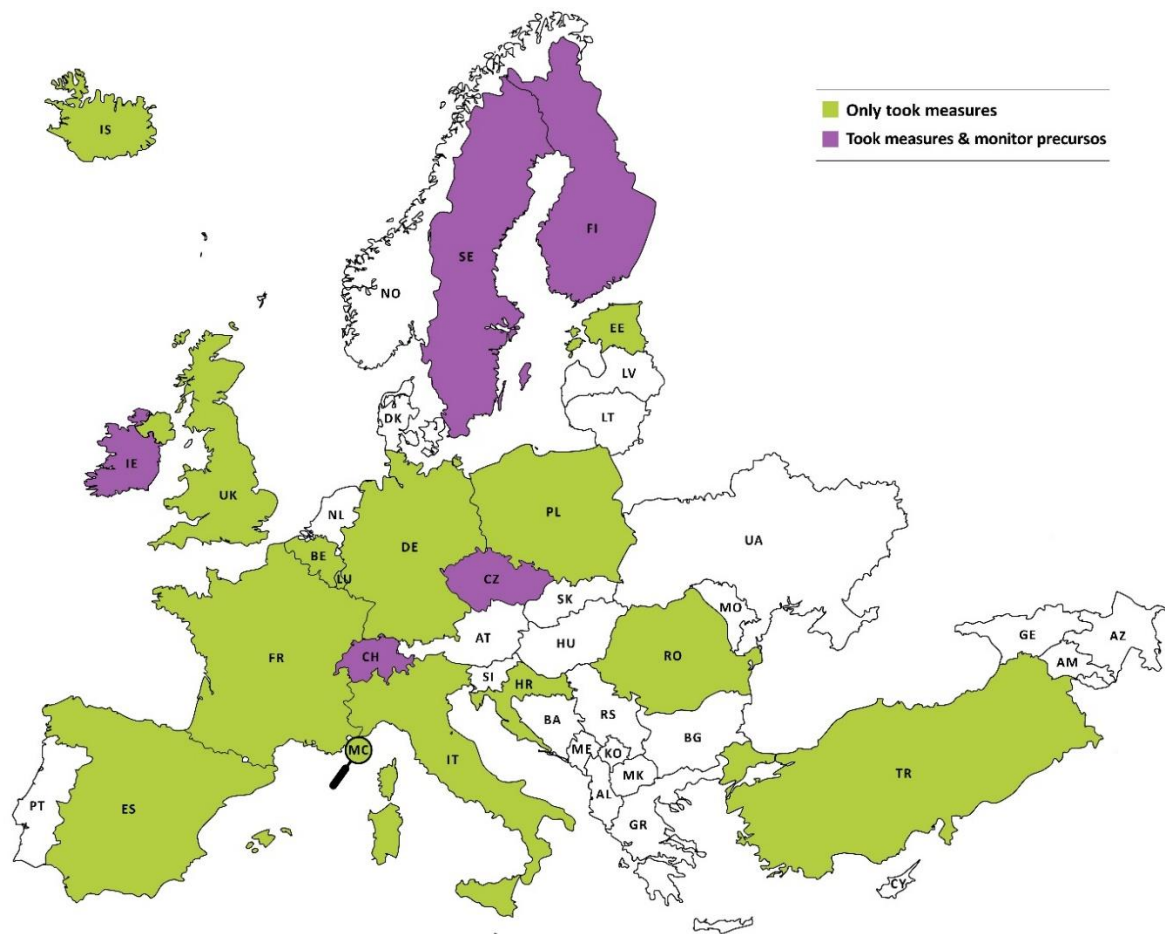
Figure 12 Countries which included runway incursions in their national State Safety Programmes
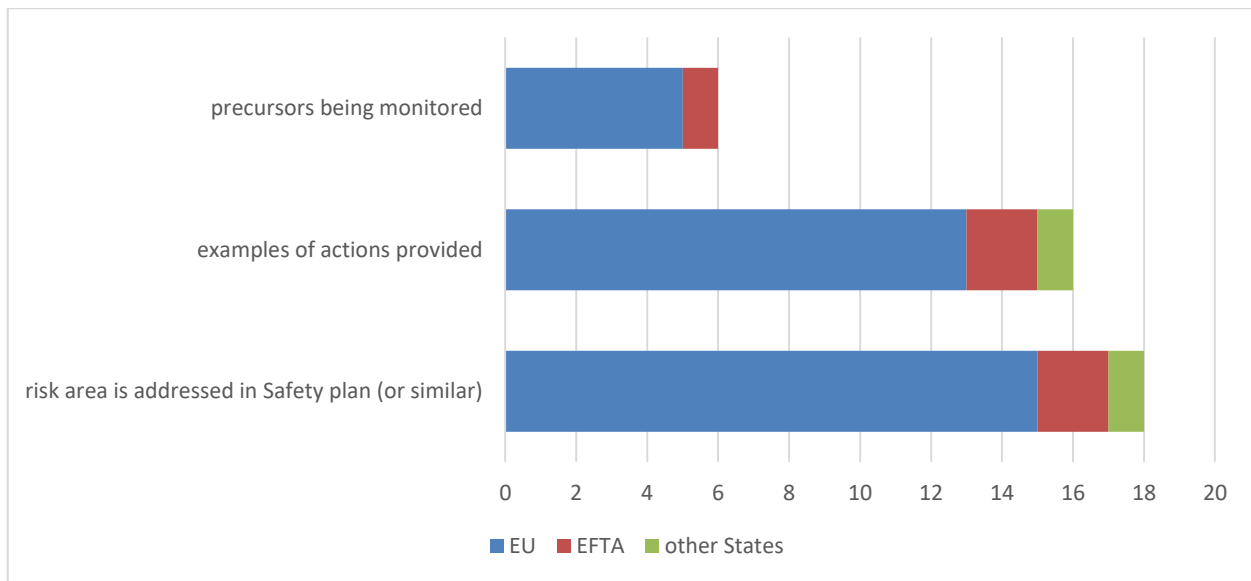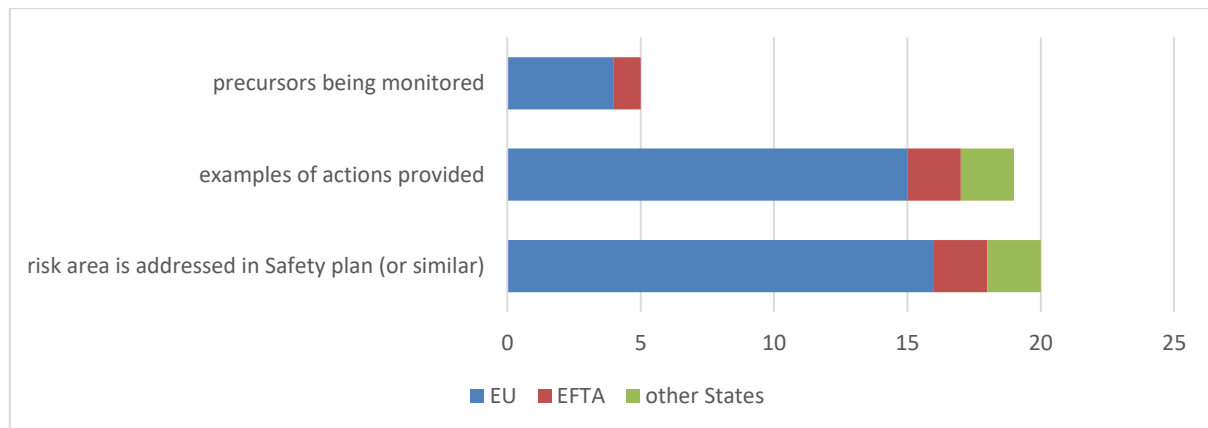
Figure 13 Actions took by the countries to address this MST in 2017

Twenty one States addressed runway incursions in their Safety Plan. The main category of actions taken by these States was the oversight of the organisations. **Turkey** monitored safety performance indicators and FDM precursors for identified risk areas, **Sweden** performed focused theme inspections, for e.g.: line inspections, OPC-inspections, training programme inspections, manual inspections, audits. **Finland** included the threat of runway incursions (RI) and their identified causal factors in the **Finnish** aviation safety performance indicators and targets. **Iceland, Ireland** and the **Czech Republic** focused on the implementation of EAPPRI. **Italy** outlined its structured approach to including this aspect in its State Safety Programme.

Some of the main factors identified to contribute to the RI risk were: aerodrome design, weather in terms of poor visibility, ATM staff communication, ignoring safety procedures by ground handling, crossing holding point without authorization, failure to establish standard operating procedures (SOP) with the effect to mitigate the hazard (CRM, TEM), miscommunication between ATC and ground handling, animals on runway.

Monaco identified three factors, specific to its situation: small size of the helipad, proximity of buildings and high density of traffic. Only **five** countries identified new precursors: work in progress (**France**), communications by flight crew with ANS (**Czech Republic**), cross-domain action and phraseology (**Sweden**), RI due animals (recently monitored by **Ireland** under the new Taxonomy 'WILD') and much more in **Switzerland**: landing on incorrect rwy, landing without clearance, ATCO clears aircraft to take off or land in error, flight crew inadequate situational awareness (SA), flightcrew believing they have been instructed to enter protected area.

Regarding the mechanisms put in place by the States in order to address these risks, the **majority** of the countries gave examples of safety promotion actions (**France, Monaco, Turkey, Sweden,** and **Slovenia**), and of oversight actions (**UK, Croatia, Latvia, Finland, Ireland, Switzerland** and **Austria**). **Belgium** focused on the communication with the stakeholders and **Luxembourg** installed an advanced surface movement guidance and control system (A-SMGCS) at Luxembourg's airport (ELLX) and was considered operational (level 1). Audits and inspections were conducted by **most** of the countries in order to check the implementation of the previously mentioned mechanism by the affected service providers. **Romania** developed surveys regarding the compliance with EAPPRI, **UK** gathered information through the feedback from LRSTs to aerodrome inspectors. Their effectiveness was measured by the countries through safety indicators in most of the countries (occurrence reports, trend monitoring, risk portfolios, runway safety team meetings).

EAPPRI - European Plan for the Prevention of Runway Incursions

More than half of the countries which answered the questionnaire, addressed EAPPRI in their Safety Plan and they monitored the implementation of its recommendation through ANSP and airport audits (**France**), through surveys (**Romania** and **Finland**), aerodrome and ATM inspections (**UK** and **Belgium**), continuous monitoring (**Croatia, Sweden, Ireland, Spain** and **Latvia**). This is represented in a map diagram and in a bar chart on the 32 of this report.

AOP03 Prevent Runway Incursions - correlations with EUROCONTROL's / SESAR JU's European Master Plan Level 3 (2015)

This risk area was also monitored by EUROCONTROL and its results published in the European Master Plan Level 3 Implementation Report (**here**). Nevertheless, after several editions, EUROCONTROL stopped reporting with the 2015 one. The conclusion on this area is as follows 'Implementation of the EAPPRI 2.0 recommendations has surpassed its FOC by two years. However, analysis of 2015 data shows that all SLoAs have reached above 80% of completion which qualifies this objective to be declared as achieved.'

2.2.3. MST.011 – Runway safety teams

Action title	Objective	Activity sector	Owner	Deliverable/ date
Runway safety teams	MS should audit their aerodromes to ensure that a local runway safety team is in place and is effective. MS will report on the progress and effectiveness.	ALL/HF	MS	Report/ continuous

Except **one** State (**Monaco**), all the other **twenty three** States had local runway safety teams (LRST) set up at the certified airports. Between the organisations which take part on them, the most popular were ANSP, aerodrome operator, airport authorities, AOC holders, handling companies, airlines, flight training clubs and the local civil aviation authority in some cases. In **Germany, Luxembourg, Spain** and **Croatia,** military representatives, aerodrome rescue and firefighting services or service providers participated to this team. Regarding monitoring the effectiveness of these LRSTs as part of the safety oversight scheme in the country's CAAs, the States were very active (**twenty one** out of **twenty two** monitor it) and all of them engaged in related activities, as attending LRST meetings (**Spain, Switzerland, Latvia, Croatia, Turkey, UK** and **Slovenia**) and continuous oversight (**France, Romania, Italy, Czech Republic, Austria, Sweden, Finland, Ireland, Estonia, Iceland, Luxembourg** and **Latvia**).

2.3. Airborne Conflict (Mid-air collisions)

2.3.1. MST.010 - Include MAC in National State Safety Programmes

Action title	Objective	Activity sector	Owner	Deliverable/ date
Include MAC in National State Safety Programmes	MACs shall be addressed by the MS on their SSPs. This will include, as a minimum, agreeing on a set of actions and measuring their effectiveness. MS should implement actions of the European Action Plan for Airspace Infringement Risk Reduction.	CAT/HF	MS	Report/ continuous
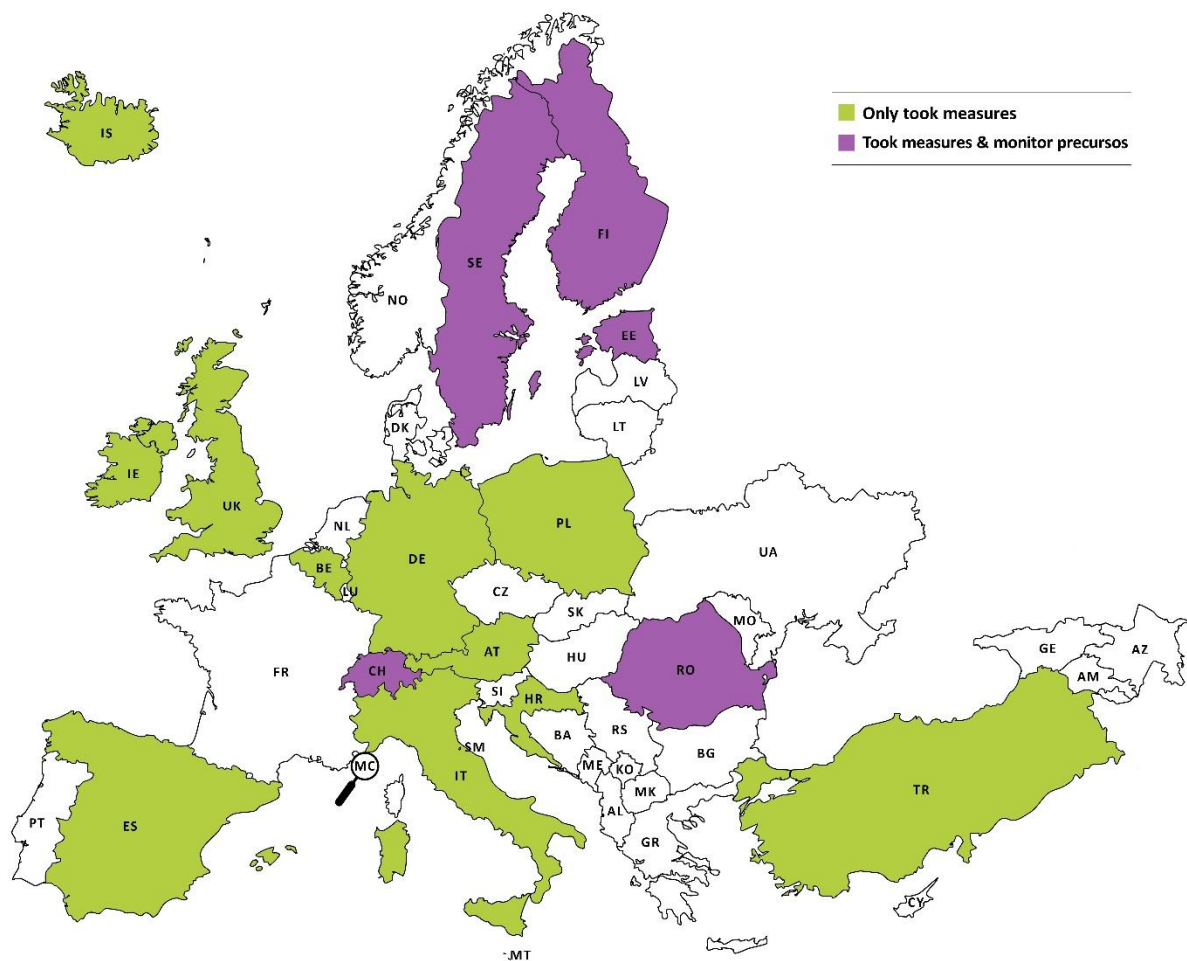
Figure 14 Countries which included MAC in their National State Safety Programmes
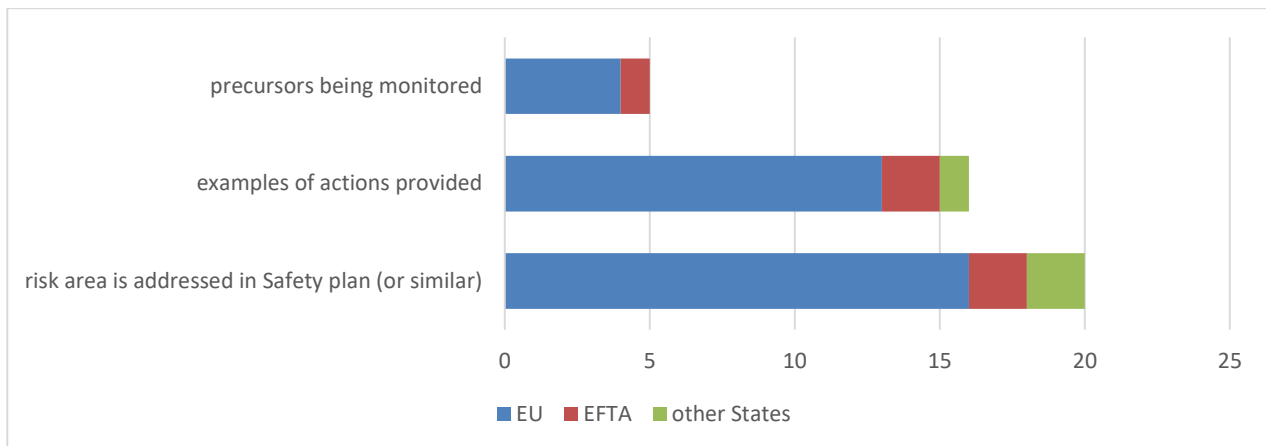
Figure 15 Actions took by the countries to address this MST in 2017

Almost all the States that provided an answer to the questionnaire confirmed addressing MAC in their Safety Plans at a national level. The **Czech Republic** did not consider mid-air collisions a safety risk and **Slovenia** was working on adopting a new safety plan.

When asked about the actions they took in this regard, most of the States monitored the number of MAC occurrences and approach them case-by-case. **Seventeen** countries identified the main risk factors: altimetry errors transmitted by one of the airplanes (**France**), airspace infringements (**France, UK, Croatia, Finland** and **Latvia**), VFR traffic (**Monaco**), poor airmanship-see and avoid (**UK**), poor pre-flight planning in GA (**UK**), level bust (**Turkey, Belgium, Croatia** and **Estonia**), loss of separation (**Belgium** and **Estonia**), human errors (**Croatia, Sweden** and **Austria**), drones (**Finland**) and many others. **Sweden** monitored new precursors such as RPAS occurrences and **Switzerland** mentioned **six**: loss of separation, separation minima infringement, near airborne collision with aircraft, near airborne collision with another airborne object, near airborne collision with RPAS and airborne collision with RPAS.

In the last year, safety promotion activities were put in place by more than ten States to mitigate the risk of MAC. **Latvia** highlighted the effectiveness of administrative penalties in GA for penetrating restricted/danger/controlled airspace and encouraged reporting of related occurrences by ANSP and military. The **UK** CAA focused on monitoring level bust and implemented Local Airspace Infringement Teams (LAITs) in higher risk areas. When asked if they knew about the actions conducted by the affected service providers and the methods to measure their effectiveness, **sixteen** countries mentioned activities related to oversight and evaluation of the data provided by the ones engaged in this matter. For monitoring them, States measured their evolution relating to the number of occurrences, KPIs, SPI indicators, risk portfolios and other expert analysis.

2.3.2. MST.024 - Loss of separation between civil and military aircraft

Action title	Objective	Activity sector	Owner	Deliverable/ date
Loss of separation between civil and military aircraft	Several EU MS have reported an increase in losses of separation involving civil and military aircraft and more particularly an increase in non-cooperative military traffic over the high seas. Taking into account this situation, and the possible hazard to civil aviation safety, the European Commission mandated EASA to perform a technical analysis of the reported occurrences. The technical analysis issued a number of recommendations for the MS: • endorse and fully apply Circular 330; • closely coordinate to develop, harmonise and publish operational requirements and instructions for State aircraft to ensure that 'due regard' for civil aircraft is always maintained; • develop and harmonise civil/military coordination procedures for ATM at EU level; • report relevant occurrences to EASA; and • Facilitate / make primary surveillance radar data available, in military units, to civil ATC units. The objective of this action is to ensure that Member States follow-up on the recommendations and provide feedback on the implementation.	CAT	MS	Report / 2018

More than half of the countries, when questioned about the implementation of the ICAO Circular 330 recommendations, confirmed taking actions in this regard. The Flexible Use of Airspace (FUA) concept was realised in **five** States (**UK, Croatia, Finland, Iceland** and **Germany**). **Italy** affirmed endorsing all the recommendations, **Romania** only the chapters 2 and 3, Sweden focused on the chapters 3 and 4.1 and Ireland on chapter 2. **Estonia** and **France** highlighted the importance of cooperation between civil and military units. **Romania** indicated that plans to implement the civil-military cooperation for ATM in crisis situations and Ireland was going to review the Circular 330 and to identify any remaining gaps.

The Agency recommended the Member States to coordinate, develop and harmonise the operational requirements and the instructions for State aircraft operations in order to ensure that, when flying over the high seas, 'due regard' for civil aircraft is always maintained. Also, the Agency recommended making these procedures publicly available, so that civil flight crews are aware of such procedures. Unfortunately, only **half** of the countries implemented these recommendations. **France, Romania, Ireland** and **Slovenia** and **Latvia** were going to take action soon. **Italy** implemented the 'EUROCONTROL EUROAT' document, **UK's** ANSPs was involved in harmonising the operational requirements for State aircraft, **Sweden** published information addressed to airline operators and to national civil operators, **Croatia** established the military zones over high seas and published them in AIP and **Finland** published a public document regarding the 'Due regard' procedure. When asked about making their State procedures available to civil flight crews, **less than ten** countries signed to do so. Most of the States were still working on their implementation.

The Agency recommended Member States to work closely together, further develop and harmonise the concrete civil and military coordination procedures for ATM at European Union level. These procedures should address, amongst other things, the timely dissemination of information when non-cooperative military traffic is likely to fly over the high seas within neighbouring Area Control Centres (ACCs). Similar coordination had to be implemented at the tactical level between Air Defence and ATC units when scramble aircraft become airborne for interceptions. **70%** of the countries implemented this recommendation or were in the process of implementing it. **Romania** claimed having an agreement with the Government of the Republic of **Bulgaria** regarding Air Policing Cross-Border Operations, a technical arrangement between the Ministry of Defence of the Republic of **Bulgaria** and the Ministry of National Defence of Romania regarding Air Policing Cross-Border Operations, 'RENEGADE Procedures' and a letter of agreement (LoA) between ACC Sofia and ACC Bucharest. The **UK** re-launched the MAC programme and published the Skyway Code which was designed to provide practical guidance on safety, operational and regulatory issues relevant for those involved in GA. **Finland** actively participated and contributed to the European initiatives concerning civil/military cooperation. As a practical example is the establishment of the Baltic Sea ad-hoc civil-military expert group together with ICAO, NATO and the Baltic Sea States. Based on this project, **Latvia** underlined the fact that navigation waypoints for flight planning purposes were established over the high seas in the Baltic sea for Russian State aircraft for flight planning processes (along with the FIR border), based on their historical data.

Another recommendation is that the Member States should notify the Agency of related safety occurrences in a timely manner. Most of the countries reported having had a system for reporting safety occurrences involving the civil and military aircraft and report having them in the last five years. The most popular method of reporting to EASA was through the European Central Repository (ECR), quoted by: **Italy, UK, Ireland, Switzerland, Germany, Spain**, **Latvia** and those who mentioned ECCAIRS are: **France, Belgium, Finland** and **Iceland. Romania** and **Sweden** preferred to share this information through a contact point at **EASA**.

In situations where there is a risk of interference of non-cooperative traffic with civil traffic, not many countries provided the primary surveillance radar data to the civil ATC units. According to **Latvia's** national regulations, this kind of information was considered off limits to the civilian ANSP. In the **UK,** military sensor data was merged with civil sensor data to produce one single composite radar picture at London Joint Area Operations (LJAO).

2.4. Ground safety

2.4.1. MST.018 - Include ground safety in national State Safety Programmes

Action title	Objective	Activity sector	Owner	Deliverable/date
Include ground safety in national State Safety Programmes	The ground safety issue shall be addressed by the MS on their SSPs. This will include, as a minimum, agreeing on a set of actions and measuring their effectiveness.	CAT/HE/HF	MS	SSP established/ continuous
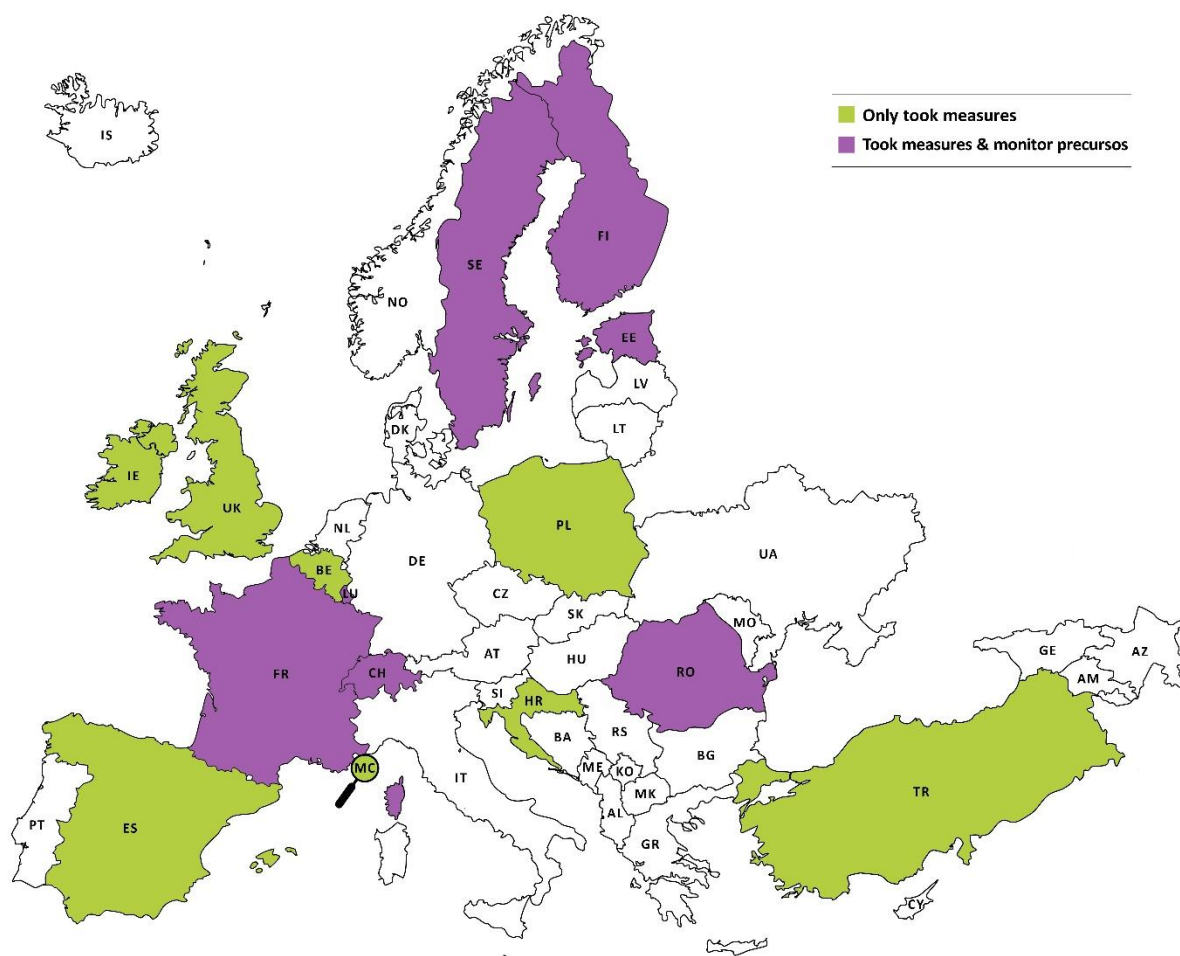
Figure 16 Countries which included ground safety in their national State Safety Programmes
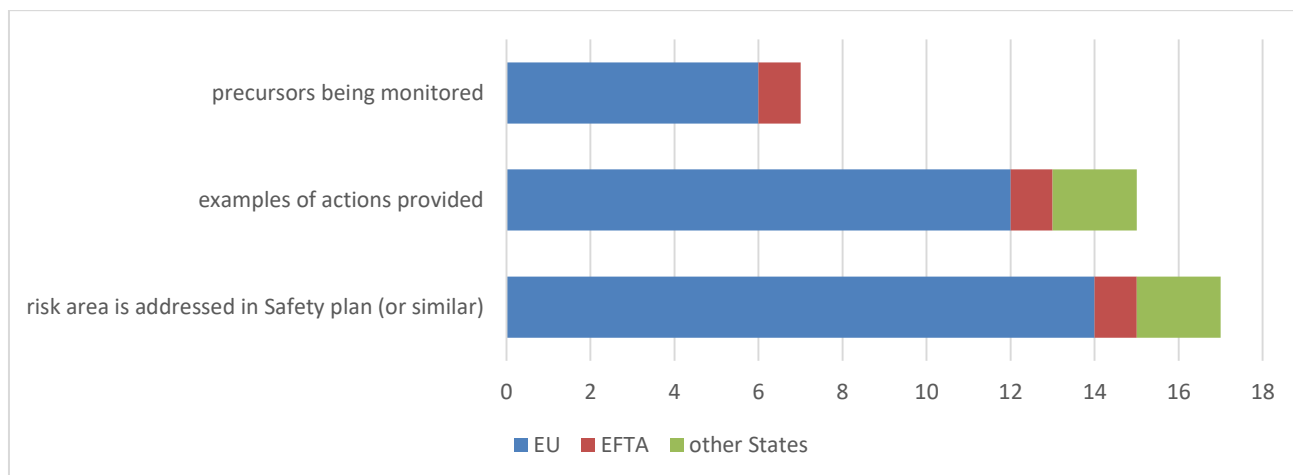
Figure 17 Actions took by the countries to address this MST in 2017

Ground safety addressed in State's Safety Plan at national level or similar

Fifteen States included ground safety in their SSPs, namely: **France, Monaco, Romania, Italy, the UK, Turkey, Belgium, Sweden, Finland, Ireland, Estonia, Poland, Spain, Luxembourg** and **Latvia**. **Four** States included specific actions to comply with MST.018 in their multiannual safety plans without specifying which the concrete ones were.

From the States replying with details, measures in place ranged amply. They are as follows:

- Safety promotion symposiums/seminars were mentioned by two States (France and Sweden). Sweden detailed that several of their agenda items were to identify findings and corrections regarding SMS, including subcontractors, as well as highlights the topic of de-/anti-icing,
- France's DGAC participated to the ICAO Ground Handling Task Force,
- Helipad safety operations were developed in the heliport operations manual in Monaco,
- The UK put in place for many years a document titled 'Airside Safety Management'. This provides guidance to airside operators, including ground handlers, on safe working and operational practices. The document was planned be republished by the end of 2017. The State' CAA ran a regulator/industry group for many years - Ground Handling Operations Team (GHOST). This group organised meetings about the industry initiatives including: miss loading of aircraft, late changes of baggage, ground damage occurrences and just culture issues. The UK's CAA was also taking an active part in the debate on the inclusion of Ground Handling safety in the Basic regulation and was chairing an ICAO task force that was developing a best practice manual. The safety data section of the CAA continued to monitor all mandatory occurrence reports in this area including ground collisions, miss loading of baggage and freight and de-icing.
- Two States (Finland and Sweden) monitored safety performance indicators/safety promotion occurrences, including Ground Handling.
- The approval of ground handling activities in Belgium (at Brussels-National airport) for existing ground handling companies included the requirement for ground handlers to implement SMS. In the same State the development of safety awareness animations for ground safety was a measure conducted by the main airport managing company.
- All aerodromes in Austria were going to be certified in 2017. Based on the Regulation EU 139/2014, a full compliance check in respect of RE was going to be performed (DSN and AMC).

In the case of a non-compliance, a CAP is developed by the ADM-operator and agreed by the oversight authority.

- Based on non-compliances/deviations, a hazard-log was developed, which could be reflected in ongoing oversight activities including a 48-month-oversight-plan (Austria).
- The ADM-operators and the third-party ground handling service providers were subject to a risk-based continuous ongoing oversight (Austria).
- Focused OPS inspector training on industry standards and procedures to assure air operating certificate (AOC) and competence on Ground Handling and/or audit function for a nominated person from ground operation (Sweden).
- Safety promotion in SMS (Sweden);
- Detailed audit schedule/base inspections focusing on the most relevant Ground Handling items (Sweden);
- Safety promotion LED Lights at Airports, Ramp, Taxiway, Runway and Approach lights (mentioned by Ireland);
- Continuous monitoring of ground operations indicators defined in SSP, analysis and assessment of the occurrences which contributes to GO and taking preventive and corrective measures to mitigate the risks. Ground handling service providers were regulated on a national level, also they were required to implement SMS (Croatia);
- Organisation of a working group with airports safety managers and handling operator's managers to discuss safety concerns on a regular basis (Croatia);
- Ground safety, causal factors and performance indicators and targets were included in one State's national safety plan. The stakeholders must address and process ground safety related threats relevant to their operations and strive to reduce their risk. The State's CAA monitored the number and risk level of ground safety events, defined the required actions as part of the national authority process and evaluated, as part of its oversight, how the stakeholders addressed and processed the ground safety related threats relevant for their operations (Finland);
- Actions currently focused on preventing ground collisions on ramp and taxiways. Previously addressed actions were on the reporting culture and specific risks, such as ground de-icing, loading errors, etc. (Ireland);
- Estonia was monitoring the number of MAC occurrences and approaching case-by-case;
- Some of the highest risk safety issues identified by Luxembourg' 'Direction de l'aviation civile' (DAC) were triggered by events related to ground handling, mainly handling of cargo: cargo moving/shifting during flight and weight and balance issues due to wrong loading.

Three States (**Slovenia, Switzerland** and **Iceland**) planned to address ground safety in their State's safety plan in the near future and included ground safety as part of their draft national plans and **one** additional State quoted that they regard the subject as not developed enough to include it yet.

From the **six** remaining States that did not include ground safety in their Safety Plan at the national level, **two** indicated that they did not spot a particular risk. **Three** others, despite answering negatively to the question, replied with some form of measure or explanation on the steps that were being adopted.

Three main factors contributing to ground safety risks in the Member States

From the States that reported on factors considered contributing to ground safety risks, they included, in order of their magnitude, based on the number of times quoted:

- Ground service equipment/vehicles damages to parked aircraft (detected damage) (mentioned in nine cases);
- Aircraft outside the mass and balance envelope (incorrect loading) (quoted in seven cases);
- Aircraft commences take-off with contaminated flying surfaces or engines (mentioned in three cases);
- Dangerous goods (mentioned in three cases);
- Baggage and cargo not offloaded according to instructions (mentioned in two cases);
- Late turnarounds and turnarounds less than the minimum scheduled time (mentioned in **two** cases) and
- Ground handling in general (mentioned in two cases).

Mentioned in **one** case:

- Load sheet errors;
- Personnel's mental and emotional State;
- Knowledge of procedures;
- Personnel attention and vigilance events;
- Significant ground damage undetected prior to aircraft commencing take-off;
- Less training;
- Airport markings;
- Lights and procedures;
- OPS procedures taxi, including low visibility operations/procedures (LVO/LVP);
- New airport infrastructure and work in progress;
- Lack of SMS-requirement at EU-level as an example of a systemic issue scenario;
- Passenger or baggage reconciliation;
- Human errors/training for ground collisions of vehicle and equipment with aircraft;
- Handling/parking/pushback procedures;
- Cargo moving/shifting during flight;
- Securing of doors/latches;
- De-icing error and
- Human errors in the ground handling operations (GHO).

Also, **Monaco** included specific factors: the small size of the heliport, proximity of pedestrian circulation lane with landing pads and high density of traffic.

One State remarked that ground operations in their country was an area characterised by an extensive use of subcontractors, and therefore it was more difficult to create a sound safety culture.

Five States provided no information or did not record any factors. **One** State was conducting its bowtie exercise and **another** reported that it decided, for the time being, not to include Ground Safety into their SSP.

New precursors for ground safety risks

Amongst the answers provided by the States that reported, the factors that being taken into account include:

- Lithium battery handling;
- Take-off overweight or incorrect Centre of Gravity;
- Take-off with previous damage;
- Icing conditions encounter;
- W&B issues due to wrong loading and
- W&B issues due to wrong data.

Finland provided a good insight into its safety plan process concerning the management of Ground safety aspects. Risk workshops were held on the State`s risk portfolios. As of October 2017, all the ground safety threats went through initial risk assessment. Out of this number, 20 operational and 17 systemic scenarios were assessed that need further, detailed risk assessment. For example, different scenarios on mass and balance/loading related risks were assessed in more details. They also indicated that the lack of SMS-requirements at EU-level, as an example of a systemic scenario that would be also assessed.

The **UK** did not add any new precursors, however, reported that work is being done to try to baseline some statistics that could be measured by a loading inspector with respect to aircraft parking, de-icing, fuelling, etc. in an attempt to gather more data with respect to aircraft loading.

Sweden indicated they were researching methods to measure and assess future new precursors including the number of subcontractors or turnover rate of subcontractors or other relevant precursors relevant to ground operations.

Two States noted that in their plans in 2016, ground safety was not addressed. So it remained a new aspect for them. In **one** of these States the reason was that SSP was not implemented, however, they collected statistics on a yearly basis on ground safety aspects.

Fifteen States replied that they did not identify any new precursors or simply did not provide information. **One** State indicated they were conducting a bowtie exercise and **another** State reported that they were not going to include Ground Safety into their SSP.

Mechanisms in States to address corresponding ground handling safety risks

Fifteen States mentioned different mechanisms (**France, Monaco, Romania, the UK, Turkey, Belgium, Austria, Sweden, Croatia, Finland, Ireland, Slovenia, Switzerland, Poland** and **Luxembourg**). They range significantly and include:

- Assessment of 'SMS' processes in GH providers (mentioned by **France** and **Turkey**). In **France** an assessment was conducted to implement 'SMS like' processes amongst GH providers (which are non-certified organisations), whereas in **Turkey** they need to have SMS following national regulations;
- Safety training sessions for ground operators (mentioned by **Slovenia**, **Monaco** and **Turkey**). In **Monaco** these are mandatory;
- Visual monitoring by ATC and video surveillance in the specific case of **Monaco**;
- Ground handling service providers were audited or submitted to comprehensive risk-focused oversight activities based on performance as part of the AOC ground handling contracts (in **six** States, namely: the **UK, Sweden, Croatia, Ireland, Slovenia** and **Switzerland**). In **Sweden, Croatia** and **Ireland** oversight/audit conclusions were assessed in dedicated safety review

forums to assess result of oversight and corresponding hazards including risk assessment. In **Belgium**, at the BCAA Safety Committee, a discussion with concerned service providers took place about the risks, despite not specifically mentioning if they stem from any audit process.

- **Austria** detailed the adopted measure: during 2017 all aerodromes were certified in that State. Based on the Regulation EU 139/2014, a full compliance check in respect of RE was performed. In the case of a non-compliance, a compliance assurance plan (CAP) was developed by the aerodrome operator and agreed by the oversight authority. Based on non-compliances/deviations, a hazard-log was developed, which reflected the ongoing oversight activities including a 48-month-oversight-plan. Besides the certification of ADM (providing ground handling as well), the ADM-operators third-party ground handling service providers were subject to a risk-based continuous ongoing oversight.
- Ground Handling Service Providers in the **UK** also attended the Ground Handling Operations Safety Team (GHOST) meeting three times per year;
- Identification, assessment and mitigation of risks, on a case-by-case basis, was mentioned by **Finland, Croatia** and **Ireland**. If it appears to be a significant trend in a particular kind of occurrence, the service provider concerned is approached (in the case of **Croatia** and **Ireland**). **Croatia** included monitoring of implementation and effectiveness of the mitigating measures by assigned inspectors and for the overall overview by State's Safety Board. The same State pointed at the publication of national Plan for Aviation Safety as a way of raising awareness.
- **Ireland** was dedicated to the Ground Ops inspectors who focus on key risks during safety oversight. They complemented this with other actions such as: monitoring of Ground Ops events for adverse trends, follow-up on of high-risk events, detailed safety analysis initiated for Ground events (including Ramp and Taxiways) reported under mandatory occurrence reporting (MOR) and organising a bi-annual Ground Ops Working Group together with industry.

Slovenia outlined that they were going to review dangerous goods related occurrences, develop mitigating measures and follow up operators during oversight activities to ensure that procedures regarding dangerous goods were followed. The **Slovenian** CAA planned to promote training about operator's staff and provision of information regarding the transportation of dangerous goods by air.

Five States did not provide any information. **Two** States indicated they were considering this aspect in their future plans. Another State indicated their SSP was too recent to have a proper evaluation of the effects of risk assessments of GH operators.

Implementation of risk prevention mechanisms by affected ground handling service providers

Fifteen States mentioned different mechanisms. They range significantly and include:

Safety risk factors oversight and inspection activities of ground handling companies (mentioned by **nine** States; **the UK, Turkey, Belgium, Sweden, Croatia, Finland, Slovenia, Switzerland** and **Poland**. The **UK** also checked the implementation through the Ground Handling Operations Safety Team (GHOST).

Spain and **Luxembourg** stated they were conducting annual desktop reviews. **Sweden** also signalled having seminars on the subject.

In the case of **Romania**, the measures approved were going to oblige ground handling providers to develop an SMS coordinated with the airport's SMS. Ground handling providers were already subject to CAA's certification in that State.

Finland and **Austria** included SPIs and SPTs, including ground safety related-SPIs, in their safety programmes. **Austria** specified they use the indicator of reduction of damages caused by ground handling service providers to illustrate GH's progression.

Croatia also indicated that the effectiveness of specific mitigating measures was being monitored for trends by assigned inspectors and for an overall view by the national Safety Board.

France indicated they monitor incidents (provided by GH, airlines or airport operators) and considered the possible involvement of the State's authority if necessary.

Estonia and **Ireland** indicated they conduct SMS effectiveness audits on this topic. **Ireland** indicated a dedicated checklist addressing the key risks (the ones identified in the SSP) was used as part of the air operators' SMS oversight audit, with focus on key risks by dedicated Ground Ops oversight inspectors.

Seven States did not provide any information on the implementation of risks prevention mechanisms by affected ground handling service providers. **Two** States indicated they were considering this aspect in their future plans.

Effectiveness measurement of risk prevention mechanisms by affected ground handling service providers

Fifteen States mentioned different mechanism. They range significantly and include:

Romania monitored the value of the safety indicator, attached to corresponding safety action, and comparing with its target;

Austria conducted an annual evaluation of facts and figures of Aeronautical Decision Making –SMS;

Occurrence reports, compared with targets and established effectiveness of measures adopted and/ or trends were mentioned in **eight** States: **Romania, Croatia, Turkey, Belgium, Ireland, Estonia, Spain,** and **Luxembourg**. **Croatia** established an alert line. In the event a trend is negative, the national Safety Board would be warned and put appropriate measures to mitigate and control the risk. On the point of occurrence reports, **one** of these States pointed out that the contribution of each action to the global evolution of these numbers was very difficult to address.

Audits of ground handling companies/continuous oversight were also used to measure effectiveness in **two** States: **Switzerland** and **Sweden.**

Finland specified that risk portfolios and service providers risk profiles were regularly updated. Risk portfolio updates included re-assessment of the threats (e.g. are there any new threats or is there a need to re-assess the previous threats or to conduct a re-assessment of the threats that led to action items? did the actions work?).

The **UK** developed a procedure for assessment of effectiveness of mitigating actions. It showed two additional areas of concern, or requiring mitigation: operators training programme encompassing applicable procedures regarding ground handling, and operators' capability to ensure correct procedures from subcontracted ground handling activities.

Nine States did not provide information or indicated they were not measuring it yet (the case of one of these States). **Two** States indicated they were considering this aspect in their future plans.

2.4.2. MST.006 - Include controlled flight into terrain in national State Safety Programmes

Action title	Objective	Activity sector	Owner	Deliverable/ date
Include controlled flight into terrain in national State Safety Programmes	CFIT shall be addressed by the MS on their SSPs. This will include, as a minimum, agreeing on a set of actions and measuring their effectiveness.	CAT/ HF	MS	SSP established/ continuous
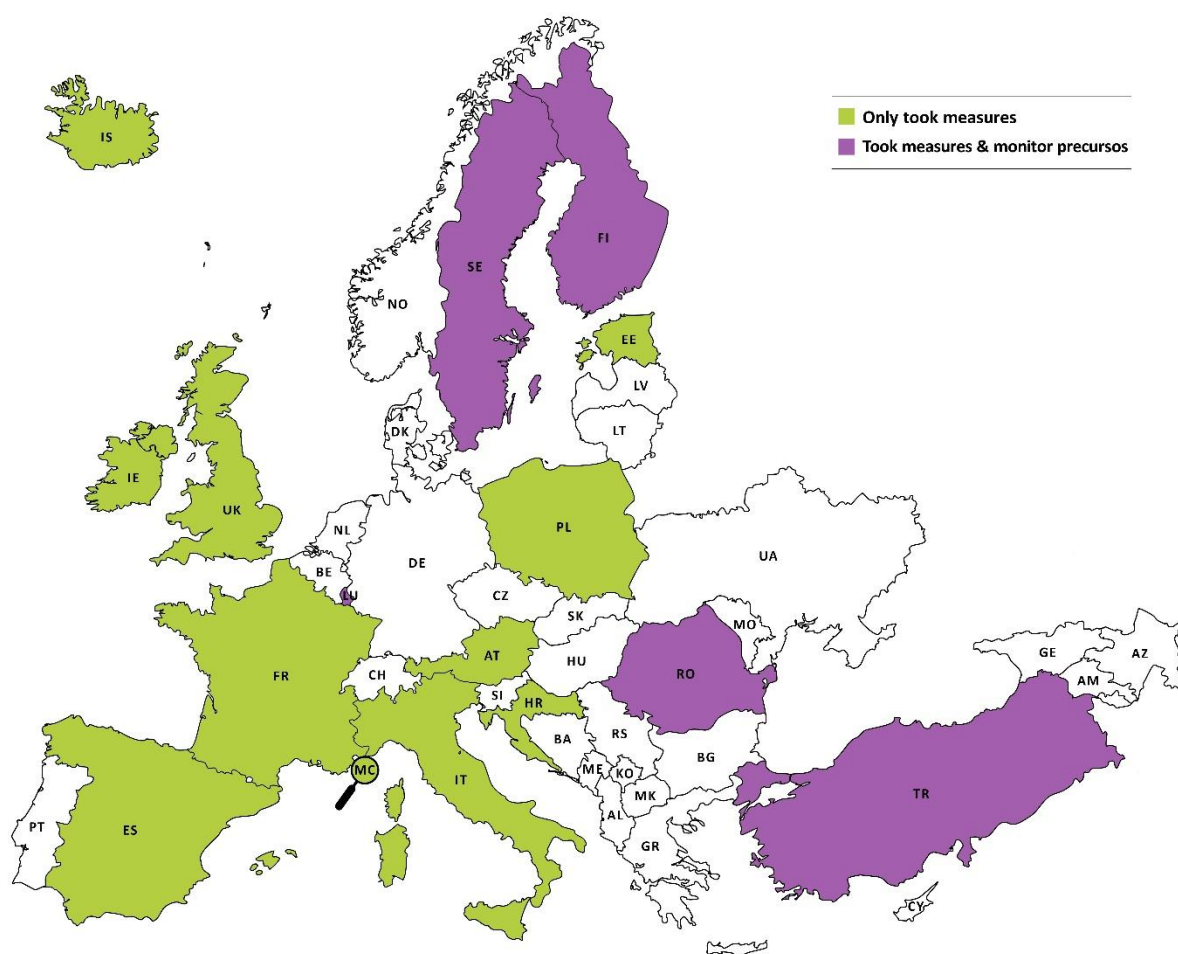
Figure 18 Countries which included controlled flight into terrain in their national State Safety Programmes
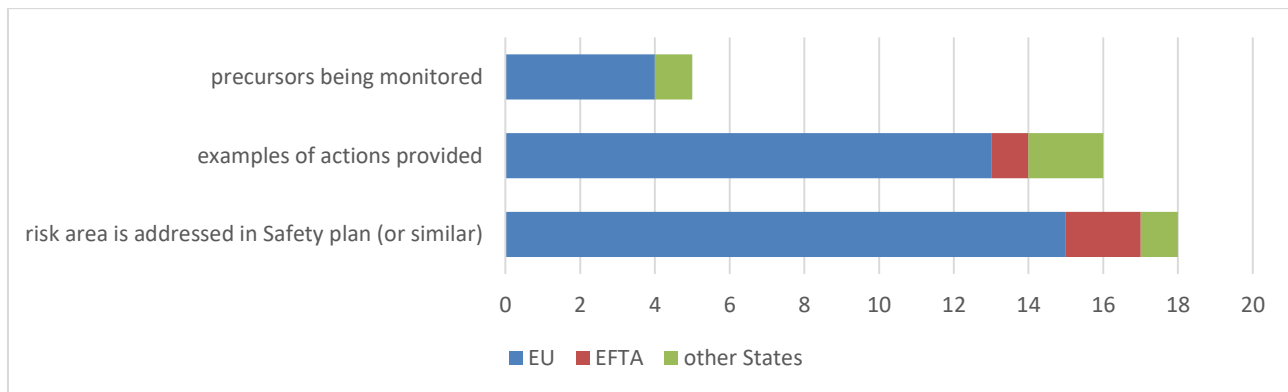
Figure 19 Actions took by the countries to address this MST in 2017

Addressing CFIT by the Member States in Safety Plan at national level or similar

From the **seventeen** States that answered positively to addressing CFIT in the State, the following information was provided:

- In **One** State the risk remained at a low level without further details provided. This was in contrast with **another** State that answered 'no' to CIFT, with exactly the same rationale.
- **Seven** States mentioned that corresponding actions were included in their national safety plans or SSPs (in one case reported as being a priority issue) without providing any further details.

They were including, in some cases, concrete actions that were being taken:

- **Latvia, Slovenia, Italy, Poland, Spain** and **Croatia** performed continuous monitoring of CFIT indicators, defined in SSP or State plans;
- Analysis and assessment of CIFT occurrences in **Croatia,** and **Estonia**;
- **Croatia** also took preventive and corrective measures to mitigate the risks;
- **Italy** actively monitored safety performance indicators and FDM precursors for identified risk areas and
- **Turkey** measured CFIT precursors for aircraft operators for identified risk areas to aircraft operators.

Four States provided more insight into the actual actions being followed. For e.g.:

- **Ireland's** actions in 2017 focused on encouraging the implementation of APV approaches in airports licensed for CAT.
- In the **UK**, the pilot performance plan intended to optimise Pilot Performance to ensure flight crew receive the appropriate technical and non-technical training to enhance the skills necessary to operate aircraft. This was going through understanding the conditions and behaviours that influence the actions of the flight crew to safely manage a flight. The work, in collaboration with Industry, was going to identify specific areas where the performance of pilots needs greater focus and develop joint strategies to enhance flight safety in this area. Another aspect brought up by the same State included human factors in Automation and Flight Path Management and some competencies: The Future Focus on Non-Technical Pilot Skills; Crew Supply Chain in Flight Operations.
- **Sweden** organised safety promotion seminars, such as: early action - safety promotion controlled flight into terrain (CFIT), approach procedures with Vertical guidance (APV) and continuous descent final approach (CDFA). Or safety promotion, follow up action, CDFA, APV procedures and ANS, Safety Promotion 2014, Cross Domain OPS-ANS, CFIT and APV, Safety Promotion 2015-2016 CFIT and APV. In

the same State, a detailed audit schedule focused on most relevant CFIT items: Risk-Based Theme Inspection, Inspection Line, check of procedures to mitigate CFIT, AOC Audit Flight OPS Department, Crew Training Department and Safety Management System within the Surveillance Period including control of airport classification procedures and relevant briefing/training procedures.

- **France** indicated they placed an important focus on 2D approaches, based on recurrence of other incidents, DSAC considers that 2D approaches (including 2D RNAV approaches) had a safety level significantly lower than 3D approaches. To this effect, **France** suggested to make a specific item on this point in the next version of the EPAS.

Germany and **Slovenia** indicated they were considering measuring CFIT in their draft SSP, which was going to be adopted in 2018. **Switzerland** included this aspect in its draft version of the State's safety plan and reported that CFIT was addressed through their Risk Management Process.

Five States indicated not addressing CFIT in the SSP or State Safety Plan at the national level. They broadly argued a lack of relevance, in terms of risk, with **one** of the States reporting very few events in their records. **One** State indicated giving more importance to other risks and another State (despite replying 'no' to the question on measurement), indicated that they do measure the main factors contributing to CFIT, however, they had not yet implemented specific measures as they gave priority to other safety actions.

Three main factors contributing to CFIT risks in States

Fourteen States reported risk factors (**France, Monaco, the UK, Turkey, Belgium, Norway, Austria, Sweden, Croatia, Estonia, Slovenia, Spain, Luxembourg** and **Latvia**). The range was very varied and included, in order of their magnitude based on the number of times quoted:

- Steep approaches/GPWS sink rate and GPWS/glideslope warning (mentioned by **five** States);
- Bad weather and other environmental encounters (mentioned by **three** States);
- Unstable/de-stabilised final approaches (mentioned by **three** States);
- Mountainous area/terrain configuration (mentioned by **two** States) and
- Terrain separation deteriorating below normal requirements (mentioned by **two** States).
- Mentioned by **none** or **one** State only:
- Insufficient operational use (and/or training) of 2D approaches;
- Visual approach during night;
- Non-compliance to published minimum altitudes;
- Bad visibility;
- Turbulent wind conditions;
- Arrival or departure (in general);
- Non-precision approach in IMC or at night;
- High approach speed;
- Significant heading change below 300 AFE;
- Non-compliant use of approach briefing and sterile cockpit concept;
- Non-compliant use of continuous descent final approach (CDFA) approaches (use of non-precision approach (NPA) with Step Down Procedures);
- Airport classification and referred training without relevant CFIT considerations;
- G/S deviations;
- Approach design and documentation;
- Aircraft handling;

- Aircraft upset;
- Technical pressurisation system;
- Lack of situational awareness;
- Fatigue and
- Malfunction of automatic flight management system.

Finland reported that in its country most of the occurrences in the CFIT-category, involved military aircraft and separation minima infringements in relation to the obstacles.

Another State underlined that they recorded a very low level of CFIT events reported as MORs (e.g. less than 40 in 2016). However, the main reason for the CFIT occurrence category was found to be TAWS alerts (e.g. sink rate, terrain, and obstacle) mostly caused by environmental or crew procedural/handling factors sometimes leading to a missed approach.

Five States provided no information or did not record any factors. **Four** States indicated being at various stages in the process of determining factors, arguing reasons such as: 'SSP to be adopted next year', 'bow tie exercise in progress', 'currently in the process of recording data for CFIT', 'not having specified the main factors as of today' (in **two** cases), as the dataset is rather small (in **one** case) or simply 'determination of factors is still in progress along with ongoing collection and analysis of data' (in **another** case).

One of the States that had not yet finalised the specification of the main factors (as it was still collecting data and analysing it), provided a relation however of the CFIT events involving CAT in two years: 1 CFIT by national CAT operators in foreign countries (below GP-GPWS caused by wind shear), 2 CFIT by national CAT operators in the country (both ATC contribution) and 5 CFIT by foreign operators in the country (mainly descends below radar minimum).

New precursors for CFIT risks

Eighteen States replied not having identified any new precursors or did not provide an answer. However, **one** State included in its answer that this area was to be developed. **Two** States mentioned CFIT as being too new in their plans to identify new precursors. Additionally, **one** State was considering developing this aspect when adopting its SSP in 2018.

For **six** States replying positively, precursors include, in **three** of them (**Sweden**, **Finland** and **Luxembourg)**, technical - malfunction of automatic flight management system, use of and training of, TEM.

Mechanisms in States to address corresponding CFIT safety risks

Five States explained their procedures to address the risks. They range from:

- Performing focused theme inspections (**Sweden**);
- Line inspections (**Sweden**);
- OPC-Inspections (**Sweden**);
- Training Programme Inspections (**Sweden**);
- Manuals inspections (**Sweden**);
- Audits (**Sweden**);
- Focussed training of OPS Inspectors regarding CRM and TEM, to enhance effectiveness of oversight i.e. HF in cockpit and relevance of correct approach/departure briefing (**Sweden**);
- Discussion of risks at national Safety Committees/groups and with concerned service providers. Such committees were in place in **Belgium, Croatia,** and **Iceland** and

- Publication in State's Plan for Aviation Safety and communication to stakeholders (**Belgium**).

Croatia and **Estonia** set up mechanisms to mitigate risks on a case-by-case basis. Implementation and effectiveness of mitigating measures were monitored to observe trends by assigned inspectors and for a general overview and eventual action by the State's Safety Board (in the case of **Croatia**). Monitoring of trends of the precursors was also quoted by **Ireland. Finland** included threat identification, safety risk assessment and management in its procedures. **One** State reported that there were no indications, from a safety risk perspective, to further mitigate that risk in its country.

Those States that provided information on how they address CFIT risks, provided the following information:

- in **France**, work was in progress in the safety review framework, however ANSP did not allow to propose visual approach during night time (assessing the air navigation service providers - minimum safe altitude warning (ANSP MSAW) events and corresponding statistics);
- safety training sessions for pilots performed by civil aviation senior members about heliport (only activity in **Monaco**);
- operators in **Turkey** had to use FDM to monitor GPWS alerts and the unstabilised/destabilised approaches;
- In **Austria** the oversight of training activities was focused on CFIT procedures during simulator sessions (Recurrent Training and Checking);
- MSAW safety net was implemented in **Slovenia** and electronic Terrain and Obstacle Data (eTOD) were being implemented;
- Aerodrome Obstacle Chart — ICAO Type B for Ljubljana AD will be published in **Slovenia** and
- In **Poland** the following occurrences were monitored: flying below Safety Altitude for ATM, TAWS alerts for AOC operators.

Switzerland was active on the implementation of approach with vertical guidance (APV) at airports licenced for CAT operations, consisting of monitoring CFIT events for adverse trends, follow-up on high risk events, safety oversight of organisations SMS for monitoring of precursors to CFIT events, safety promotion on the benefits of implementing APV approach.

The **UK** was going to develop mechanisms in accordance with the outcome of the pilot performance plan to optimise performance to ensure flight crew receive the appropriate technical, and non-technical, training to enhance the skills necessary to operate aircraft, and in the airspace. This was planned to be done through understanding the conditions and behaviours that influence the actions of the flight crew to safely manage a flight. The work, done in collaboration with Industry, was going to identify specific areas where the performance of pilots needs greater focus and develop joint strategies to enhance flight safety in this area.

Four States did not provided any information. **Four** other States were in the process of including or implementing mechanisms to address the risks in their plans during the course of next year.

Implementation of risk prevention mechanisms for CFIT

For the **eleven** States reporting on the implementation of these mechanisms by affected stakeholders, these took the form of:

- Occurrence reports (**Estonia**);
- Continuous oversight/audits/flight operations inspections (including on SMS effectiveness) in the **UK, Sweden, Croatia, Finland, Ireland, Slovenia, Iceland** and **Poland**;
- Additionally, reporting of actions annually or in seminars was mentioned by **Spain, Sweden** and **Finland** as employing one or more of these mechanisms.

- In **Croatia** the implementation and effectiveness of specific mitigating measures were monitored for trends by assigned inspectors and for overall overview by the State concerned Safety Board. In **another** State, inspections of affected stakeholders to ensure training material and SOPs of affected stakeholders reflected the mechanisms developed.
- In **Austria** State training programmes had to be approved by the CAA.
- **Ireland** pointed out that a dedicated checklist to address the key risks identified in the SSP was used as part of the air operators SMS oversight audit. The on-going tracking of APV implementation programme was done in the State's airports.

Concerning occurrence reporting, **Latvia** informed that, following its procedures, responsible inspectors were advised that there should be an adverse trend identified. If precursors show an increase in events, the issue is investigated by the principal inspector (usually investigated by the organisation itself and then the result is provided to the CAA).

Finland explained that SPIs and SPTs included CFIT-SPI as a tier 2^3 SPI and its related tier 3^4 SPIs as a CFIT-precursors. SPT for the stakeholders was in most cases to conduct a risk assessment of own operations, set target levels, identify actions required, implement actions and monitor their effects. The achievement of these targets was monitored during the oversight process. The main action items was going to be part of Finland`s national plan 'FPAS', Annex 1. Since the FASP-process and it`s Risk portfolio work started from September 2016 on, some of the results were already in the FASP 2017-2021. Prioritised action items were taken into FPAS. FPAS-action items and other FASP-process results were executed as part of the authority`s work and as part of regular oversight, Trafi in **Finland** evaluated how the stakeholders addressed and processed CFIT- related threats relevant to their operations.

Eight States did not provide information and **one** State reported this risk was not being relevant to them. **Two** States indicated they were in the process of including how to check if actions were being implemented by affected stakeholders in their plans during the course of 2018. **One** State reported that despite approving measures in its recently adopted plan, it was too early to affect stakeholders.

Effectiveness measurement of risks prevention mechanisms for CIFT

Fifteen States reported on ways they measure effectiveness (**France, Romania, the UK, Austria, Sweden, Croatia, Finland, Ireland, Estonia, Slovenia, Switzerland, Iceland, Spain, Luxembourg** and **Latvia**). It is worth noticing that from these, **three** reported on difficulties of doing so. The ways effectiveness was monitored ranges from:

- Trend monitoring of MOR's (and other occurrence data), in **Ireland;**
- Oversight of organisations SMS trend monitoring (in **Austria, Croatia, Ireland, Estonia, Slovenia** and **Iceland**);
- In **Croatia** an alert line was established for trend monitoring If the trend is negative, CCAA Safety Board puts appropriate measures to mitigate and control the risk and
- During licensing activities (in **Austria**).

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[3] Tier 2 refers to monitoring those types of incidents that, at the international level, have been found to lead most often to tier 1. Tier 1 is the highest and refers to the consequences – accidents, serious incidents and fatalities.

[4] Tier 3 examines the causal factors of 2-tier incidents in more detail, and also aims to identify any emerging threats well in advance.

- In **Finland**, risk portfolios and service providers risk profiles were regularly updated. Risk portfolio updates included re-assessment of the threats (e.g. are there any new threats or is there a need to re-assess the previous threats or to conduct a re-assessment of the threats that led to action items? did the actions work?).

- **Romania** quoted measuring effectiveness by simply monitoring the safety indicator values attached to respective safety actions and comparison with their target.

- **Iceland** indicated they assess the effectiveness of the service provider's risk management and the effectiveness of the SMS in general (quoted in two cases). **Iceland** also recognises that work should be placed in developing how to reflect the data source to measure effectiveness, for e.g. number of reportable occurrences etc.

- **France** recognised not having a formal system in place but suggested indicators used such as the number of minimum safe altitude warning (MSAW) alerts recorded by the ANSP and number of GPWS reported by the airlines in its State. In **France, Luxembourg, Spain** and **Latvia** measurement of the evolution on the number and rates of reported occurrences is actually used. **Two** of these countries specified the difficulties to address how each action contributes to the global evolution of these numbers while another State mentioned that measurement was very subtle as it relies on the mutual trust of unbiased reporting culture. Both **Latvia** and **Croatia** assumed that in case of a trend identified by the CAA and a pertinent communication of the potential issue to the organisation concerned, the reporting would continue as before allowing the CAA (in the case of **Croatia** its CCAA Safety Board) to monitor the trend and put appropriate measures to mitigate and control the risk.

2.5. Fire, smoke and fumes

2.5.1. MST.005 - Include fire, smoke and fumes in national State Safety Programmes

Action title	Objective	Activity sector	Owner	Deliverable/date
Include fire, smoke and fumes in national State Safety Programmes	This safety issue shall be addressed by the MS on their SSPs. This will include, as a minimum, agreeing on a set of actions and measuring their effectiveness.	CAT/HF	MS	SSP established/continuous
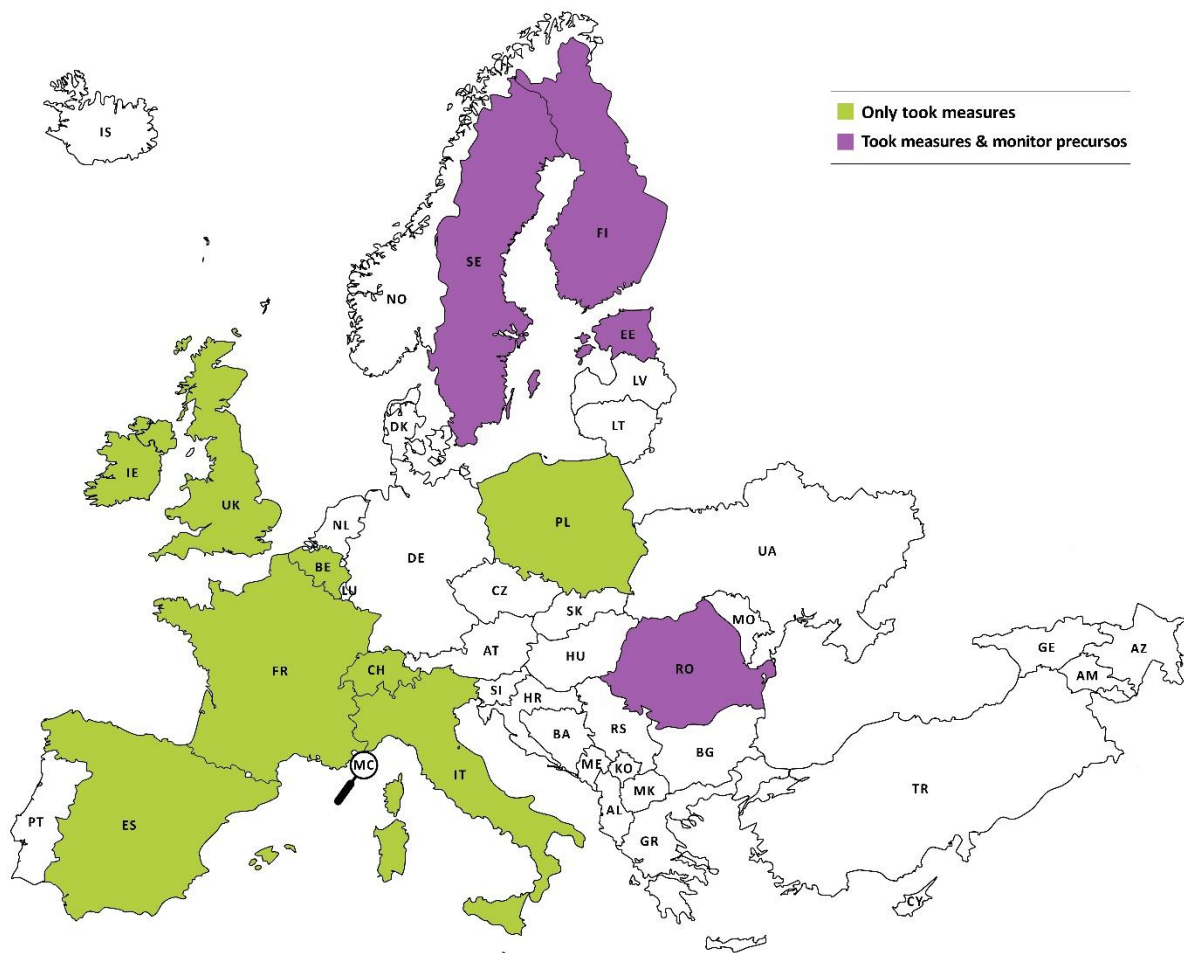
Figure 20 Countries which included fire, smoke and fumes in their national State Safety Programmes
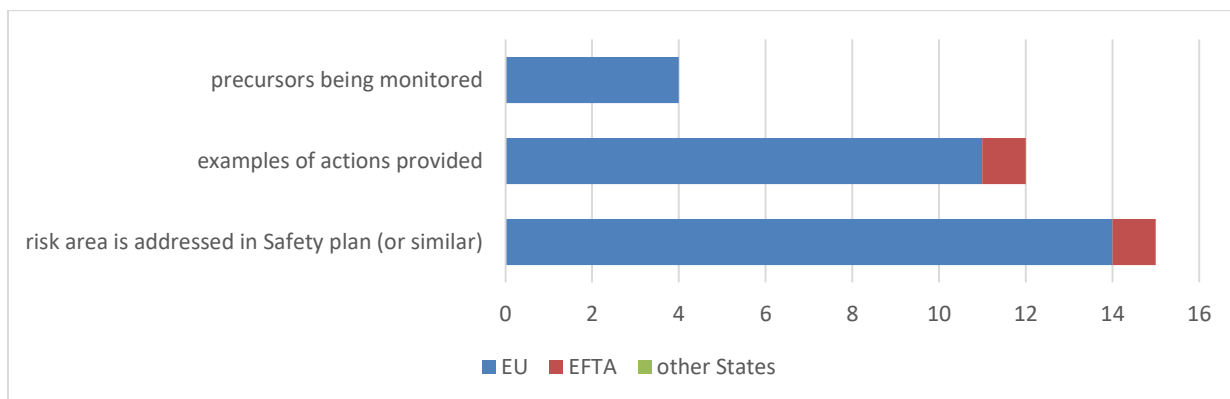
Figure 21 Actions took by the countries to address this MST in 2017

Addressing fire, smoke and fumes by States in Safety Plans at national level or similar

Amongst the **thirteen** States that do address fire, smoke and fumes (**France, Romania, Italy, the UK, Belgium, Sweden, Croatia, Finland, Ireland, Estonia, Switzerland, Poland, Spain** and **Latvia**), **five** (**France, Romania, Italy, the UK, Finland** and **Poland**) reported as having included it in their national plans, with another **four** States (**France, Belgium, Sweden** and **Ireland**) including specifically lithium batteries and/or putting it high on the agenda for 2018.

Most of the actions initiated included general safety promotion on handling of generic dangerous goods amongst AOC operators and passengers (in **Belgium** and **Sweden**). Specific awareness campaigns on the transport of lithium batteries was predominant amongst many respondent States, in all aviation sectors / all stakeholders, including cargo by air and in airports. In **Sweden**, dedicated seminars were held and **Ireland** and **Sweden** reported making good use of EASA published material on lithium batteries in tandem with other guidance from national institutions.

In **Sweden**, a national research institute was performing training on handling and protection related to fire/smoke/fumes incidents with lithium batteries. Their AOC Training departments were looking for reliable sources of information on this issue. A preliminary assessment of this aspect was proven, according to this State, and a good input for content on AOC Fire/Smoke/Fumes training programmes.

In **Sweden,** fire risk of electronic cigarettes in checked baggage was considered. Other items, such as the approval of the transport of dangerous goods activities for ground handling companies, were considered in **Belgium** and **Sweden**. Other aspects implemented include:

- Specific/ recurrent OPS inspector training;
- Detailed audit schedule revised to encompass and focus on most relevant Fire, Smoke and Fumes items;
- Inspection Line;
- Check of equipment and procedures to mitigate Fire, Smoke and Fumes;
- AOC Audit Flight OPS Department;
- Crew Training Department and Safety Management System assessment within Surveillance Period including control of hazard identification and mitigating measures and
- Cross-domain action following OPS, SEC, aerodromes, air routes and ground aids (AGA) safety promotion performed according to EASA SIB.

Two States reported interesting actions concerning their systems in place for managing fire, smoke and fumes risks. **Sweden** actively promoted the inclusion of this aspect in safety systems with correct

reporting procedures. The objective was to assure better safety-related information exchange between the AOC holder and contracted safety-related activities and to assure that correct information is provided to the competent authority. **Finland** also included fire, smoke and fumes, and their identified causal factors in the State's aviation safety performance indicators and targets.

Finland monitored the number and risk level of fire and smoke events, defined the required actions as part of the State planning process and evaluated, as part of its oversight, how the stakeholders addressed and processed the threats related to fire and smoke events relevant for their operations.

Six States indicated they were not addressing fire, smoke and fumes in their safety plans at the national level, or similar plan. **Four** of them justified this by stating that this risk was not identified through occurrence reporting. **Four** States indicated they would consider this aspect in their 2018 SSP's version, with **one** of them addressing it in 2017 through its risk management process and **another** monitoring the number of occurrences related to fire, smoke and fumes and approaching the issue case-by-case. **An additional** State admitted that it included it since it was in the EPAS, however, that it was not a high concern based on occurrence reports. **Another** State, that did not include this issue in its plans, reported that occurrences with fire, smoke and fumes were very rare (almost all of them concerned foreign aircraft) and there were no occurrences related to uncontrolled fire, smoke or fumes on-board aircraft. **One** State reported that fire, smoke and fumes issues were not considered a separate safety issue and that this was being tracked as a part of LOC-I.

Three main factors contributing to fire, smoke and fumes safety risks in States

The **twelve** States that have identified risk factors (**France, the UK, Turkey, Belgium, Sweden, Finland, Ireland, Estonia, Slovenia, Switzerland, Spain** and **Latvia**), indicated the following factors (in the order of magnitude based on the number of times quoted):

- Fumes in relation with ingestion of de-icing anti-icing products;
- Fumes in relation with engine' lubricant leaks;
- Hidden area fire;
- Fire occurring externally to the pressurised areas of the aircraft in-flight;
- Electrical systems and wiring;
- Non-compliant protective procedures to mitigate fire hazardous cargo or equipment;
- Lack of training related to protection and fighting of fire;
- Smoke and fumes;
- Lithium batteries in general (and more concretely the lack of knowledge related to the new risks associated to Lithium batteries);
- Smoke warning messages;
- Ageing aircraft in service that has consecutive modifications performed to wiring;
- Residue in air conditioning system and galley equipment;
- Pressurization system and
- Landing gear system (wheels and brakes).

On lithium batteries, **Finland** indicated that they assessed related risk scenarios as part of their process and the amount of occurrences and their associated risk were closely monitored. Moreover, the risk level was re-assessed regularly and when necessary.

Ireland signalled that they receive a relatively low number of such reports as MORs, amongst them a small portion were described as fire, and most of these were attributed to false indication. There were no reports of fire/smoke/smell due to lithium batteries. The majority of reports were low risk concerning

actual or suspected smoke in cabin, galley or toilets. No specific pattern could be established other than an indication that normally fire, smoke and fumes are related to different types of technical failures – incidents.

Six States acknowledged not identifying or did not report on any factors contributing to the fire, smoke and fumes risks.

Three States indicated they were working on it (performing bow-tie risk assessment exercises or via a 'qualitative' assessment of occurrence reports) with expected conclusions throughout 2018.

New precursors for fire, smoke and fumes safety risks

From the **four** States (the **UK**, **Sweden**, **Estonia** and **Switzerland**) that actually identified new precursors (with **one** of the States outlining most of them), these include:

- Lithium batteries (reported as being a constant and significant issue);
- Knowledge and procedures for cargo agents early enough in the cargo-delivery chain;
- Fire occurring external to the pressurized areas of the aircraft in flight;
- Engine or APU fire;
- Fuel tank explosion;
- Fires in flammable fluid zones (e.g. wheel wells, wing leading edge, etc.);
- Bleed air leak exposes aircraft components/ducting/wiring to extremely hot air;
- Hidden area fire or fire within pressurized or cockpit cabin cargo equipment area becomes established;
- Electrical overheat or arcing event (e.g. due chaffing or component failure or non-electrical fire within pressurized or cockpit cabin cargo equipment area);
- Thermal runaway of aircraft equipment batteries (e.g. ELT or main aircraft battery) and
- Hand baggage in an evacuation (i.e. the aircraft is not evacuated quickly enough in an accident due to the baggage from compartments that slows down the evacuation/passengers which slows down the evacuation).

Finland provided an insight into the process followed to identify and manage new scenarios (in this case fire, smoke and fumes related). They were assessed within the CAA's process thorough risk assessment methods and, if applicable, included in the country's risk portfolio. The resulted in action items were added at the national level, but also a proposal for a new action item was made into EASA's EPAS 2018-2022.

Eighteen States did not identify any new precursors or did not answer the question. **Two** States reported that the already identified risks were, in a way, new precursors to them because they have not been yet formalised. **One** of these States reported that there were no other SPI-s monitored because SSP was not implemented although overall statistics were collected yearly.

Mechanisms in States to address corresponding fire, smoke and fumes (FS&F) safety risks

Thirteen States (**France, Romania, the UK, Belgium, Sweden, Finland, Ireland, Estonia, Slovenia, Switzerland, Poland, Spain** and **Latvia**) provided evidence and included different mechanisms in their processes, including:

- **Ireland** exerted an oversight of organisations' SMS for monitoring of precursors to F-NI events and for implementation of EASA recommendations regarding lithium batteries;

- **Poland** had as an SPI the number of fuel leaks / 10 000 operations, the number of FS&F incidents during fuelling for aerodrome operator, the number of smoke and fumes incidents onboard / 10 000 operations and the number of fire incidents onboard /10 000 operations for AOC operators, threat identification and risk assessment and management. For example in the **UK**: the analysis on lithium batteries revealed that the highest risk comes from undeclared and undetected batteries being carried in freight. The pertinent actions were planned to be built on the work CAA UK already did with the Department for Transport and a private company was going to develop and provide a global capability in lithium battery detection.

- Inspection procedures in **Slovenia** were being prepared to control modifications on existing aircraft as well as control of STC and modifications on imported aircraft. Also, it was ensured that lithium batteries were transported in accordance with the Technical Instructions, both as cargo and by passengers. Likewise, other aspects were included/revised, such us: fire emergencies in the aerodrome emergency plan, safety promotion (for e.g.: publishing and promoting information amongst AOC operators and passengers regarding hazards related to Lithium Batteries and other fire-related issues).

Belgium mentioned discussions were held on risks at BCAA's Safety Committee and with concerned service providers. Communication with stakeholders was achieved with the publication of the country's SSP.

Switzerland concluded bilateral meetings between Inspectors, Operators and Stakeholders.

One of the responding States indicated they were integrating these aspects into their system and that they were going to review its policies and procedures.

Eight States did not provide any answers to this question. **Four** States indicated they were in the process of developing a system for the purpose. **One** State declared its SSP was still quite recent, and that it would address risks on a case-by-case basis and if there is a significant trend in a type of occurrence, the service provider would be approached by the authority of the country.

Implementation of risks prevention mechanisms for fire, smoke and fumes safety risks

For the following **twelve** States, the risk prevention mechanism implementation would be monitored through:

- Regulatory oversight/inspections/audits (in **ten** cases: **France, Romania, the UK, Belgium, Sweden, Finland, Ireland, Poland, Spain** and **Latvia**), with **Ireland** having a dedicated checklist or procedures to address the key risks identified in the SSP used as part of the air operators SMS's oversight audit;
- Seminars (**Sweden**);
- Occurrence reports (**Estonia**);
- Specific meetings between inspectors and stakeholders concerned in the case of **Switzerland** (when and if applicable) and
- An analysis of stakeholders' SMSs in the case of **Spain, Estonia** and the **UK** (in some cases it was not specified whether this was done as a desktop review or through on-site audits).

Finland stated that since Trafi' s process and its risk portfolio work was in place for more than a year, some of the resulting actions were already in their national multiannual safety plan. Prioritised action items were taken into account by the State's CAA as part of oversight, evaluating how the stakeholders addressed and processed fire, smoke and fumes related threats relevant to their operations. Implementation of SPIs and SPTs were included in their national safety plan.

In **Latvia**, the responsible inspectors were advised that in the event of an adverse trend is identified and if the precursors show an increase in events, the issue could be investigated by the principal CAA's inspector, but it is usually investigated by the organisation concerned itself and then the result is provided to the country's CAA.

Nine States did not provide any answer to this question. **Three** States indicated they were in the process of developing a system for the purpose.

Effectiveness measurement of risks prevention mechanisms for fire, smoke and fumes

The remaining **ten** States that indicated measuring effectiveness use one or more of these methods:

- Measurement of effectiveness (quoted by the **UK** and **Sweden**) during performance review as part of regulatory processes as well as through occurrence reporting (the **UK**). It was outlined by **Sweden** that enough time was needed to make a proper assessment. **Spain** indicated it was very difficult to address the contribution of each action to the global evolution of these numbers.
- Monitoring the value of the safety performance indicator attached to a safety action (in the SSP) and comparison with its target was another way to measure effectiveness (quoted by **Romania** and **Belgium**)**.**
- **Switzerland** and **Latvia** mentioned bilateral meetings between inspectors and affected stakeholders when required by events. **Latvia** highlighted that measurement was very subtle for them. Based on their experience it relies on the mutual trust and an unbiased reporting culture.
- Audits/oversight of organisations' SMSs was also a common resource, as well as trend and rate monitoring of occurrence reports (quoted by **three** States: **Belgium**, **Ireland** and **Estonia**).
- In **Finland**, risk portfolios and service providers risk profiles were regularly updated. Risk portfolio updates included re-assessment of the threats (e.g. are there any new threats or is there a need to re-assess the previous threats or to conduct a re-assessment of the threats that led to action items? did the actions work?).
- Also, they conduct SPI-monitoring and situation analysing on a continual basis, with SPIs and SPTs updated according to Risk portfolios and their biggest risks.

Ten States indicated they do not measure the effectiveness or did not provided an input to the question. **Three** States indicated they were considering this aspect in their plans.

Chapter Three: Operational issues - Helicopters

3.1. MST.015 - Helicopter safety events

Action title	Objective	Activity sector	Owner	Deliverable/ date
Helicopter safety events	NAAs in partnership with industry representatives, to organise helicopter safety events annually or every two years. The EHEST material could be freely used and promoted.	HE	MS	Workshop/ continuous

For **most** of the States the level of helicopters activity is rather low according to the answers received. **Eighteen** countries confirmed that they have been organising various helicopter safety-related events (training, promotion, management, etc.). **Most** of them planned to arrange these actions at least once a year. **Thirteen** countries identified what specific safety issues related to this subject were addressed and the methods for managing them.

Germany and **Italy** focused on the issues related to HEMS operations and the German Helicopter Association hosted a dialogue in this regard. Also, **Finland** performed a study about fatigue in HEMS operations and created a helicopter risk portfolio. The **UK** indicated placing emphasis on the safety culture, and they manage helicopter safety issues and industry performance through Performance-Based Regulation and the Regulatory Safety Management System. The SSP team from **France** analyzed three areas: safety culture and reporting, availability of local data, and defining a helicopter risk portfolio in the framework of the national safety plan.
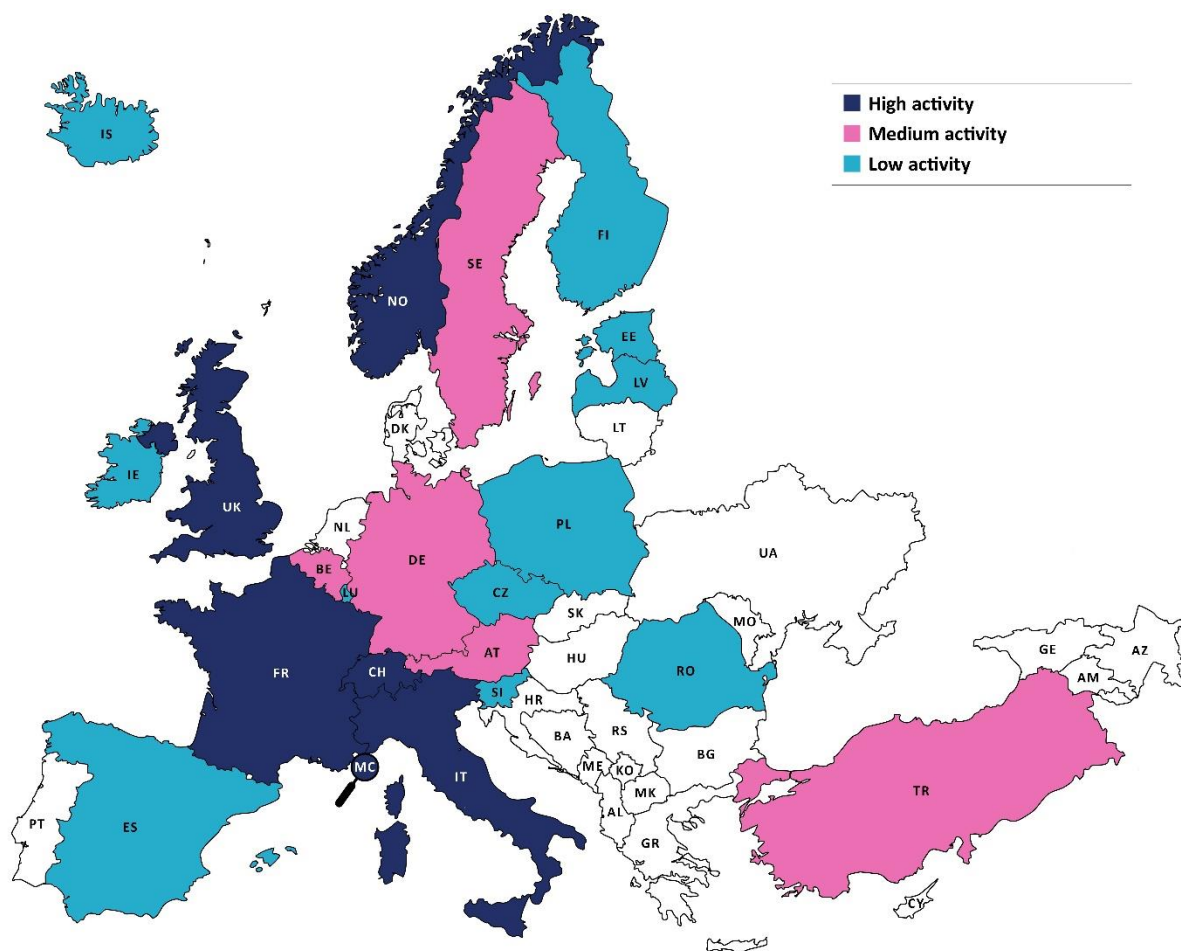
Figure 22 Countries which reported helicopter activity

Note: *The classification is based on the responses received from the Member States taking into consideration the number of helicopters and the number of AOC operators.*
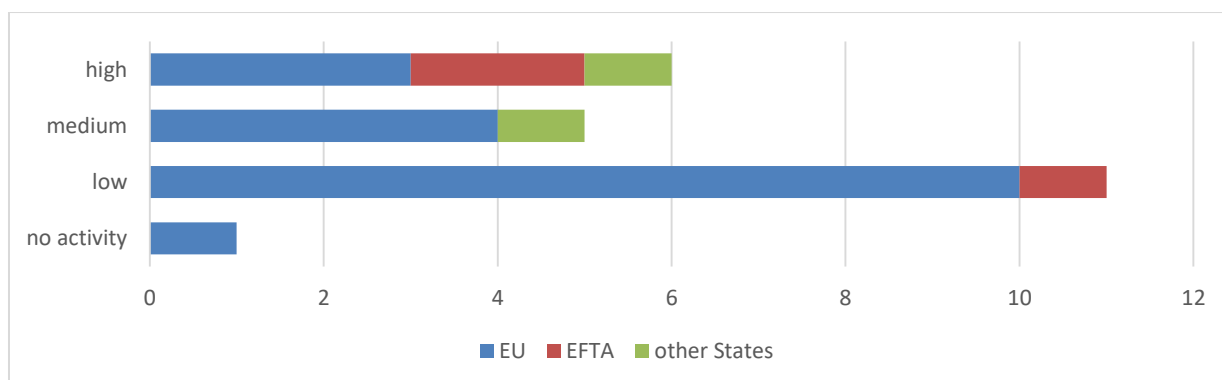

Figure 23 Countries which reported helicopter activity

Chapter Four: Operational issues- General Aviation

4.1. Fixed Wing leisure flying

4.1.1. MST.016 - Airspace infringement risk in General Aviation

Action title	Objective	Activity sector	Owner	Deliverable/ date
Airspace infringement risk in General Aviation	NAAs should play the leading role in establishing and promoting local implementation priorities and actions.	MS	MS	Report/ continuous

The most common safety concern in the GA area identified by the States was airspace infringement, which leads to mid-air collision or loss of separation. Managing the airspace in the presence of a high density of light aircraft was considered very difficult. In addition, loss of control in flight and inadequate flight preparation increase the airspace infringement risk. Although more than **twenty** States acknowledged airspace infringements involving GA as a top safety concern, only **half** of them indicated having a safety plan at national level that contains actions covering GA. **Italy, Norway, Luxembourg** and **Iceland** reported having a small number of airspace infringements related to GA, which they inferred as the reason why this was not a priority for them. Many States organised promotion activities in 2016 through websites and magazines (**Czech Republic**), coordinated campaigns targeting best practices to avoid an airspace infringement involving all the stakeholders such as CAA and flying association (**Switzerland**), published new safety bulletins online (**Slovenia**), hold instructional seminars for GA pilots (**Estonia**) and workshops (**Croatia**). **France** and **Latvia** highlighted the importance of effective administrative penalties in the GA domain. Regarding the European Action Plan for Airspace Infringement Risk Reduction (EAPAIRR), **half of the States** responding claimed implementing it.

4.1.2. MST.017 - Safety transportation of dangerous goods in GA

Action title	Objective	Activity sector	Owner	Deliverable/ date
Safe transportation of dangerous goods in GA	MS will develop a safety leaflet to inform pilots on the risks involved in transporting dangerous goods.	GA	MS	Safety Promotion material / 2019

The risk involved with the transportation of dangerous goods was not a popular topic for the safety promotion material or for the training addressed to the pilots of GA aircraft. Although many States claimed that they already had planned related activities, some of them considered this type of risk very low or not relevant. Only **four** States confirmed creating this kind of material. **Iceland, UK** and **Sweden** developed and published a safety leaflet and **Finland** established a national action in this regard. In addition to the safety leaflets, safety bulletins on the website (**Finland**) and safety newsletters (**Austria**) were considered effective means for promotion. Unfortunately, the States were not able to identify which are the least popular. Also, a small number of States indicated having means to measure the effectiveness of this deliverable: Romania monitored the value of the safety indicator attached to the safety action,

comparing it with its target, **Austria** gathered all the info in pivot tables and after creating a statistic, shared it with the other countries and **Finland** requested feedback and follow up to create suitable safety bulletins.

Based on the feedback received, the subject action was removed from the EPAS.

4.1.3. MST.025 - Improve the dissemination of safety messages

Action title	Objective	Activity sector	Owner	Deliverable/ date
Improve the dissemination of safety messages.	Improve the dissemination of Safety Promotion and training material to authorities, associations, flying clubs, insurance companies targeting flight instructors and/or pilots through means such as safety workshops and safety days/evenings.	GA	Safety Promotion Network (SPN)	2017

Delivery/distribution of safety promotion material / training to associations, flying clubs, insurance companies targeting flight instructors and/or pilots.

Seventeen States indicated actively delivering a range of measures in this area targeting pilots, owners, operators, private pilot license (PPL) registered facilities, other GA activities, etc. (**France, Monaco, Czech Republic, the UK, Belgium, Norway, Austria, Croatia, Finland, Ireland, Estonia, Slovenia, Switzerland, Iceland, Spain, Luxembourg** and **Latvia**). Some examples include:

- **Finland** provided a comprehensive report of the integration of the EPAS MST.025 action into its multiannual safety plan. It described the aim of the State's effort as disseminating safety messages and developed safety communications for general and recreational aviation as set out in the operating model for safety work in a GA safety project developed in 2015. Safety promotion was an element of this operating model where various national institutions and relevant aviation organisations committed to the operating model. The objective of the action was to improve the safety promotion as an essential systemic safety factor, thus improving the safety of GA. The deliverable was to implement an operating model on the basis of jointly specified plans.

- **Finland** included promotion safety material on their CAA website or concrete online sites, performed special campaigns or so called 'safety evenings' on general awareness or specific GA aspects based on occurrence rating or risk (e.g. preventing Helsinki – Mami (EFHF) airport airspace infringements, avoid airspace infringements, location awareness, situational awareness, abnormal runway contact, a safe operations model for flying clubs) that were going to be disseminated in clubs or divulged in CAA bulletins.

- **Two** States provided websites, in the case of the **UK** to a closed site with key information and facts (accessible with a password) and in the case of **Norway**, to a webpage for RPAS pilots containing basic rules and illustrations.

- In the case of **three** States the social media platform of Facebook is used (in **Ireland, Switzerland** and **Iceland**).
- In **two** cases a specific webpage on the operation of drones was set up (in **Finland** and **Slovenia**).
- Using webcasts as a channel for news or with specific videos or via specific corporate e-mails, that users can address queries to as it is the case in **Finland, Switzerland** and **Croatia.** E.g. in the case of **Croatia** a video was produced titled 'prepare to fly' and in **Finland** a video on airspace infringements was produced.
- In the case of the **UK, Ireland, Finland, Switzerland** and **Belgium**, promotion was also done in the CAA magazines. Distribution of (presumably printed) leaflets, bulletins, guides was also quite common (for e.g. VFR guides for GA pilots, manual for use and standard phraseology in their national language). **Ireland** indicated they were cutting back on printing material at the request of the recipients.
- Organising of yearly regional safety meetings/seminars was also quite widespread. In **France** regional Safety meetings were held on a yearly basis. **Austria** and **Latvia** organised a specific 'open GA season' for pilots and A/C owners and in **Luxembourg** occurrence reporting was used to illustrate issues to GA pilots, in **Slovenia** instructor refresher seminars were organised by ATOs.
- In many cases these seminars were organised in cooperation with associations and aero clubs. **Switzerland** remarked that regular meetings of the country's Airspace Infringement Working Group (AIWG) were held with the participation of the CAA, the Air Force, aero clubs, hang glider associations, etc.
- Specific safety training sessions in various States (e.g. on helicopter operations, hand gliding or during instructor refresher courses), in the case of **Norway** online and in **Slovenia** free of charge.
- Holding specific roadshows or workshops (in **three** States: the **UK**, **Slovenia** and **Switzerland**) on relevant issues or changes to regulations (e.g. performance based navigation (PBN), operational application, forthcoming upset prevention recovery training (UPRT));
- **Slovenia** included in its answer the scheduled standardisation meetings organised twice a year for ATO heads of training (before and after the flying season), aeromedical examiners (AMEs), flight examiners etc. They also included discussions during oversight with person-to-person communication.
- **Germany** outlined that, with the exception of Class E aircraft, GA safety awareness was administrated through national associations. They reported on several comprehensive safety promotion activities, where representatives of the CAA were frequent speakers. One task under the State's SSP would be to harmonise these activities and to open them to EPAS and GASP.

Most States that actively distributed material/organise training provided examples as evidence.

Five States indicated not delivering/distributing safety promotion material/training to associations, flying clubs, targeting flight instructors and/or pilots.

One State indicated they were considering this approach and **another** State indicated that this action was planned to be included it in its national plan. **Another** State replied that this aspect was not identified at national level, but was being included in the national audit programme.

Audience scope addressed with a particular product/service

The range of answers provided by the audience (targeted with promotion material/training) was:

- Flight instructors' community, GA pilots (with PPL license and also ultralight and glider pilots), including international pilots (as reported by **Norway**), other airspace users, ATC;

- **Some** States targeted all, **some** only one type or a selection of them. **Slovenia** targeted nominated persons (e.g. head of training) in organisations. The country's CAA required that the information gained on the meetings to be disseminated throughout the organisation. As ATOs for GA are normally part of flying clubs, the information was expected to reach also pilots (club members) and other personnel.

- About how the products were promoted, **Finland** shared its experience. The main lesson learnt, after a focused project was conducted in 2015 for the GA community, was that it is important to use multichannel safety promotion. This was the reason why in Finland, many of the promotion materials were targeted to a certain part of GA community and concerned a particular safety topic.

- The website was by far the most widespread channel for promotion. In **France** the products were prepared in collaboration with representative GA federations who were also giving them wide visibility. Facebook was also quoted by **Ireland** as working very well.

- Other means of promotion were to provide information through targeted email campaigns, issuance of bulletins, articles in safety magazines, etc. with the purpose of disseminating safety initiatives points or roadshows/workshops in GA specific aerodromes or via specific safety or thematic meetings (also referred as safety evenings) with training organisations and pilots association (where both printed material as well as presentations were delivered and where open and frank exchanges were encouraged).

- In **Belgium,** ATOs and flying clubs were prompted to use safety promotion products as teaching material. In **another** State, pilots were requested to register first to these sessions, so they could be addressed for further initiatives. Flyers distributed at airports were also one means of information quoted.

- In **Germany**, safety messages were part of aviation safety promotion activities amongst the GA community in the country. This promotion was carried out by various means and organizations. The German Accident Investigation Board (BfU) delivered a number of speeches, lectures and presentations to the GA community during members´ assemblies. These could be general in scope, but also focused on specific accidents and identified causes. Furthermore, BfU published safety promotion documents on a regular basis, called 'Flugsicherheitsinformationen'. The associations, mandated in **Germany** to administer the activities in regard to flying models, ultralight, hang-/paragliders and parachuting, played an even greater role in the promotion of aviation safety in the field of GA and air sports. They were obliged to provide safety promotion messages and to safeguard an equal level of aviation safety in their respective area. This was mainly achieved through seminars, lectures at a local level and by periodic publications. The German CAA (LBA) oversaw these activities of the associations. The German branch of Aircraft Owners and Pilots Association (AOPA) was also very active in this regard by publishing 'safety letters' in German bi-monthly. In the context of **Germany's** State Safety Programme, it was envisaged to further co-ordinate these activities to improve their efficiency.

- Other tools quoted included: leaflets and posters, videos (e.g. 'Prepare for flight'), guidance material 'Are you ready for flight?', online quiz, (e.g. 'How do you know rules of air?'), pilot kneeboard with flight preparation lists.

- **Nine** States (**France, the UK, Belgium, Croatia, Finland, Ireland, Slovenia, Switzerland** and **Spain**) provided details on the best acclaimed safety promotion/training material after receiving feedback from users. **Austria** and **Iceland** indicated that in general all the material produced was welcomed.

Although not in the scope of the question, **no State** reported any type of material as not well received.

From the States providing a precise example, the following were the most noticeable:

- Brochure on bird strike, 'Stay Safe' campaign;
- Pilots' kneeboard;
- Online quizzes (for e.g. 'How do you know rules of air?');
- Airspace infringement leaflets for General Aviation;
- A video titled 'accidentologie' (with more than 10 000 views recorded), coming from DGAC **France** and
- Safety promotion material and seminars, in general, were stated as being well received too.

Finland did not provide examples, but gave a good exposure to useful tips to attract the audience attention, for examples citing meetings and direct contact usually worked the best for them. Multichannel and good short content, with 'real life' examples, in the material worked well.

Means to measure the effectiveness of the delivered material/training

The answers provided by States to this aspect were very heterogeneous. **Some** States appeared to monitor this aspect, whereas **others** did track somehow the effectiveness, but remained dubious as to the significance of the results. **Others** considered that not enough time had passed to gather relevant information or that the data was not useful to provide a statistically based conclusion.

The only measurement in place, and used by **some** States, was video views count on websites (e.g. mentioned by the **Czech Republic** or **France**). The **UK** and **France** pointed at the possibility of using increased web analytics tools in this respect. Oral feedback or feedback forms (after trainings, seminars and the like), appeared to be the most common means (quoted by **Germany, the UK, Ireland** and **Slovenia**). However, not many States considered these as a mechanism for monitoring of the effectiveness of training/material in relation to reducing accident and incident rates, but as a way to conclude, for example, on arrangements, the length and the topics of next sessions. However, for the **Czech Republic** and **Croatia**, verbal or direct contact was reported as an effective means to measure the effectiveness of the campaigns conducted, with one of these States actually noticing an improvement in safety culture and awareness in preparation for flights. Moreover, States such as the **Czech Republic, Norway** and **Spain** also considered that it was too early for them to be able to draft a conclusion about the effectiveness of the material/training. However, some noticed a slightly improved reporting culture which, according to them, cannot be directly attributable to promotion efforts.

Austria and **Norway** pointed at the need to enhance collection of direct and simple feedback/reports (not so much for the sake of safety improvements) and hence to ensure involvement of all concerned parties within the aviation community. **Belgium** created a corporate email address to collect all feedback and comments on safety promotion material. The State remarked that the response of GA pilots and flying clubs regarding the safety promotion material via this email address were positive, some clubs and ATOs mentioned to use the safety promotion documents as teaching material. **Slovenia** pointed at the verification of the dissemination of information (i.e. safety leaflets) during oversight visits of organisations.

Two States actually did not provide a reply, but recommended instead monitoring the value of the safety indicator allocated to its safety action and comparing with its target, with the consideration for the use of

GA indicators in this case. **Two** States suggested monitoring the evolution and trends of safety occurrence reports on the concerned issues as a possible indicator.

On this subject, **one** State remarked that the availability of safety performance indicators for GA remained a challenge and the occurrence reporting culture remained low in its State. Tier 1 indicators (Numbers of Accidents/severity index (SI)) did not provide a means to measure the effectiveness of training material due to the random nature of a low number of events. There was also limited information on safety oversight (i.e. only for approved training organisations). That being said, the effectiveness of the State's CAA itself could be gauged on a yearly base depending on the influence and in terms of membership: attendance at safety evenings and the number of Facebook members.

One State claimed there was no credible way to relate development for safety measurements, or even valid safety indicators, for single and rather small safety promotion activities. Two States pointed to a lack of internal resources to perform any sort of checks.

Chapter Five: Emerging issues

5.1. New products, systems, technologies and operations

5.1.1. MST.020 - Loss of radar detection

| Action title	Objective	Activity sector	Owner	Deliverable/ date
Loss of radar detection	On 5 and 10 June 2014, there were several occurrences of radar losses from ATC displays in central Europe. These events resulted in a reduced capacity in some of the affected ATC sectors, in the introduction of flow measures and in delays. As this type of events may also have a serious impact on safety, EASA was mandated by the Commission to perform a technical investigation and propose recommendations.	CAT/HE	MS	Report / 2017
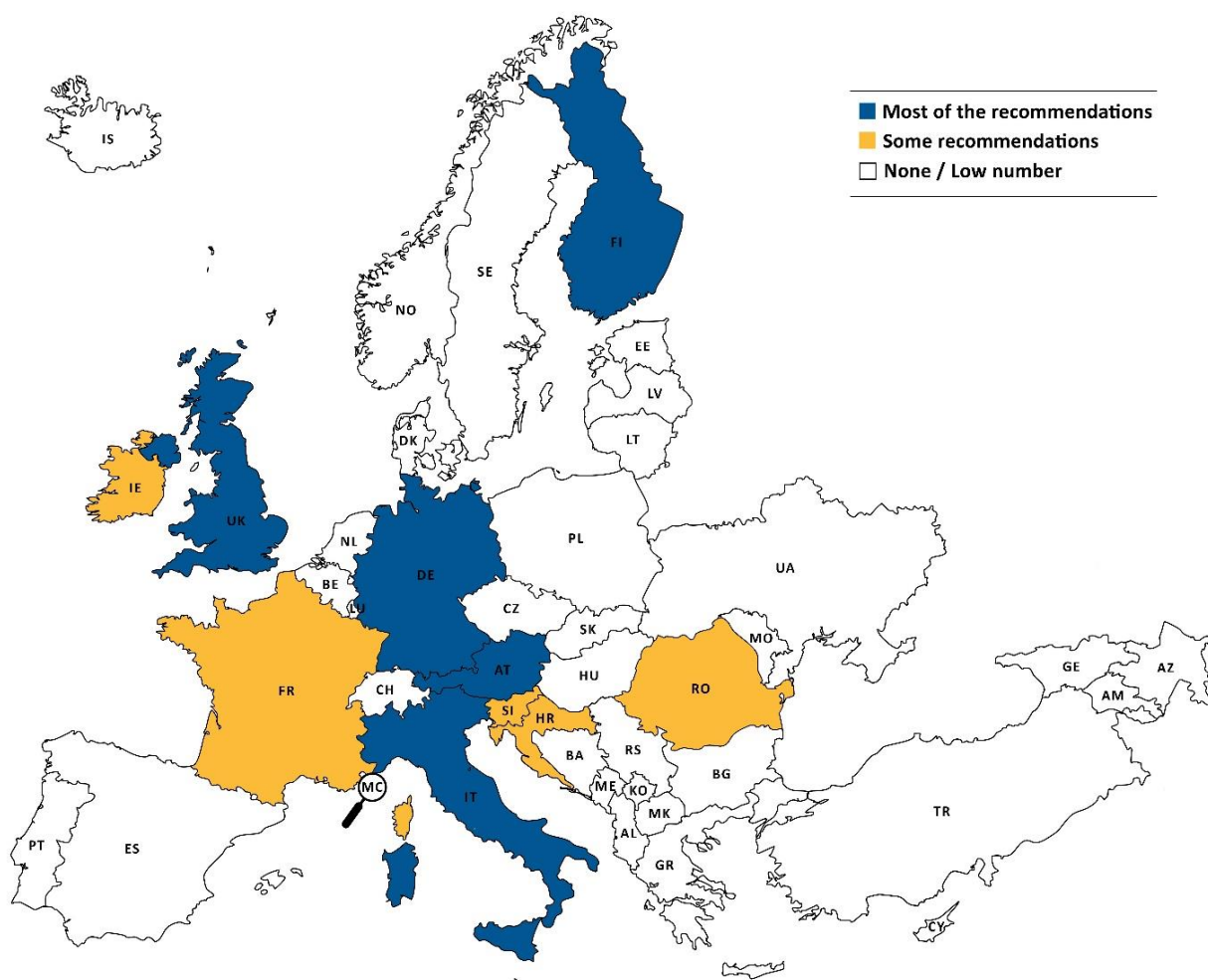
Figure 24 Countries which implemented the recommendations regarding Loss of radar detection

Information was received from **twelve** countries concerning this action. The rest of the States provided no justification for not replying. In **one** of these cases, no answer was provided for most of the recommendations, except for one. **Another** of these States acknowledged the information could not be collected on time and **two** States recognised the overall action was not applicable in their States (in one of them there is no radar given to the small size of their territory).

In order to comply with all six recommendations in the action MST.020, **Italy** indicated they were working on a specific action contained in its national ENAC Safety Plan 2017-2021.

The remaining **nine** States replied with a broad variety of details on how they were addressing the recommendations laid down in the EPAS action MST.020. Answers range as follows:
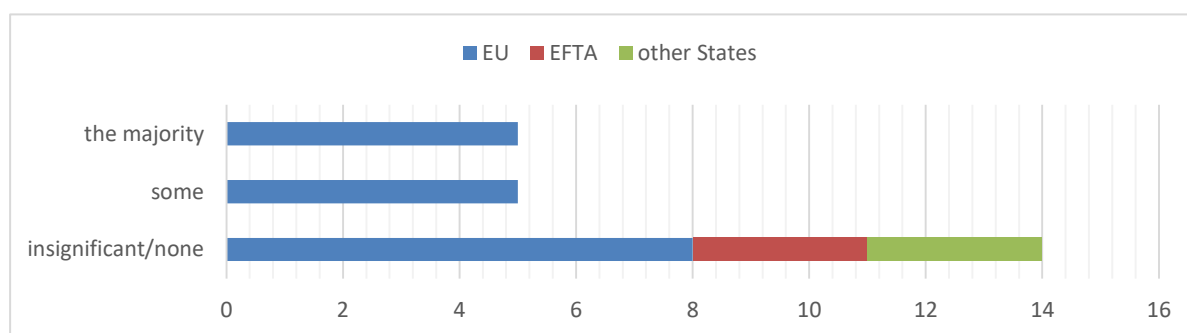
Figure 25 The number of recommendations implemented on loss of radar detection within the states

Recommendation 01 - Member States are reminded that Article 6 of regulation 1207/2011 - laying down requirements for the performance and the interoperability (and amendments), clearly identifies their responsibility for spectrum protection at the latest by 5 February 2015. Member States should put in place required mechanisms to comply with it.

Given the date of implementation of Article 6 of Regulation 1207/2011 has been changed in Regulation 2017/386 to the 02/01/2020, **Italy, Belgium, Switzerland, Germany** and **Austria** indicated they had not yet adopted this recommendation. Some of these States indicated that the spectrum monitoring was under consideration as a task to be undertaken by EUROCONTROL, with a final decision still to be made in this respect.

Iceland indicated that Regulation (EU) No 1207/201 did not apply in its State. **Iceland** was within the ICAO NAT region, while Regulation 1207/2011 covers the airspace in the ICAO EUR/AFI regions.

France replied that this point was being monitored by a working group (presumably at national level) including the military party.

Romania: Romania's ANSP (ROMATSA) used the draft document 'Guidelines for the EUROCONTROL of means of compliance to SPI IR Article 6, Edition 0.2, 10/24/2014' elaborated by the Surveillance Ground Environment Group, under the guidance of EUROCONTROL, to achieve a theoretical calculation of congestion of 1030/1090 MHz frequencies in the Romanian airspace. Taking into account the assumptions provided by EUROCONTROL and considering all systems (SSR Mode A / C and Mode S civilian and military) issuing queries in the Romanian airspace, the calculations made at the ROMATSA level showed that, in the identified region as covered by the more radar and heavy traffic, the aircraft transponders received less than half of the number of interrogations set out by ICAO standards.

The **UK** reported as operating the joint civil/military identification friend or foe secondary surveillance radar (IFF SSR). The committee that manages the 1030/1090MHz environment to ensure transponders were interrogated at a rate below the one specified in MOPs. This was achieved through effective licencing

and co-ordination between organisations. This committee also evaluated new requests for use of this frequency range and also had an on-going monitoring programme of the pulse environment. These activities were supported through the SSR/IFF Environment Model (SIEM) planning/simulation tool.

In **Croatia**, the national regulatory authority for network industries (HAKOM) was responsible for frequency protection activities in general. It means that all frequency interferences were being investigated and the source was determined by HAKOM. Regarding the over interrogation by the SSR, there were several defence mechanisms to prevent over interrogation caused by ground systems operated within FIR Zagreb. ANSP, as the Mode S operator, was controlling parameters, such as pulse recurrence frequency (PRF) or extraction of BDS registers, to reduce number of interrogations to required one. On the other hand, each Mode S operator was required to receive II/IR codes from CroControl as the designated organisation for code allocations in **Croatia**, so the number of interrogators was controlled that way.

In **Ireland**, the NSA acceptance of additional surveillance systems (or changes to transmissions of existing systems) were taking into consideration any potential impact on the existing RF environment. Due to Ireland's location, the relatively low number of overlapping radars covering the airspace combined with relatively low traffic levels loss of radar detection and to the spectrum protection, this was not considered a significant risk. Simulation work was undertaken in co-operation with the **UK** CAA using their RF model and the results did not indicate any issues in Irish airspace.

In **Slovenia**, a permanent working group was planned to be established by the end of the year 2017 where, in addition to NSA, several stakeholders were going to be involved (ANSP, Aviation Military Authority and Agency for Communication Networks and Services of the Republic of **Slovenia**). The main objective of the working group was going to be the regularly analyse the situation and to define potential measures and requirements. One of the envisaged roles of the group was the coordination of 1030/1090MHz frequency operation.

In **Finland**, Trafi included MST.020 in the FPAS 2017-2021 as a national action item EME.NPST.003.1. Trafi ensured that the recommendations of the EASA's technical report were evaluated together with the stakeholders and communicated to Finavia. Finavia announced that it had addressed the report's proposals in its processes where appropriate. The objective of the action was to control the introduction of new products, systems, technologies and operations. The deliverable was planned to be a discussion on the recommendations and their deployment where appropriate during 2017. More concretely, there were no reports on detection of aircraft as a result of SSR over-interrogation. There was one TopSky - ATM system with SSR-radars which covered the all Finnish airspace. In this system any problems with transponders as SSR- over-interrogation could be detected 24/7. Also there was a WAM system under installation with a monitoring feature, so in the future, this system could be used to monitoring. The WAM-project was delayed due to manufacturer problems.

Recommendation 02 - Member States should decrease the amount of interrogations in their airspace originating from ground systems (e.g. from SSRs, MSSRs, MLAT, WAM, test transmitters, military SSR/MSSR), so that each transponder is interrogated well below the rates required in the MOPS; Particular attention should be paid to tests or maintenance activities that use interrogators in the 1 030/1 090 MHz frequency.

France replied that mode S stations were working in a way to limit the rates.

Poland reported that its authorities notified EUROCONTROL before each part of maintenance activities.

For the recommendation number 02, the **UK** and **Romania** referred to the same remarks made for the previous recommendation number 01.

Austria replied that as a result of calculations and measurements, some provisions were set to reduce the load of 1030/1090 MHz frequency. In 2016, the radar Linz was converted from mixed mode to P4 short to avoid double interrogations of Mode-S-Transponders. Some Mode-3A radars were planned to be decommissioned in 2018.

Croatia replied that this recommendation was not implemented. The whole system was composed of 7 Mode S interrogators and there were no MLAT/WAM systems in operation in 2017.

In **Ireland,** the NSA, as part of its review and acceptance of all surveillance systems, required that their transmissions are in compliance with applicable ICAO requirements and any associated MOPS. There were no radar manufacturers in Ireland, therefore the only test transmissions were done during the commissioning of the ANSP's systems and these were conducted in a carefully controlled manner. There were no tests conducted by the ANSP that could result in over-interrogation.

Slovenia considered this recommendation as non-applicable in their State since the present operational system was considered optimal. On the other hand, the monitoring system was planned to be implemented in due course.

In **Germany,** the SUR systems were divided into two clusters to reduce the interrogations. The Federal Network Agency, in cooperation with the Frequency management of the Federal Air Traffic Control Authority, restricted the level of interrogations in some individual cases.

In **Finland,** Trafi included MST.020 in the FPAS 2017-2021. There was only one service provider (Finavia) which provided surveillance service to others and also to the military. System testing was done according to Finavia's process to avoid creating unexpected interrogation.

Recommendation 03 - Member States ensure that the use of the 1 030/1 090 MHz frequency band is monitored and recorded.

France replied that such an activity should be done under the umbrella/guidance of EUROCONTROL.

In **Romania,** monitoring and recording in 1030/1090 MHz frequencies of surveillance ground systems were performed as follows:

- The surveillance ground systems were fitted with recording features which allow the replay of loss of radar targets events;
- The type of radar data loss events were reported by ROMATSA to the Civil Aviation Safety Investigation and Analysis Center (CIAS) and to the RO CAA in accordance with the provisions of Regulation (EU) no 376/2014 and with the procedures specified in RACR REAC, edition 2/2016 and
- According to national legislation RACR-ATS/2016, chapter 6, recording in 1030/1090 MHz frequencies of surveillance ground systems and other surveillance equipment (ex: ADS-B, ADS-C) were performed automatically for the purpose of accident and incident investigation, search and rescue, surveillance and ATC systems evaluation and for training sessions.

Records are kept, normally, for 30 days, in accordance with applicable regulatory provisions, and the record storage period could be extended as long as necessary for the aviation investigation activities.

The **UK** replied that actual transmissions were not recorded, however the radar surveillance data within the transmissions was recorded. This was mandated in the UK for approximately 6 years. This data was required by law to be kept for 30 days, however, in the event of an incident or accident, this data could be impounded and kept for as long as it is necessary for the investigation. The **UK** supports the EUROCONTROL overflight activities with respect to airborne monitoring of these frequency ranges.

Austria replied that due to lack of tools this recommendation was still open. No progress was indicated coming from EUROCONTROL CS-7.

Croatia replied that it was implemented partially. There was no systematic monitoring and recording of the 1030/1090 MHz band implemented. However, CroControl arranged EUROCONTROL to record 1030/1090 MHz band and evaluate of the SSR system used in Croatia. The process took place in 2016 and partially in 2017 and it included ground and performed in flight records. Some recommendations were being implemented. There was no commercial of self-tools systems on the market supporting continuous monitoring of the band and the production of reports and evaluations. This recommendation was also unclear about the scope of such monitoring and recording.

Ireland considered this recommendation as not being implemented. As noted earlier, the risk based approach indicated was not currently required in Irish controlled airspace. The NSA attended the SGEG (Surveillance Ground Equipment Group) meetings in EUROCONTROL about European initiatives to record and analyse airborne spectrum usage across the EU.

Slovenia considered this recommendation as partially put in place. 1030/1090 MHz frequency band was already recorded and stored at least for 2 months. If required, certain data could be stored even longer than 6 months. A monitoring system was planned to be put in place by the end of 2019.

Germany indicated that its main ANSP, the DFS, monitored all flights with a tool called AMOR.In **Finland**, Trafi included MST.020 in the FPAS 2017-2021. Recording was done at TopSky - ATM system for three months. Data of occurrences could be locked for longer time when needed.

Recommendation 04 - Member States should ensure that each MLAT/WAM interrogator use a unique interrogator code and interrogations are kept to a minimum. The level of interrogations should be coordinated within the Member States and across boundaries.

France replied that there was no WAM and there was only a limited range MLAT in France.

Romania considered that MLAT/WAM interrogator cannot use a unique interrogator code due to the fact that it contravenes to the regulatory provisions of Regulation (EC) 262/2009 (MSI IR). According to the provisions of MSI IR, a unique interrogator code (II≠0), which is an eligible interrogator code, was planned to be allocated only to an eligible Mode S interrogator. But MLAT/WAM interrogator was not an eligible Mode S interrogator. The rationale for the above Statement was presented during NCP IOP WG no. 15, no. 16 and no. 17 and no official interpretation of the provisions of MSI IR has been reached so far. The rationale was presented in a working paper and presented during NCP IOP WG no. 17 meeting.

The **UK** recognised this was less critical for the **UK** than for other European countries. However, the **UK** used the SIEM tool to model the frequency environment and ensure that the interrogations were minimised. Further, the UK CAA are members of the EUROCONTROL ORCAM group to co-ordinate such activates.

Austria replied that it was not in line with EUROCONTROL recommendations to make use of interrogator code 0 for MLAT/WAM systems. AWAM/MLAT sensors have SI=0 (no lockout), the use of unique interrogator code was under investigation. Despite that these interrogations were optimized for AWAM, resulting in a reduced amount of interrogations due to the coordination with neighbour ANSPs.

Croatia replied that this recommendation was not yet implemented. There were no MLAT/WAM interrogators put in service in the State.

In **Ireland**, at the time of the survey, there was only a single MLAT system in the State (Dublin airport). The system was configured in accordance with applicable ICAO and international standards and in operation for several years with no adverse impact on the RF spectrum noted during this time.

Slovenia considered this recommendation as not applicable in its State. However, special attention was given in the design phase of MLAT network. MLAT was planned to be operational by the end of 2019, but testing phase was planned to start in the Q4 of 2018.

Germany's Federal Network Agency (the BNetzA in cooperation with their Federal Air Traffic Controlling Office/the BAF) restricted the level of interrogations in individual cases.

Finland included MST.020 in their FPAS 2017-2021. The MLAT/WAM system was in the test phase. It had unique interrogation code and the MLAT/WAM had a whispering system in which the interrogation power, direction and repetition rate was managed dynamically.

Recommendation 05 - Neighbouring Member States should collaborate particularly within the Functional Airspace Block (FABs), but ensuring also wider collaboration at the EU level, to make sure that recommendations numbers 1, 2, 3 and 4 are carried out in a consistent and harmonised way.

France was waiting for FABs or EUROCONTROL to put this point on the agenda of an ad-hoc meeting.

Romania: The conclusions of the Working Group established to analyse the EASA recommendations were presented during Danube FAB NSA Board No 5. It was agreed that, if the case may arise, exchange of information regarding this issue could happen during the next Danube FAB NSA boards.

The **UK** is a member of the UK/Ireland Functional Airspace block (FAB). Where cross boarder issues emerged, they were managed and resolved through the FAB Supervisory Committee and the FAB Management Board.

Austria replied that FAB-CE Project 18 had started on the 6th of July 2016. The goal was the infrastructure optimization in FAB-CE which was also going to include Regulation (EU) No 1207/2011.

Croatia replied that this recommendation was considered implemented partially in their State. There were regular contacts within FAB, and neighbouring countries regarding the issue. However, there were no formal interfaces regarding the matter, especially on EU level. Centralized service CS 7.2 by EUROCONTROL had been considered as potential collaboration on EU level.

In **Ireland**, the national NSA worked closely with the UK CAA. Irish radar sensor interrogation information was provided to the UK CAA for use in their RF simulation model and the results of this modelling were provided to the Irish NSA.

Slovenia had regular cooperation with NM and EC. Between FAB CE NSAs the information was exchanged regularly and also with other neighbouring States.

In **Germany,** European-wide cooperation was guaranteed by the Federal Network Agency through participation in the FABEC Treaty.

Finland included MST.020 in their FPAS 2017-2021. This was done according to Regulation 262/2009 and by direct cooperating between service providers and also within NEFAB and DK-SE FAB when necessary.

Recommendation 06 - Member States should ensure that a NOTAM is issued when maintenance activities or tests are conducted in their territory that could affect or interfere the frequencies 1 030/1 090 MHz.

Italy replied that NOTAMs were regularly issued by ENAV when maintenance activities or tests were conducted. ENAC monitored ENAV during the periodic oversight audits.

France replied NOTAM is not an adapted risk reduction tool for such maintenance activities or tests. NOTAM is considered for pilot use. France questioned the use for a pilot of such a NOTAM.

Croatia replied that NOTAMs were issued for each activity of maintenance performed on SSR systems. Because NOTAMs informs only about outage of the system and there were no NOTAMs informing about possibility of interference on 1030/1090 MHz, the purpose of such NOTAMs was considered unclear.

Romania did not consider this recommendation implemented due to the fact that the Ministry of Defence and ROMATSA were the entities owning authorisations for using 1030/1090 frequency. ROMATSA had in place SLA for the share use of radar sensor data with Ministry of Defence that specified the mutual information for any planned periodic breaks, planned breaks or any failure in the provision of the radar data.

Germany replied that SUR systems were only operated by the ANSP Deutsche Flugsicherung GmbH (DFS) which was also responsible for the publication of NOTAMs. In the case of maintenance activities, DFS checks (based on internal processes) that the operational requirements for the SUR system are fulfilled and that there is no impact or interferences of the 1030/1090 MHz frequencies.

For tests in the frequency band 1030/1090 MHz, the users (e.g. ANSP, Military, the Industry) had to send an application to the radio regulator Bundesnetzagentur (BNetzA). BNetzA forwarded the application to BAF. To avoid impact or interferences on the 1030/1090 MHz frequencies, the frequency management of BAF contacted the DFS frequency management for a Statement. If interferences of the 1030/1090 MHz frequencies were expected, the frequency management of BAF recommends to the BNetzA not to grant the frequency allocation. In the theoretical case that an amplification of the frequency spectrum congestion cannot be completely excluded within a test operation, a NOTAM would be initiated.

The **UK** replied that as part of the licencing to use such frequencies, transmitting organisations were made aware of their obligations to raise NOTAMs when testing or maintenance activities are carried out that could interfere with these frequencies. The majority of ground based transmitters and receivers were operated by ANSPs which are aware of this requirement, raise NOTAMs effectively when required and have an effective SMS that identifies this as a risk.

Austria replied that this was implemented by ANSPs, and additionally that information was going to be provided to counterparts on technical level.

Ireland indicated there were no radar manufacturers or test sensors located in their State. Routine scheduled maintenance of the ANSP systems did not require any testing that will interfere with the 1030/1090 band. Aircraft maintenance testing was co-ordinated with local ATC centre.

In **Slovenia** the recommendation was considered to be in place. Also there was an agreement with MIL to publish NOTAMs and ad hoc coordination if needed. **Finland** included MST.020 in their FPAS 2017-2021. Issuing NOTAMs was normal process for Finavia.

V.   SUMMARY

1.   EPAS actions' implementation within reporting States

Below it is presented an assessment of the general implementation of the EPAS 2017-2021 actions on the **twenty four** States (out of **forty-four**) which replied to the questionnaire. The actions are framed in four categories.

The following actions show an **advanced level** of implementation amongst the Member States that sent a report in 2017:

- ✈ MST.001 - Member States to give priority to the work on State Safety Programmes (SSP) *(implemented fully or partially in more than 20 States)*;
- ✈ MST.002 - Promotion of safety management system (*implemented fully or partially in about 17 States*);
- ✈ MST.007 - Include runway excursions in national State Safety Programmes *(implemented fully or partially in nearly 18 States)*;
- ✈ MST.014 - Include runway incursions in national State Safety Programmes *(implemented fully or partially in nearly 20 States)*;
- ✈ MST.011 - Local runway safety teams (*implemented fully or partially in 22 States*);
- ✈ MST.015 - Helicopter Safety Events *(implemented fully or partially in more than 18 States. Although many States wrote the helicopter activity in their countries is rather low, improvements were registered since 2016)* and
- ✈ MST.010 - Include MAC in national State Safety Programmes *(implemented fully or partially in nearly 20 States)*.

The actions outlined below, are observed to be advancing at a **reasonable progress**, however work is still required:

- ✈ MST.003 - Member States should set up a regular dialogue with their national aircraft operators on flight data monitoring programmes *(implemented fully or partially in about 14 States)*;
- ✈ MST.018 - Include ground safety in national State Safety Programmes *(implemented fully or partially in about 15 States)*;
- ✈ MST.006 - Include controlled flight into terrain in national State Safety Programmes *(implemented fully or partially in 16 States)*;
- ✈ MST.025 - Improve the dissemination of safety messages *(implemented fully or partially in 17 States)*;
- ✈ MST.004 - Include Loss of Control In Flight in national State Safety Programmes *(implemented fully or partially in more than 15 States)*;
- ✈ EAPPRE (part of MST.007) *(implemented fully or partially in 14 States)* and
- ✈ EAPPRI (part of MST.014) (*implemented fully or partially in 14 States*).

On the contrary, according to the reports received, the following actions are progressing **slowly**:

- ✈ MST.017- Dangerous Goods in GA *(implemented fully or partially in 4 States and because it remained at the same level as in 2016, it was removed from the new edition of EPAS)*;
- ✈ MST.005 - Include fire, smoke and fumes in national State Safety Programmes (*implemented fully or partially in nearly 13 States*) and

→ MST.016 - Airspace infringement risk in GA (*implemented fully or partially in 12 States, although more than 20 acknowledged the fact that airspace infringements involving GA is a top safety concern*).

The following MSTs are perceived by many responding States as not applicable to them or not a priority, and therefore they are called **'question mark'** actions. Both actions are related to the technical investigations on specific safety issues carried out by EASA on behalf of the European Commission and leading to specific safety recommendations:

→ MST.020 - Loss of radar detection (*no answer received from 15 countries. Some of them considered that it was not applicable for them. Only 9 States provided details on how recommendations are being addressed*) and

→ MST.024 - Loss of separation between civil and military aircraft *(most countries took some form of action on this action, but most of them still did not fully implement it)*.

2.   Implementation of safety actions in main risk areas in State's safety plans

The chart below shows the seven major risk areas categorised according to the level of implementation by the Member States of their MSTs. Based on the answers received from them, the two most popular areas were the MAC and RI, where 83% of the countries implemented different measures in order to mitigate these risk. Following them, LOC-I, RE and CFIT registered 75% participation from the States which underlines the high commitment of the States into preventing these hazardous situations to happen. Moreover, with only four percentages less, ground safety actions were included at national level. Even though fire, smoke and fumes was the topic with the least number of actions taken by the Member States, it still has a percentage bigger than 50, which indicates a great commitment from their part.
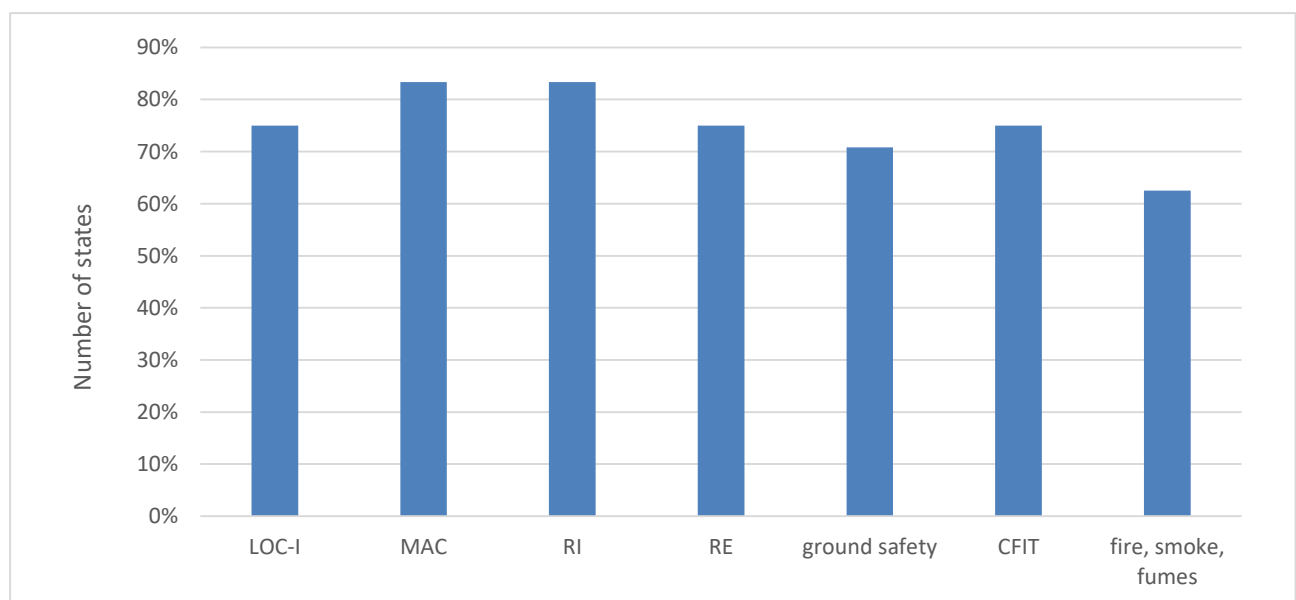

Figure 26 The percentage of States that implemented safety actions on to the main risk areas

3. List of actions by EASA and MSs for the EPAS reporting cycle

This is a table showing an update of the actions reflected in the 2016 EPAS implementation report as well as new actions derived from the last SM Teb held during the 16-18 January 2018 at EASA.

Item	Action	Deadline	Status (as of mid Feb 2018)
1.	Update the next reporting template and reconsider the reporting format to receive adequate, relevant and needed information from States.	Before the 01-2018 Safety Management TeB meeting	Done with the launch in July 2017 of the EASA questionnaire. A new format and platform was used (EU Survey).
2.	Clearly define the levels of actions implementation to receive harmonised status and data across the States.	Before the 01-2018 Safety Management TeB meeting	The new format of the survey overcomes this problem. Self-reporting on the level of implementation was abandoned.
3.	Discuss the new reporting template as well as the implementations levels definitions with States during the next Safety Management TeB meeting.	–	Self-reporting on the level of implementation was abandoned. The States implementation report of 2017 was discussed with States at SM TeB in Jan 2018.
4.	Provide a comprehensive definition of what a high or major risk is for each operational issue to avoid receiving different interpretations from States.	–	This is already addressed in the 2017 questionnaire.
5.	EASA and MS should review the difficulties identified in each studied action.	SM TeB	This action remains open and it will be discussed at the next SM TeB.
6.	States to confirm or update the list of EPAS contact points to the EASA **EPAS** team.	Recurrent	EASA manages a list that was used for the EPAS questionnaire 2017.
7.	EASA to directly address the States, which did not reply the questionnaire on implementation of EPAS 2017 – 2021, offering support and inviting to complete the EPAS questionnaire available in the EU survey tool.	During January and February 2018	Ongoing

8.	States to confirm their EPAS contact.	Recurrent	Ongoing
9.	EASA to seek more clarifications, amongst the States that submitted a questionnaire during 2017, for certain lack of answers to some question.	During quarter Q2 of 2018	Ongoing
10.	EASA to prepare a paper to better explain the EPAS reporting mechanism in preparation for the new Basic Regulation.	Before the end of 2018/Safety Management TeB meeting	Ongoing
11.	EASA to trigger a discussion about the actions detected in the 2017 report under 'question mark', namely: MST.024 - Loss of separation between civil and military aircraft, and MST.020 - Loss of radar detection.	Before the Q2-2018 Safety Management TeB meeting	
12.	EASA to include in the next SM Teb agenda an item related to a discussion on the implementation of EPAS actions.	Before the Q2-2018 Safety Management TeB meeting	

4.   List of publicly available material provided by States and EASA

This section contains a list of all the requested relevant material or internet sites, solicited in each applicable question for each relevant EPAS action. The links and documents were kindly provided by the Member States to illustrate some of the answers to the survey questions in order to show evidence or best practices implemented in their countries. The aim of this section is two-fold:

→ Serve as an illustrative reference on how States approach the different actions prompted in each question;
→ Boost interest and possible enquiries amongst States.

Some of these documents are in the national languages of the countries and/or translated to English (indicated where applicable).

Note: *The list below represents the States that provided a copy/reference to the documents concerning the EPAS questionnaire.*

MST.001 - Member States to give priority to the work on State Safety Programmes (SSP)

Q 2: Do you have an SSP implementation plan?

- **Belgium** (**here** in Dutch) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Albania** (**here** in English) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Romania** (**here** in Romanian) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Turkey** (**here** in Turkish) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Finland** (**here** in English) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Ireland** (**here** in English) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*

Q 3.a: Do you have an approved SSP document in your country? If YES, have you made your SSP document public?

- **Monaco** (**here** in French)
- **France** (**here** in French)
- **Romania** (**here** in Romanian)
- **Italy** (**here** in Italian, including a courtesy translation in English)
- **UK** (**here** in English)
- **Norway** (**here** in Norwegian)
- **Croatia** (**here** in Croatian)
- **Finland** (**here** in Finish) and (**here** in English)
- **Iceland** (**here** in English)
- **Slovenia** (**here** in Slovenian)
- **Ireland** (**here** in English)
- **Spain** (**here** in Spanish)
- **Latvia** (**here** in Latvian)
- **Turkey** (**here** in Turkish) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Belgium** (**here** in English) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Austria** (**here** in German) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Sweden** (**here** in English) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*

- **Ireland** (**here** in English) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Estonia** (**here** in Estonian) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Switzerland** (**here** in English)
- **Albania** (**here** in English) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Poland** (**here** in Polish)
- **Portugal (here** in Portuguese including a courtesy translation in English)

Q 4: Do you have a Safety Plan at national level or a similar document (e.g. Business plan or national action plan)?

- **Ireland** (**here** in English)
- **Finland** (**here** in English) and (**here** in Finish)
- **France** (**here** in French)
- **Romania** (**here** and **here** in Romanian)
- **Italy** (**here** in Italian)
- **Romania** (**here** in Romanian) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Croatia** (**here** in Croatian) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Albania** (**here** in English— *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*

Q 5.a: Is your Safety Plan evidence based by linking actions to strategic safety priorities (e.g. through Safety risk portfolios or other similar process)? If YES, could you provide us with your Safety risk portfolios or equivalents?

- **Finland** (**here** in Finish) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Ireland** (**here** in English) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Belgium** (**here** in English) — *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*

MST.002 - Promotion of safety management system

Q 1.a: Are you promoting SMS material developed by the EASA and SMICG? If the answer is YES, which products are you promoting?

- **France** (**here** in French)
- **Sweden** – all examples in English (**here**), (**here**), (**here**), (**here**) and (**here**)
- **Finland** – all examples in Finnish, except where indicated (**here**), (**here**), (**here**), (**here** in English), (**here**), (**here**), (**here**), (**here**) and (**here**)
- **Spain** (**here** in Spanish) and (**here** in Spanish)

Q 1.b: How are you promoting these products?

- **UK** (**here** in English)
- **Latvia** (**here** in English)

Q 2.a: Do you have a process in place to identify any gaps in terms of SMS promotion/training in your State? If the answer is YES, can you describe it?

- **Switzerland** (**here** in English) and (**here** in English)

Q 4: Have you developed your own material to promote SMS?

- **Romania** – all examples in Romania (**here**), (**here**) and (**here**)
- **Czech Republic** (**here** in Czech)

- **Finland** – all examples in Finish (**here**), (**here**), (**here**) and (**here**)
- **Switzerland** (**here** in English)
- **UK** (**here** in English) – *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*
- **Slovenia** (**here** in English) – *in Sinapse, within the library of documents, or enquire with **EPAS** if you need a copy.*

Q 4.b: How was this material delivered?

- **Croatia** (**here** in Croatian)
- **Spain** (**here** in Spanish)

MST.004 - Include Loss of Control In Flight in national State Safety Programmes

Q 1.b: Is LOC-I addressed by your State in your Safety Plan at national level or similar document? If your answer is YES, please provide details on the actions you are taking.

- **France** (**here** in French)

Q 5: How do you measure their effectiveness?

- **Switzerland** (**here** in English)

MST.005 - Include fire, smoke and fumes in national State Safety Programmes

Q 1.b: Is fire, smoke and fumes addressed by your State in your Safety Plan at national level or similar? If your answer is YES, please provide details on the actions you are taking.

- **France** – all cases in French (**here**), (**here**) and (**here**)

MST.006 - Include controlled flight into terrain in national State Safety Programmes

Q 2: What are the 3 main factors that contributed to the CFIT risk in your country?

- **UK** (**here** in English)

MST.007 - Include runway excursions in national State Safety Programmes

Q 1: Is RE addressed by your State in your Safety Plan at national level or similar document?

- **UK** (**here** in English)

Q 1.b: If your answer is YES, please provide details on the actions you are taking.

- **France** (**here** in French)

Q 2.a: Are there any new precursors events being monitored by your State compared to previous years?

- **Finland** (**here** in English) and (**here** in Finish)

Q 3: What mechanisms has your State put in place to address corresponding risks?

- **France** (**here** in French) and (**here** in French)

MST.014 - Include runway incursions in national State Safety Programmes

Q 3: What mechanisms has your State put in place to address corresponding risks?

- **Sweden** (**here** in Swedish) and (**here** in Swedish)

MST.015 - Helicopter safety events

Q 2: What type of helicopter safety related events (training, promotion, management, etc.) have you organised in 2016/2017 and/or plan to organise?

- **Romania** (**here** in Romanian)
- **Finland** (**here** in Finnish)
- **Switzerland** (**here** in German)

MST.016 - Airspace infringement risk in General Aviation

Q 2: Does your Safety Plan at national level also contain actions covering GA?

- **UK** (**here** in English) and (**here** in English)

Q 3.b: Is airspace infringements involving GA a top safety concern in your State? If your answer is YES, please explain the main action you are taking.

- **Sweden** (**here** in Swedish)

MST.017 - Safety transportation of dangerous goods in GA

Q 1: Have you developed any safety promotion material/training to inform pilots of General Aviation aircraft about the risks involved with the transportation of dangerous goods?

- **Austria** (**here** in German)

Q 1.a: If your answer is NO, please provide some background as to the reason why/ issues encountered.

- **Ireland** (**here** in English)

Q 1.b: If your answer is YES, please provide examples.

- **UK** (**here** in English)
- **Finland** (**here** in Finnish) and (**here** in Finnish)

Q 1.b.2: Which ones have been most /least popular by the audience?

- **Norway** (**here** in English)

MST.018 - Include ground safety in national State Safety Programmes

Q 2: What are the 3 main factors that contributed to the ground safety risk in your country?

- **UK** (**here** in English)

MST.014 - Include runway incursions in national State Safety Programmes

Q 3: What mechanisms has your State put in place to address corresponding risks?

- **Sweden** (**here** in Swedish) and (**here** in Swedish)

MST.025 - Improve the dissemination of safety messages.

Q 1: Have you delivered /distributed any safety promotion material / training to associations, flying clubs, insurance companies targeting flight instructors and/or pilots?

- **Ireland** (**here** in English)

Q 1.b: If your answer is YES, please provide examples.

- **UK** (**here** in English) and (**here** in English)
- **Ireland** (**here** in English)
- **France** (**here** in French)
- **Czech Republic** (**here** in Czech)
- **Finland** (**here** in Finnish), (**here** in Finnish), (**here** in Finnish), (**here** in Finnish), (**here** in English), (**here** in Finnish), (**here** in Finnish), (**here** in Finnish), (**here** in Finnish), (**here** in Finnish), (**here** in Finnish) and (**here** in Finnish)
- **Slovenia** (**here** in Slovenian)
- **Switzerland** (**here** in English), (**here** in English), (**here** in French), (**here** in German) and (**here** in German)
- **Belgium** (**here** in English) – *in Sinapse, within the library of documents, or enquire with* **EPAS** *if you need a copy.*
- **Iceland** (**here** in English) – *in Sinapse, within the library of documents, or enquire with* **EPAS** *if you need a copy.*
- **Spain** (**here** in Spanish) – *in Sinapse, within the library of documents, or enquire with* **EPAS** *if you need a copy.*

Q 1.b.3: How are you promoting these products?

- **UK** (**here** in English)

Q 1.b.4: Which ones have been best /worst received by the audience?

- **France** (**here** in French)

Q 2.a: Do you have any means to measure the effectiveness of the delivered material/training?

- **Slovenia** (**here** in Slovenian)

Finally, embedded in the EPAS questionnaire, **EASA** provided links to the following relevant sites and documents:

- EASA safety promotion (**here**)
- Safety Management International Collaboration Group - SMICG (**here**)
- European Authorities Coordination Group on Flight Data Monitoring – EAFDM (**here**)
- European Plan for the Prevention of Runway Excursions – EAPPRE (**here**)
- European Plan for the Prevention of Runway Incursions - EAPPRI (**here**)
- European Action Plan for Airspace Infringement Risk Reduction (**here**)
- EASA GA promotion (**here**)
- Commission Implementing Regulation (EU) No 1207/2011 of 22 November 2011 laying down requirements for the performance and the interoperability of surveillance for the single European sky (**here**)
- Report on occurrences over the high seas involving military aircraft in 2014 (**here**)

5. List of acronyms

This is a list of the acronyms used in this report.

A-SMGCS	Advanced Surface Movement Guidance Control System
ACC	Area Control Centres
ADM	Aeronautical Decision Making
AGA	Aerodromes and ground aids
AIB	Accident Investigation Body
AIP	Aeronautical information publication
AL	Albania
ALoSP	Acceptable Levels of Safety Performance
AMC	Acceptable means of compliance
AME	Aviation Medical Examiner
ANS	Air navigation services
ANSP	Air navigation service provider
AOC	Air operator certificate
APV	Approach procedure with vertical guidance
APU	Auxiliary power unit
AT	Austria
ATC	Air traffic control
ATCO	Air traffic controller
ATM	Air traffic management
ATO	Approved training organisation
ATOS	Air Traffic Operations Service
Basic Regulation	Regulation (EC) No 216/2008 of 20/02/2008 on common rules in the field of civil aviation and establishing a European Aviation Safety Agency, and repealing Council Directive 91/670/EEC, Regulation (EC) No 1592/2002 and Directive 2004/36/E
BE	Belgium
CAA	Civil aviation authority
CAG	Collaborative Analysis Group
CAMO	Continuing airworthiness management organisation
CAP	Continuing airworthiness of type design
CAT	Commercial air transport
CDFA	Continuous descent final approach
CFIT	Controlled flight into terrain
CH	Switzerland
CoFG	Centre of gravity
CMM	Component maintenance manual
CRM	Crew resource management
CZ	Czech Republic
DE	Germany

DGAC	Direction générale de l'aviation civile (France)
DSAC	Direction de la Sécurité de l'aviation civile (France)
DSN	Design (aerodromes)
EAFDM	European Authorities Coordination Group on Flight Data Monitoring
EAPPRE	European Action Plan for the Prevention of Runway Excursions
EAPPRI	European Action Plan for the Prevention of Runway Incursions
EASA	European Aviation Safety Agency
EASA FS.5	EASA Policy & Planning Department
EASA SM.1	EASA Safety Intelligence & Performance Department
EASA SM.2	EASA Strategy & Programmes Department
EC	European Commission
ECAC	European Civil Aviation Conference
ECCAIRS	European Co-ordination Centre for Accident and Incident Reporting System
ECAST	European Commercial Aviation Safety Team
ECR	European Central Repository
EE	Estonia
EFTA	European Free Trade Association
EGAST	European General Aviation Safety Team
EHEST	European Helicopter Safety Team
ELLX	ICAO code for the Luxembourg-Findel International Airport
ELT	Emergency Locator Transmitter
EoSP	Effectiveness of Safety Management
EOFDM	European Operators Flight Data Monitoring forum
EPAS	European Plan for Aviation Safety
ES	Spain
ESSI	European Strategic Safety Initiative
eTOD	Electronic Terrain and Obstacle Data
EU	European Union
FDM	flight data monitoring
FIR	Flight Information Region
FI	Finland
F-NI	Fire - non-impact
FOI	Freedom of Information
FOC	Full Operational Capability
FOCA	Federal Office for Civil Aviation (Switzerland)
FR	France
FSTD	Flight Simulation Training Devices (FSTD)
FUA	Flexible Use of Airspace
G/S	Glideslope
GA	General Aviation
GASP	Global Aviation Safety Plan (ICAO)
GH	Ground Handling

GHO	Ground Handling Organization
GHOST	Ground Handling Operations Team
GM	Guidance material
GND	Ground
GO	Ground operator/s
GPWS	Ground proximity warning system
HE	Helicopter
HEMS	Helicopter emergency medical services
HF	Human factor
HR	Croatia
ICAO	International Civil Aviation Organization
IE	Ireland
IE-REST	ICAO EUR Regional Expert Safety Team
iSTARS	The integrated Safety Trend Analysis and Reporting System (ICAO)
IMC	Instrument meteorological conditions
IS	Iceland
IT	Italy
JAA	Joint Aviation Authorities
JAA TO	Joint Aviation Authorities Training Organisation
KPI	Key performance indicators
LAITs	Local Airspace Infringement Teams
LED	Light Emitting Diode
LJAO	London Joint Area Operations (UK)
LOA	Letter of Acceptance
LOC-I	Loss of control - in flight
LPL	Leisure pilot license
LRST	Local runway safety teams
LTE	Loss of Tail Rotor Effectiveness
LU	Luxembourg
LV	Latvia
LVO	Low visibility operations
LVP	Low visibility procedures
MAC	Mid-air collision
MC	Monaco
MCTOM	Maximum certified take-off mass
MOR	Mandatory Occurrence Reporting
MS	Member States
MSAW	Minimum Safe Altitude Warning
MST	Member States' tasks
N/A (or n/a)	Not applicable
NAAs	National aviation authorities
NBM	New business models

NO	Norway
NoA	Network of Analysts
NPA	Notice of proposed amendment
OPC	Operator Proficiency Check
OPS	Air operations
Part-145	Maintenance organisation approvals
PBN	Performance-based navigation
PL	Poland
PPL	Private pilot license
RE	Runway excursion
RI	Runway incursion
RO	Romania
RNAV	Area navigation
RPAS	Remotely Piloted Aircraft Systems
rwy	Runway
SA	Situational Awareness
SE	Sweden
SIB	Safety Information Bulletins
SIM	Simulator
SKPI	Safety Key Performance Indicator
SI	Slovenia
SLOA	Stakeholder Line of Action
SMICG	Safety Management International Collaboration Group
SM	Safety Management
SMM	Safety Management Manual
SMS	Safety management systems
SM Teb (EASA)	Safety Management Technical Body
SOPs	Standard operating procedures
SPI	Safety performance indicator
SPN	Safety Promotion Network
SPT	Safety promotion task
SQL	Structured Query Language
SRB	Safety Review Board
SSP	State safety programme
STC	Supplemental type certificate
TAWS	Terrain awareness warning system
TeB	Technical body
TEM	Threat and error management
TO	Training organisation
TR	Turkey
TRAFI	Transport Safety Agency (Finland)
UK	United Kingdom

USOAP	Universal Safety Oversight Audit Programme (ICAO)
UPRT	Upset prevention and recovery training
VFR	Visual flight rules
W&B	Weight and Balance
WX	Weather