

ANNUAL SAFETY RECOMMENDATIONS REVIEW



Strategy & Safety
Management Directorate

Safety Intelligence &
Performance Department

2022



Catalogue number
TO-AE-22-001-EN-N

ISBN
978-92-9210-280-7

ISSN
2599-7793

DOI
10.2822/199328



ANNUAL SAFETY RECOMMENDATIONS REVIEW

Strategy & Safety Management Directorate
Safety Intelligence & Performance Department

2022

Disclaimer:

The Annual Safety Recommendations Review is produced by the European Union Aviation Safety Agency (EASA). This edition provides an overview of the safety recommendations that have been addressed to EASA in 2021. It also presents the replies produced during the year.

This annual review aims at providing feedback on the follow-up given to safety recommendations in the context of openness, transparency and accountability that characterises European Public Administration.

Apart from its safety-related informative character, this review is also expected to provide relevant information related to safety concerns raised, for both EASA and its stakeholders, including the European public.

Neither the European Union Aviation Safety Agency, nor any person acting on behalf of the European Union Aviation Safety Agency may be held responsible for the use that might be made of the information contained within.

Image credits

© iStock

European Union Aviation Safety Agency, 2022. All rights reserved. Proprietary document.

Printed copies are not controlled. Confirm revision status through the EASA-Internet site: www.easa.europa.eu.
2022 Annual Safety Recommendations Review



Contents

0	Abbreviation list	8
1	Executive summary.....	11
2	Introduction	13
3	Safety Recommendations received in 2021.....	16
3.1	Overview of Safety Recommendations received in 2021.....	16
3.2	Origin of the Safety Recommendations received in 2021.....	19
3.3	Involvement in accident and serious incident investigations	21
4	Safety Recommendations replies in 2021	24
4.1	Overview of Safety Recommendations replies in 2021.....	24
4.2	Status of Safety Recommendations replies issued in 2021	25
5	Overview of key safety topics processed and actions carried out in 2021	29
5.1	Crash resistant fuel systems	30
5.2	Conflict zones	32
5.3	Airborne collision risks - collision avoidance systems for aircraft below 5700 MTOW.....	33
5.4	Reporting of runway surface condition	35
5.5	Accidents involving the Boeing 737-8(MAX)	36
6	Conclusions	39



List of Figures

Figure 1: Safety Recommendations addressed to EASA per year	16
Figure 2: Annual Safety Recommendations by occurrence class 2012-2021	17
Figure 3: Safety Recommendations received in 2021 by Type of Operation and Aircraft Category	18
Figure 4: Origin of Safety Recommendations received by EASA	19
Figure 5: States contribution to Safety Recommendations received in 2021.....	19
Figure 6: EASA replies to safety recommendations in 2021, by year received.....	24
Figure 7: Safety Recommendation Replies sent in 2021 [status, total number].....	25
Figure 8: Reply assessment received from the originator on the EASA Replies since 2016	26
Figure 9: Assessment received by EASA on the Final Responses sent in 2021.....	27
Figure 10: Safety Recommendations addressed to EASA per topic by EU SIAs.....	29
Figure 11: Safety Recommendations addressed to EASA per topic and area	30



ABBREVIATION LIST

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

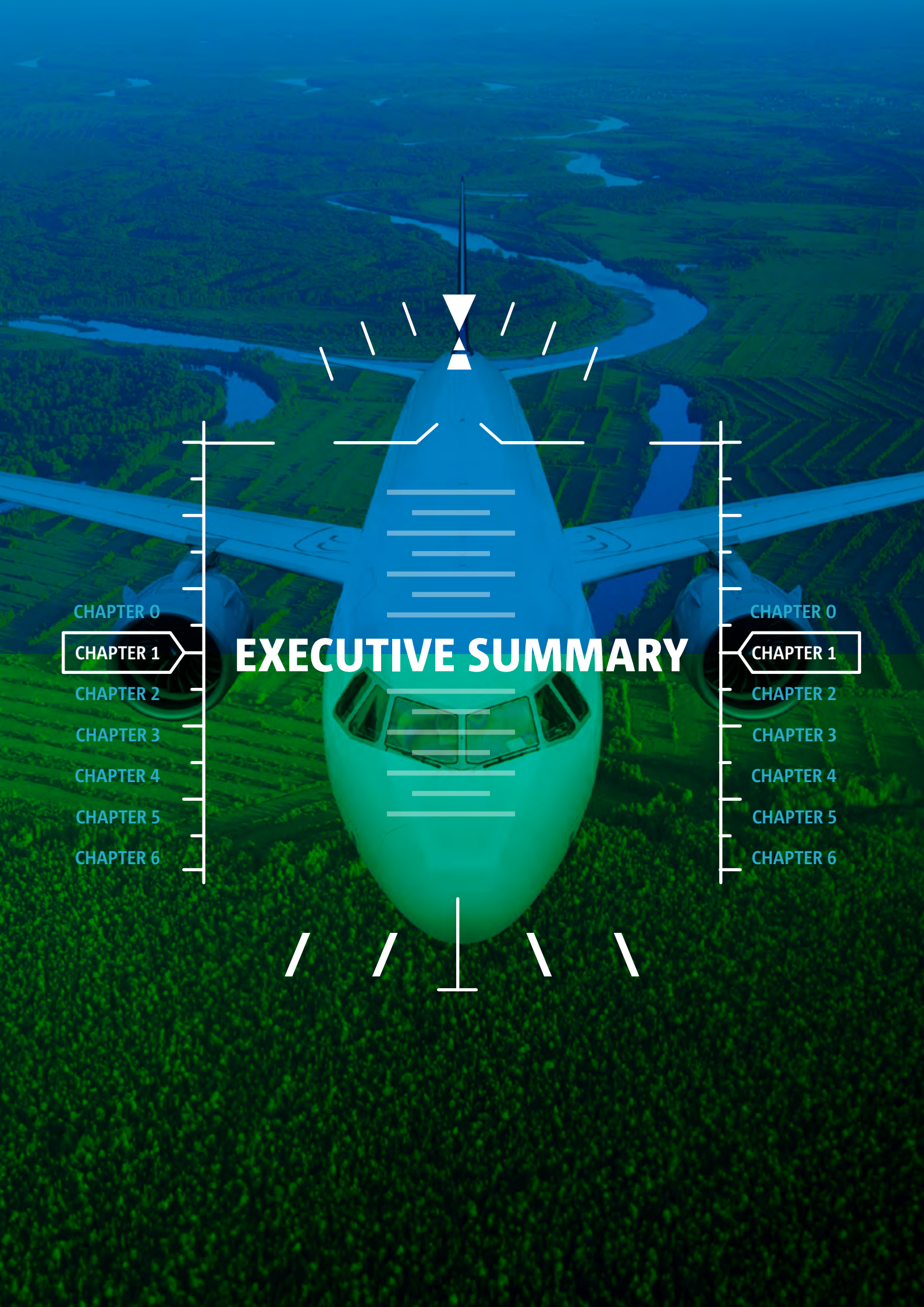
CHAPTER 6



AAIB	The United Kingdom Air Accidents Investigations Branch
AB	Advisory Body
AD	Airworthiness Directive
AFM	Aircraft Flight Manual
AH	Airbus Helicopters
AIA	Aerospace Industries Association
ALS	Airworthiness Limitations Section
AMC	Acceptable Means of Compliance
BEA	Bureau d'Enquête et d'Analyse pour l'Aviation Civile (France)
CAG	Collaborative Analysis Group
CAT	Commercial Air Transport
CAW	Continuing Airworthiness
CRM	Crew Resource Management
CS	Certification Specifications
CVR	Cockpit Voice Recorder
CRFS	Crash Resistant Fuel System
CRSS	Crash Resistant Seats and Structures
CZIB	Conflict Zone Information Bulletin
DSB	Dutch Safety Board, The Netherlands
EASA	European Union Aviation Safety Agency
EFB	Electronic Flight Bag
ED	Executive Director
EDD	Executive Director Decision
ENCASIA	European Network of Civil Aviation Safety Investigation Authorities
EPAS	European Plan for Aviation Safety
EU	European Union
FAA	Federal Aviation Administration, USA
FCL	Flight Crew Licencing
FDM	Flight Data Monitoring
FDR	Flight Data Recorder
GA	General Aviation
GM	Guidance Material
GRF	Global Reporting Format
HEMS	Helicopter Emergency Medical Services
HMU	Hydro Mechanical Unit



ICA	Instructions for Continued Airworthiness
ICAO	International Civil Aviation Organization
JRC	Joint Research Centre
MCTOM	Maximum Certified Take-Off Mass
MOPSC	Maximum Operational Passenger Seating Configuration
MSL	Mean Sea Level
MS	Member States
MST	Member State Task
MTOW	Maximum Take-off Weight
NM	Nautical Miles
NPA	Notice of Proposed Amendment
NTSB	National Transportation Safety Board, USA
QMS	Quality Management System
RCZ Network	Conflict Zones Network of Focal Points
RES	Research
RMT	Rulemaking Task
RTS	Return to Service
RWY	Runway
RWYCC	Runway Condition Code
SHK	Statens haverikommission, Sweden
SIA	Safety Investigation Authority
SIB	Safety Information Bulletin
SPT	Safety promotion Task
SMS	Safety Management System
SRGC	Safety Recommendation of Global Concern
SRIS	Safety Recommendation Information System
SRM	Safety Risk Management
SRUR	Safety Recommendation of Union-wide Relevance
SSP	State Safety Programme
STC	Supplemental Type Certificate
TC	Type Certificate
ToR	Terms of Reference
UAV	Unmanned Aerial Vehicle
UTC	Coordinated Universal Time



EXECUTIVE SUMMARY

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

Executive summary

The Annual Safety Recommendations Review provides information on the activities carried out by the Agency in the field of accident and incident investigation and follow-up in 2021. In addition, the review highlights a range of safety issues and Agency safety improvement actions that will be of interest to the European aviation community and the wider public.

This 15th edition includes:

- General statistical data on the safety recommendations addressed by Safety Investigation Authorities to the Agency in 2021;
- Information on the replies that the Agency has provided to safety recommendations in 2021;
- The main safety issues that have been addressed and the actions taken.

The Agency has a key role in safety investigation follow-up in Europe. This has been reflected in the establishment of a precise process for managing the safety recommendations received. Due to its central position in the aviation safety system, the Agency is able to take actions with respect to systemic problems and risk management.

The implementation of safety recommendations serves to ensure lessons are learned and help prevent future occurrences.

During 2021, Safety Investigation Authorities from 18 different States addressed 34 safety recommendations to the Agency in the context of EASA's remit, 20 originating from EASA Member States and 14 from non-EASA Member States. This volume is slightly higher than the number of safety recommendations received in 2020.

The vast majority, 70%, of the safety recommendations were related to procedures or regulations. 15% of the safety recommendations addressed aircraft, equipment or facilities, 12% were related to personnel and 3% to quality and safety management.

The handling of safety recommendations in a systematic manner constitutes one of EASA's key responsibilities. In 2021, the Agency provided 90 replies to 86 safety recommendations:

- 57 of these were final replies (closing safety recommendations) with 26 of these replies assessed as 'agreed' by EASA, and 21 assessed as 'partially agreed';
- The remaining 33 replies were updates providing information on the progress of the actions decided upon by the Agency and for which the relevant activities were not yet completed;
- As assessed by the originator, 29 of the responses provided by the Agency were deemed to be 'adequate' or 'partially adequate' (16 and 13 respectively), and 13 responses were deemed 'not adequate'. With respect to the 48 remaining replies sent in 2021, The Agency awaits the SIAs' assessments.



CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

INTRODUCTION





Introduction

Within the European Union (EU), the principles governing the investigation of accidents and serious incidents are defined in Regulation (EU) No 996/2010¹ of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation.

Regulation (EU) No 996/2010 transposes international standards and recommended practices as described in Annex 13 to the Chicago Convention on International Civil Aviation. It sets out an obligation for each Member State of the European Union to establish an independent, permanent national civil aviation Safety Investigation Authority, which shall investigate accidents and serious incidents in order to improve aviation safety and prevent future occurrences without apportioning blame or liability. Investigation reports and the related safety recommendations are sent to the aviation authorities concerned for consideration and action as needed.

Regulation (EC) No 2018/1139, the EASA Basic Regulation, states that: “The Agency and the national competent authorities shall undertake the necessary and effective actions to increase and promote awareness of civil aviation safety and disseminate safety related information relevant for the prevention of accidents and incidents”.

The Agency assigns a high priority to the follow-up of safety recommendations and has established effective procedures to that effect:

- The Agency delivers a first reply to a safety recommendation within 90 days;
- Safety recommendations are subject to a continuous internal monitoring process until all agreed corrective actions are closed;
- The Agency receives assessments of its responses from Safety Investigation Authorities (SIAs).

These procedures support the Agency in ensuring transparency with respect to its decisions and actions in line with its mission for safety. The Agency also supports effective cooperation in safety investigation by working with the European Network of Civil Aviation Safety Investigation Authorities (ENCASIA) in Working Group 6 on Safety Recommendations.

The Agency also monitors safety recommendations that are issued to other aviation and non-aviation addressees.

The Annual Safety Recommendations Review provides an overview of the follow-up performed by the Agency in response to recommendations received.

The first edition of this Review was issued in 2007. This 15th edition reviews the 2021 activity and presents:

- General statistical data on the safety recommendations addressed by Safety Investigation Authorities to the Agency in 2021;
- Information on the replies that the Agency has provided to past safety recommendations in 2021;
- The main safety issues that have been addressed through the actions taken.

1 As amended by Regulation (EU) No 376/2014 and Regulation (EU) 2018/1139



In order to align this document with the other publications produced by The Agency, the naming of the Annual Safety Recommendation Review has been changed. Previously the title year referred to the year under review, whereas from this edition onwards, it will reflect the year of publication.

A process to identify, assess and mitigate safety risks at the European level has been established by the Agency since 2016. The safety risk management process involves the identification of safety issues, risk assessment and decision-making on the best course of action to mitigate these risks. The Agency, the Member States (MS) and industry work together in this process through Collaborative Analysis Groups (CAG) and Advisory Bodies (ABs).

The Annual Safety Review published by the Agency provides the main and most visible elements from the European safety risk management process, such as key statistics relating to accidents and serious incidents, as well as an analysis of the key risk areas and safety risk portfolios for each domain. This risk management process is coordinated by the Agency, and it supports the European Plan for Aviation Safety (EPAS).

Safety recommendations are a key input to the safety risk management process. They provide information on the possible deficiencies in the aviation system and propose solutions to mitigate the associated safety risks.



SAFETY RECOMMENDATIONS RECEIVED IN 2021

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

Safety Recommendations received in 2021

3.1 Overview of Safety Recommendations received in 2021

EASA is the most frequent single addressee of Safety Recommendations. However, most safety recommendations issued during 2021 were addressed to the National Civil Aviation Authorities of EASA Member States.

During 2021, EASA received a total of 34 safety recommendations.

Figure 1 shows the total annual number of safety recommendations that the Agency has received over the past 10 years. The follow-up of safety recommendations and the role of the Agency is mandated by Regulation (EU) No 996/2010. The issuance of safety recommendations addressed to the Agency started to develop shortly before this regulation came into force in 2010. In the years from 2012 to 2016, the annual number of safety recommendations addressed to the Agency remained almost constant. In 2017, this amount fell by around half. Despite a marginal increase in 2018, the general downward trend continues and the number in 2021 is close to the 2020 amount.

► Figure 1: Safety Recommendations addressed to EASA per year



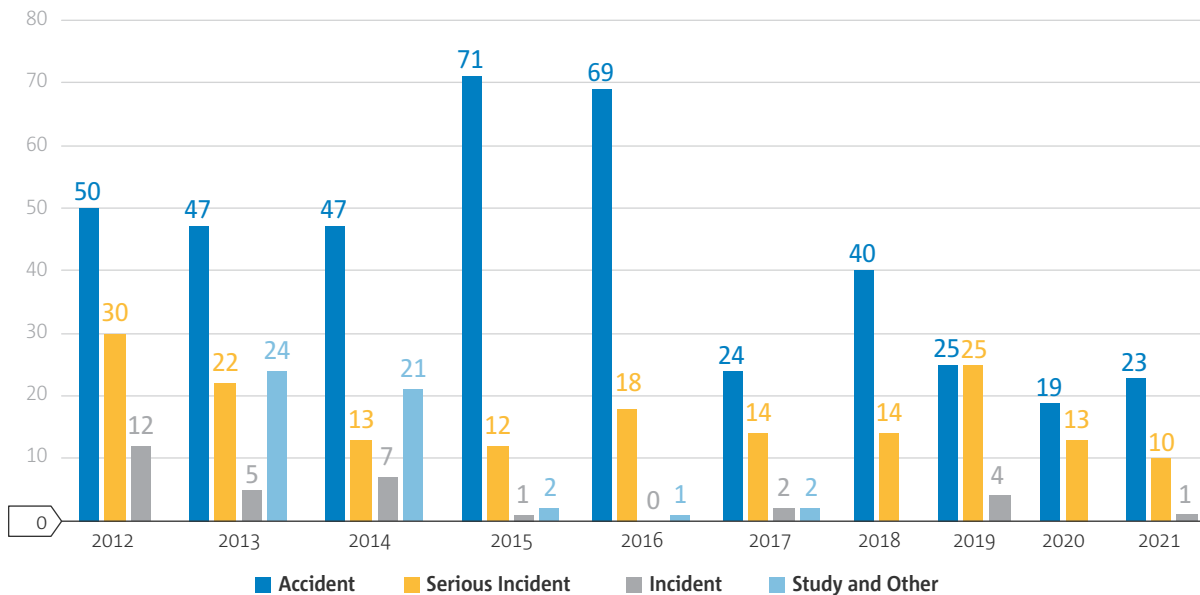


In 2021, 20 safety recommendations came from EASA MS whereas the number in 2020 was 26. The decrease is since the United Kingdom is no longer an EASA Member State. The numbers in general still seem to reflect the factors identified in recent years, namely proactively identifying safety concerns and addressing them before they would be raised during an investigation, as well as the Agency’s active involvement in investigations during the report-drafting phase, leading to draft safety recommendations being discussed in advance and in some cases either withdrawn, revised or re-addressed.

In 2021, the safety recommendations received related to 22 occurrences, comprising 15 accidents and 6 serious incidents. One arose from a study.

Figure 2 shows the total number of safety recommendations received by occurrence class since 2012.

► Figure 2: Annual Safety Recommendations by occurrence class 2012-2021





The aircraft categories and operation types involved in the occurrences that resulted in safety recommendations issued in 2021 are listed in the table below.

► Figure 3: Safety Recommendations received in 2021 by Type of Operation and Aircraft Category

Type of Operation	Aircraft Category						
	Fixed Wing				Rotorcraft	UAV	Grand Total
	Large Aeroplane	Small Aeroplane	Ultralight/Microlight	Sailplane			
Commercial Air Transport	17	0	0	0	3	0	20
Cargo							0
Airline							0
Passenger							0
Airline	15*						15
HEMS					1		1
Other	2				2		4
Non-Commercial Operations	0	9	1	2	1	1	14
Flight Training		6					6
Pleasure		3	1	1			5
Other				1	1	1	3
Specialised Operations (Aerial Work)	0	0	0	0	0	0	0
Parachute drop							0
Calibration							0
Aerial photography							0
Firefighting							0
Towing							0
Grand Total	17	9	1	2	4	1	34

* Includes 1 SR arising from a study into safe flight routes and conflict zones

Compared to the previous year, the number of recommendations related to Commercial Air Transport and Non-Commercial Operations has slightly grown. The recommendations received also include one recommendation related to an UAV-event and one issued as a result of a safety study. There were no recommendations issued relating to Specialised Operations.



3.2 Origin of the Safety Recommendations received in 2021

In 2021, the Safety Investigation Authorities (SIAs) of 18 different States addressed 34 safety recommendations to the Agency.

Figure 4 shows the percentage distribution of safety recommendations that were addressed to EASA in 2021 between EASA Member States and non-EASA Member States. The chart shows that EASA Member States issued 59% of the safety recommendations received by EASA in 2021.

► Figure 4: Origin of Safety Recommendations received by EASA

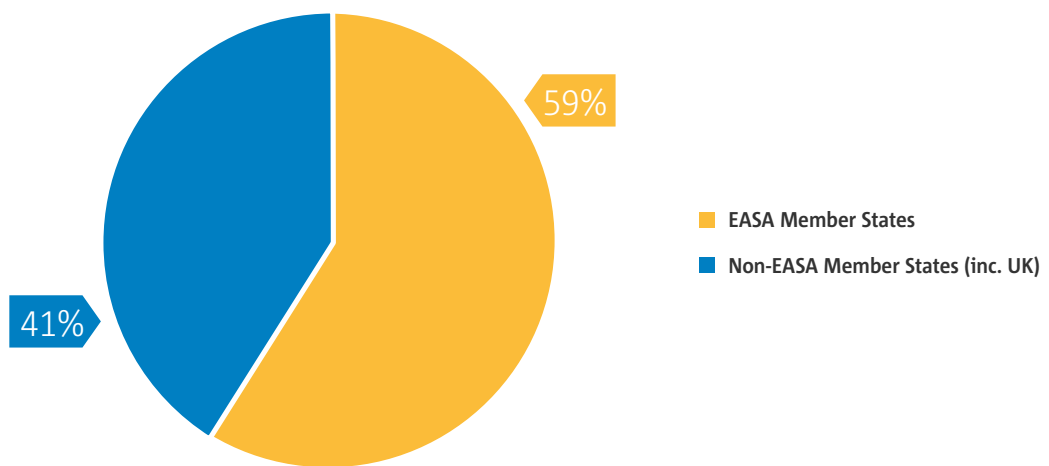
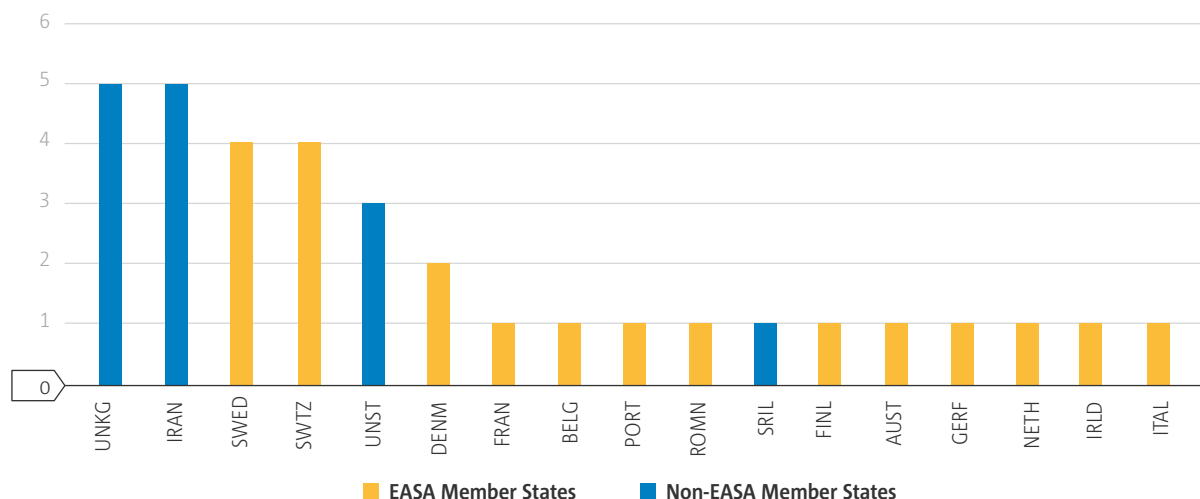


Figure 5 shows the contribution of the different SIAs to the total number of safety recommendations addressed to the Agency in 2021, as well as the number of occurrences that contributed to these safety recommendations.

► Figure 5: States contribution to Safety Recommendations received in 2021





About 40% of the safety recommendations were related to six investigations.

The United Kingdom Air Accidents Investigations Branch (AAIB) issued five safety recommendations that are related to two occurrences. Four of them result from a serious incident involving an Airbus A321 in February 2020 in UK, in which both of the aircraft's engines lost power after take-off. The crew was able to maintain a safe flightpath using a lower thrust that was nevertheless sufficient for a return to the airfield. The cause of the serious incident was due to contamination of the engine Hydro Mechanical Units (HMU), resulting from an incorrect biocide shock treatment of the aircraft's fuel system that was performed with considerably higher amount of the treatment agent than normal. The recommendations propose amending Acceptable Means of Compliance (AMC) concerning the requirements for the treatment of aircraft fuel systems with biocide additives, conducting safety promotion on the classification of biocide treatment of aircraft fuel systems as a critical maintenance task and reviewing the issue during the standardisation activities carried out by The Agency.

One safety recommendation was issued as a result of an investigation into an event involving an Alauda Airspeeder Mk II, UAV in July 2019 in UK. The pilot lost control of the UAV and it entered into controlled airspace climbing up to 8000 feet. After the battery had depleted, it fell to the ground 700 meters outside of the designated operating area. There were no injuries. The safety recommendation proposes the adoption of appropriate design, production, maintenance, and reliability standards for all Unmanned Aircraft Systems with aircraft capable of imparting over 80 joules of energy.

The Aircraft Accident Investigation Board of the Islamic Republic of Iran Civil Aviation Organization issued five safety recommendations resulting from an investigation involving an ATR-72 aircraft in February 2018 in Iran, where the aircraft started descending and prepared for landing, then lost altitude and impacted with a mountain. The collision led to the complete destruction of aircraft. All 66 persons onboard were fatally injured. The causal factors identified relate mostly to omissions by the crew. The safety recommendations address various topics, such as international sanctions affecting air traffic, aircraft operation procedures, flight crew licensing, and the content of the aircraft's manuals.

The Swedish Accident Investigation Authority, Statens haverikommission (SHK), issued four safety recommendations resulting from three investigations:

- An accident involving a Socata TB9, in which the aircraft crashed during a training flight with no fatalities. The two recommendations request more guidance to high-risk manoeuvres and safety promotion regarding the risks of a turn-back to the aerodrome after an engine failure.
- An accident involving a Schempp-Hirth powered sailplane, where the aircraft deviated from the final approach path and hit the ground. The recommendation is for a daily inspection and inspection following a hard landing to ensure proper functioning of the rudder system.
- A non-fatal accident involving a Cessna 172, in which the aircraft was unable to get airborne again after a touch-and-go exercise. The safety recommendation seeks a review of the exercises contained in the training programmes that may pose a safety risk and a decision on the best course of action to make the training organisations aware of these risks.

The safety recommendations issued by SIAs in 2021 address a wide scope of subjects under the Agency's remit including aircraft certification, maintenance and equipment, design, production and manufacturing, aircraft operations, safety risk management, security and flight crew training and checking.



3.3 Involvement in accident and serious incident investigations

Below are listed some of the Investigations to which the Agency contributed its support in 2021:

- A fatal accident involving a Boeing 737-500 in Indonesia in January in which the aircraft crashed after an uncommanded thrust reduction on the left engine which led into a steep bank and unrecoverable descent.
- A non-fatal accident involving an Embraer EMB500 in France in February in which the aircraft impacted hard the runway during landing and caught fire.
- A fatal accident involving a Pilatus PC12 in Italy in March in which the aircraft crashed during the initial climb.
- A fatal accident involving an Aerospatiale AS350-B in France in March in which the helicopter crashed on take-off.
- A non-fatal accident involving an Airbus A320 in Mexico in March in which the aircraft experienced a nose gear collapse on runway.
- A fatal accident involving a Leonardo AW119 in Mexico in April in which the helicopter hit power lines.
- A fatal accident involving a LET 410 in Democratic Republic of Congo in June in which the aircraft crashed on take-off.
- A non-fatal accident involving a Boeing 737-200 in Honolulu in July in which the aircraft lost an engine after take-off and after experiencing problems with the remaining engine, it ditched into the sea.
- A fatal accident involving a De Havilland Canada DHC-2 I Sweden in July in which the aircraft crashed during parachuting operations.
- A fatal accident involving a Gulfstream IV in Dominican Republic in December in which the aircraft crashed after experiencing control problems.
- A serious incident involving an Airbus A320 in the Russian Federation in December in which a fault in the aircraft's flight computer caused control problems.

In addition, several investigations launched in previous years were still on-going or completed in 2021 with the Agency's participation in a supportive capacity by monitoring progress and providing technical expertise. Significant events are listed below:

- A serious incident involving an Airbus A220 in France in February in which the aircraft experienced an engine failure at cruise. The engine type involved had already similar failure events in previous year. There were no injuries.
- A serious incident involving an Airbus A321 in the UK in February in which the aircraft experienced a double engine problem during the initial climb from London Gatwick due to biocide contamination caused during maintenance. The investigation was completed in 2021.



Safety Recommendations received in 2021

- An accident involving an ATR42 in Canada in December 2017 in which the aircraft crashed after take-off due to ice accumulation on the wings. Several occupants received either serious or minor injuries. The final report was issued in 2021.
- An accident involving an AW169 helicopter in the UK in October 2018 in which the helicopter crashed shortly after take-off from a football arena. The five occupants onboard were fatally injured. The draft report was issued in 2021.

The safety actions that were taken during or immediately following an investigation do not appear in this publication unless the Safety Investigation Authority issued an associated, formal safety recommendation to EASA in 2021.



CHAPTER 0
CHAPTER 1
CHAPTER 2
CHAPTER 3
CHAPTER 4
CHAPTER 5
CHAPTER 6

CHAPTER 0
CHAPTER 1
CHAPTER 2
CHAPTER 3
CHAPTER 4
CHAPTER 5
CHAPTER 6

SAFETY RECOMMENDATIONS REPLIES IN 2021



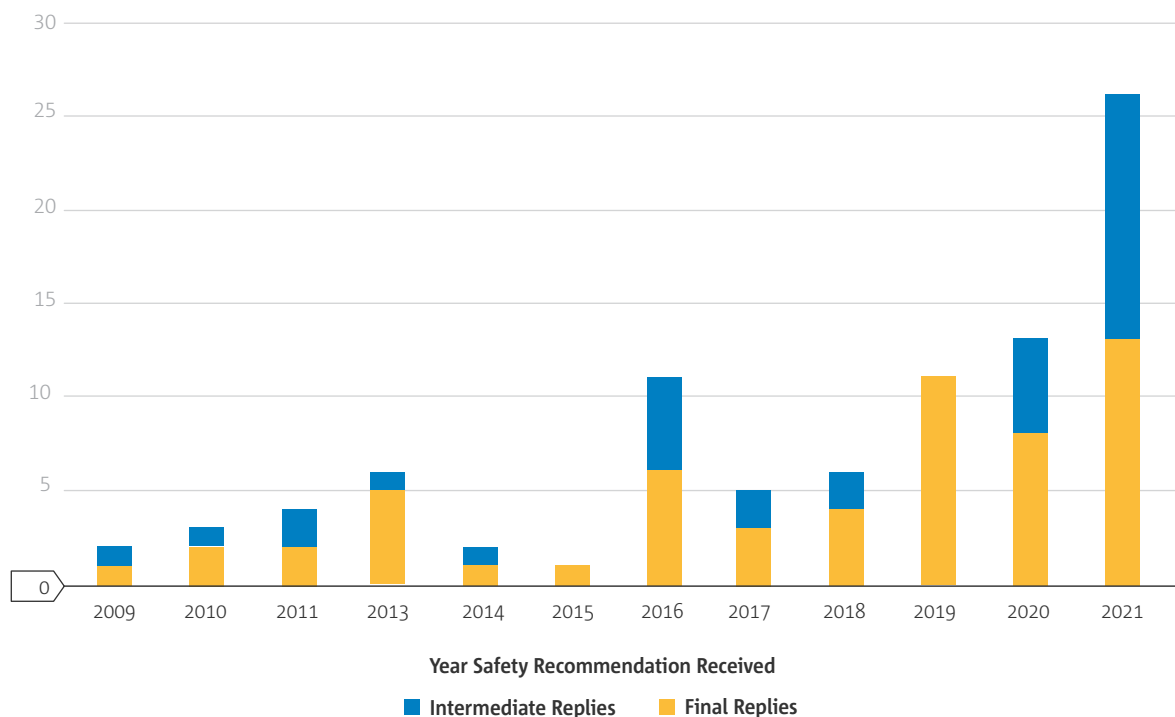
Safety Recommendations replies in 2021

4.1 Overview of Safety Recommendations replies in 2021

In 2021, the Agency issued 90 replies to 86 safety recommendations. As updates are provided, several response letters can be issued for the same recommendation within a year. The vast majority of replies produced in 2021 were Agency's responses to safety recommendations first received in the years 2016 to 2021.

However, replies to recommendations from earlier years were also issued, as shown in the table below, for those cases where follow-up actions and conclusions were reached, or which required updates and/or closure of the safety recommendation.

► Figure 6: EASA replies to safety recommendations in 2021, by year received



4.2 Status of Safety Recommendations replies issued in 2021

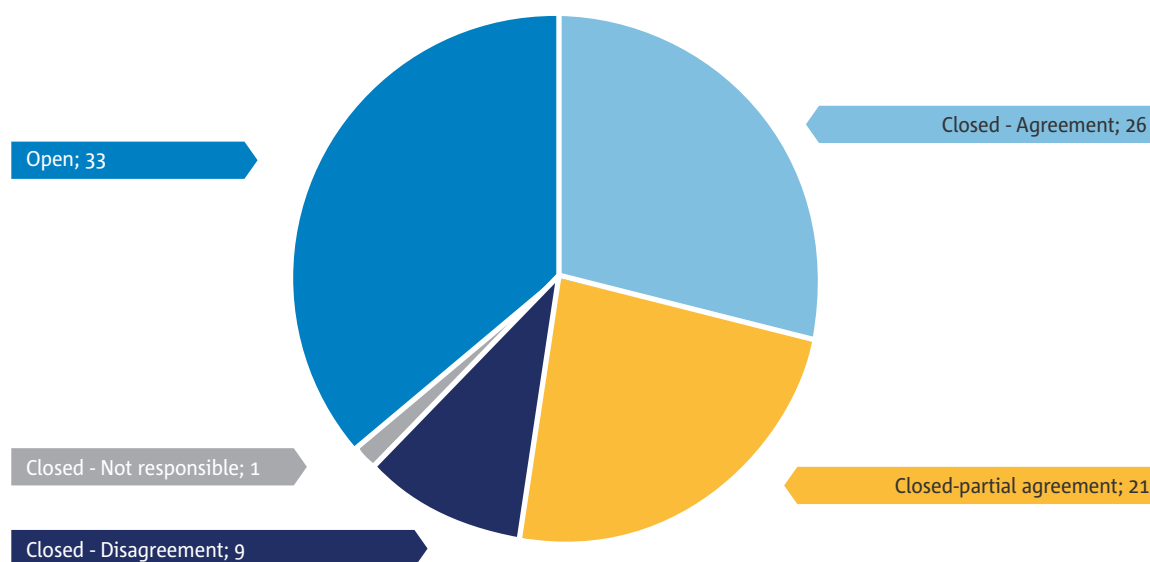
Each final response closing a safety recommendation and the response assessment by the originator is classified according to the categories² given in Annex C.

Among the 90 replies that were sent by the Agency in 2021, summarised in figure 7, 57 were final replies that closed safety recommendations. These resulted in the following responses by the Agency:

- The Agency agreed to take corrective action in 47 cases, either by directly applying the recommended actions as was the case for 26 of them or, for the remaining 21, by partially agreeing but taking corrective actions other than those recommended;
- In a further 9 cases, the safety recommendations were evaluated and the safety benefit was not agreed.
- In 1 case, the safety recommendation fell outside EASA's mandate.

Figure 7 below shows this distribution:

► Figure 7: Safety Recommendation Replies sent in 2021 [status, total number]



² These definitions of classification categories were developed in collaboration with the European Network of Safety Investigation Authorities and are part of a taxonomy aimed at facilitating the management of safety recommendations.



In monitoring safety recommendations, their status remains open until the action related to each recommendation is fully developed and completed.

In addition to the 56 final replies closing a safety recommendation, 33 updating replies (intermediate responses) were issued. These updating replies provided information on the progress of the actions decided upon by the Agency but for which the relevant activities had not yet been completed.

To monitor whether Safety Investigation Authorities (SIA) consider the Agency's responses to be adequate, or if they disagree with the actions proposed, the Agency has implemented procedures in line with Regulation (EU) No 996/2010.

Figure 8 Shows the assessment received from the originator on the EASA Replies since 2016.

► Figure 8: Reply assessment received from the originator on the EASA Replies since 2016

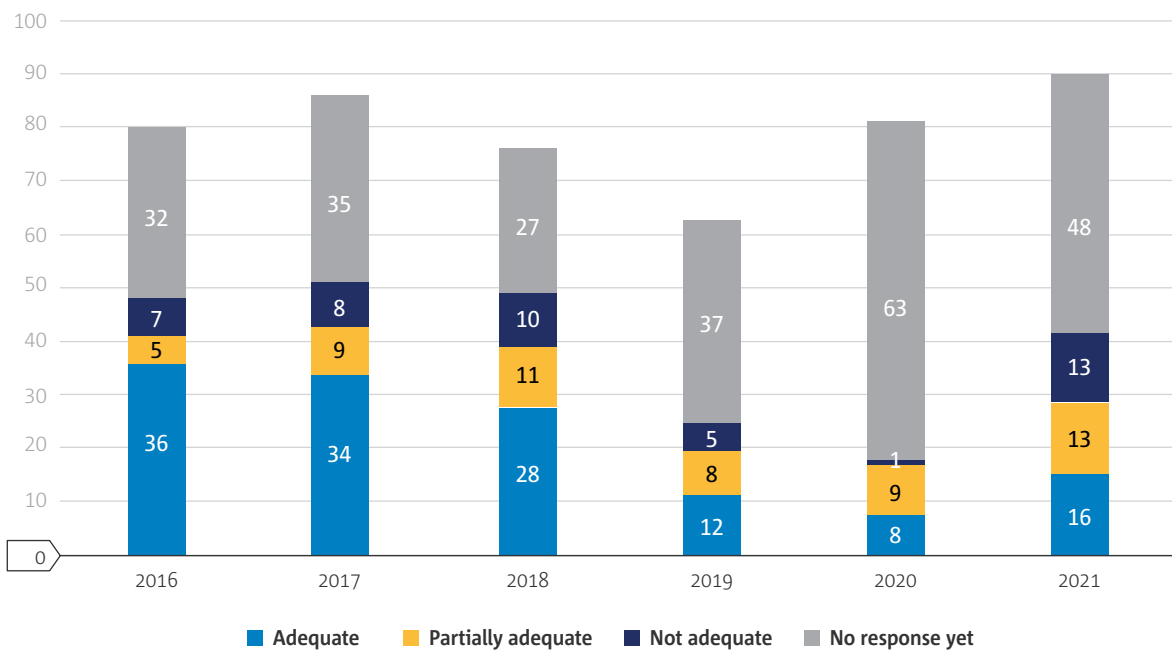
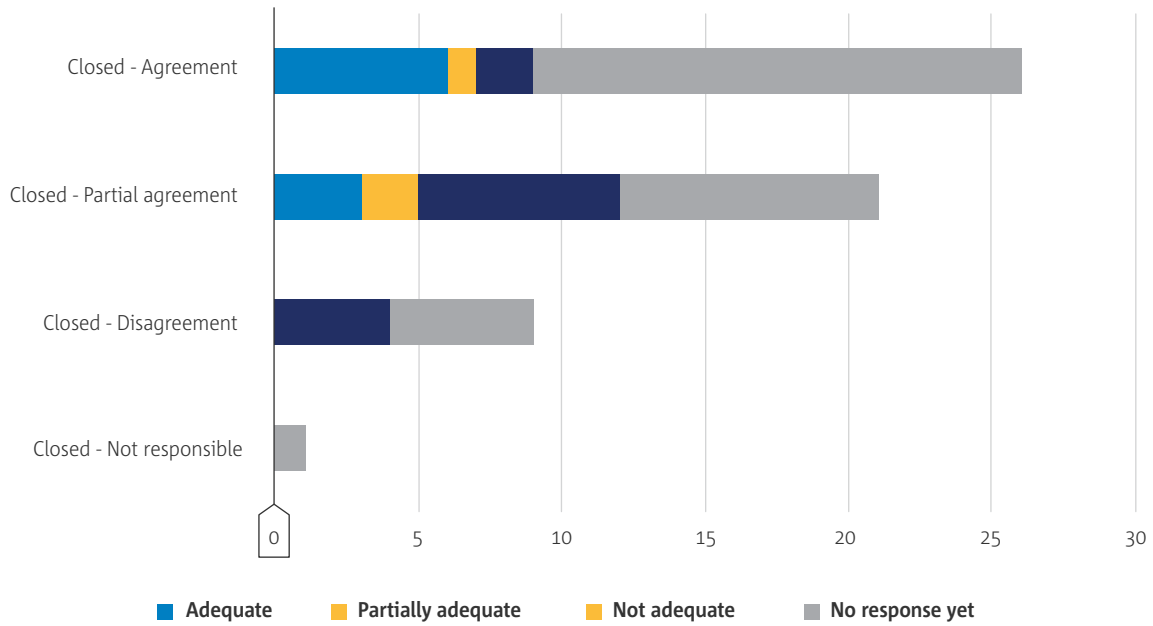




Figure 9 shows the total number of response assessments that EASA received from the SIAs based on the 90 replies sent in 2021. As assessed, 29 of the responses provided by the Agency were deemed to be 'adequate' or 'partially adequate' (16 and 13 respectively), and 13 response was deemed as 'not adequate'. With respect to the 48 remaining replies sent in 2021, EASA awaits the SIAs' assessment.

► Figure 9: Assessment received by EASA on the Final Responses sent in 2021





CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

OVERVIEW OF KEY SAFETY TOPICS PROCESSED AND ACTIONS CARRIED OUT IN 2021

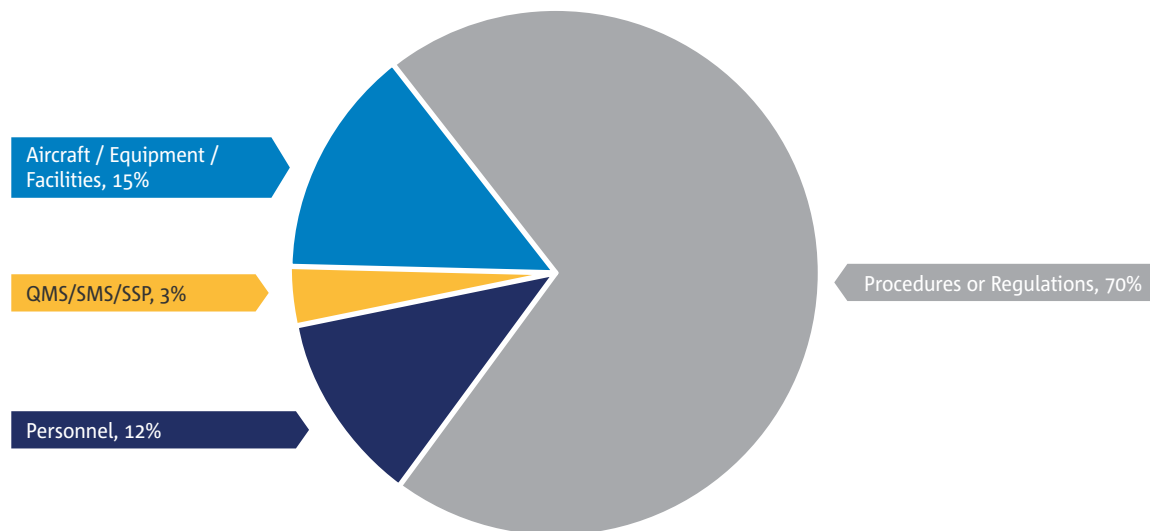




Overview of key safety topics processed and actions carried out in 2021

In 2021, Safety Investigation Authorities from 18 different States issued 34 safety recommendations to EASA that addressed issues within EASA's remit. Figure 10 provides a breakdown of the safety recommendation topics. The processing of safety recommendations in a systematic manner constitutes one of EASA's key responsibilities.

► Figure 10: Safety Recommendations addressed to EASA per topic by EU SIAs

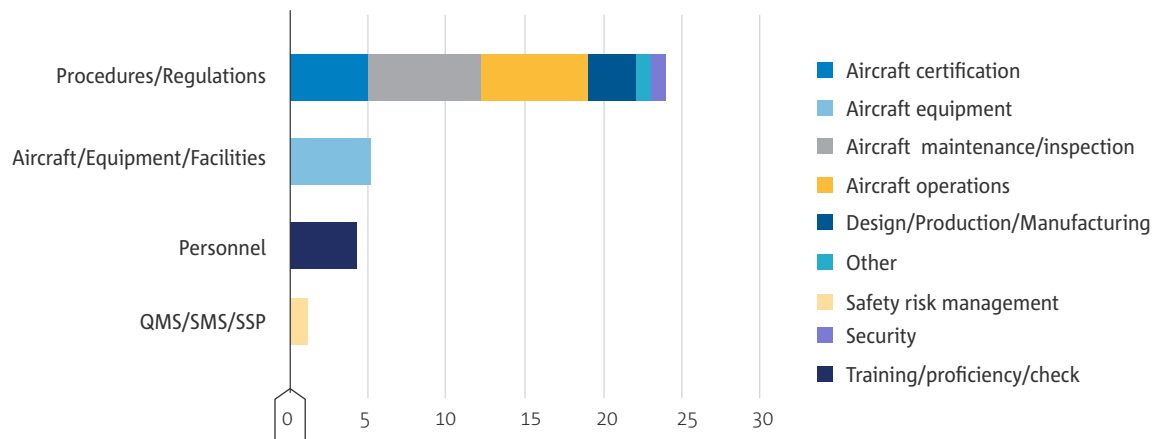




Overview of key safety topics processed and actions carried out in 2021

When comparing this with the data that the European Network of Civil Aviation Authorities (ENCASIA) presented in its Annual Report, a slight difference can be seen. At a European level, recommendations related to personnel constitute the second largest category of recommendations. A further breakdown of the topics is also provided below in figure 11.

► Figure 11: Safety Recommendations addressed to EASA per topic and area



Among the actions taken in 2021, several key safety topics are outlined below with accompanying information on the action that the Agency has taken. The description highlights the safety issues that were underlined by the safety recommendations, together with the actions taken by the Agency in response.

5.1 Crash resistant fuel systems

As a result of safety recommendations received in recent years, The Agency has carried out work aimed at improving helicopter safety and post-crash survivability by issuing a Supplemental Type Certificates (STC) to enable the installation of crash resistant fuel systems to existing helicopter fleets. In 2021, The Agency has provided replies addressing this safety issue concerning two major helicopter manufacturer's fleets. The actions are summarised below:

The European Union Aviation Safety Agency (EASA) has cooperated with Airbus Helicopters (AH) and the Federal Aviation Administration (FAA) to improve post-crash fire protection in the in-service AS350/EC130 helicopter fleet.

Within this framework, new Crash-Resistant Fuel System (CRFS) modifications have been recently developed by different applicants, approved by EASA and made available for new helicopter deliveries or, as a retrofit kit, for helicopters already in service as detailed below:

- EASA Major Change 10072097 approved on 18/12/2019, developed by AH and applicable to all AS350 B3 helicopter models without any limitation.
- EASA Supplemental Type Certificate (STC) 10064703 dated 20/06/2018, developed by Standard Aero (previously known as Vector Aerospace Helicopter Service USA, Inc.) and applicable to AS350 D, AS350 B, AS350 B1, AS350 B2, AS350 BA, AS350 B3 and EC130 B4 helicopter models without any limitation.

Overview of key safety topics processed and actions carried out in 2021

- EASA STC 10061056 Rev. 01 dated 24/01/2020 (original issue of the Supplemental Type Certificate is dated 16/02/2017), developed by AH and applicable to AS350 B3, if equipped with Safran Helicopter Engines Arriel 2D engine, and EC130 B4 helicopter models without any limitation.
- EASA STC 10060852 Rev. 01 dated 27/01/2020 (original issue of the Supplemental Type Certificate is dated 30/01/2017), developed by AH and applicable to AS350 B3, if equipped with Safran Helicopter Engines Arriel 2D engine, and EC130 B4 helicopter models with limitation forbidding underbelly installations.

EASA considers that the installation of any of the modifications listed above will reduce the risk of post-crash fires for the in-service AS350/EC130 helicopters fleet and contribute to increased occupant escape time after a survivable crash.

Consequently, their installation has been recommended by EASA via the release of EASA Safety Information Bulletin (SIB) ref. 2017-18R2 ('Installation of Crash Resistant Fuel System') dated 14/01/2021. This is strongly promoted by AH through retrofit campaign incentives for operators.

In addition, EASA, in cooperation with the Robinson Helicopter Company (RHC) and the FAA took additional actions to improve post-crash fire protection for the RHC in-service helicopters fleet. This activity led to the development of modifications approved by EASA and made available for new helicopter deliveries or, as a retrofit kit, for helicopters already in service as detailed below:

- EASA Major Change 10028494 approved on 18/01/2010 ('Installation of bladder fuel tanks'), applicable to R44 and R44 II helicopter models and mandated via the EASA AD 2014-0070 dated 19/03/2014.
- EASA Major Change 10046416 approved on 18/09/2013 ('Installation of bladder fuel tanks'), applicable to R22, R22 Alpha, R22 Beta and R22 Mariner helicopter models.

Rulemaking action has also been initiated on this subject.

On 16 December 2021, EASA published the Terms of Reference (ToR) for rulemaking task RMT.0710 'Improvement in the survivability of rotorcraft occupants in the event of an otherwise survivable crash':

<https://www.easa.europa.eu/document-library/terms-of-reference-and-group-compositions/tor-rmt0710>

The overall objective of this RMT is to improve rotorcraft occupant protection in the event of a survivable crash scenario and enhance safety by increasing the number of rotorcraft that are fitted with crash-resistant fuel systems (CRFS) and crash-resistant seats and structures (CRSS).

Compliance with the CRFS and CRSS requirements is expected to provide this protection to rotorcraft occupants, and will contribute to safety improvements.

To ensure an efficient process, the RMT.0710-related activities will be performed in two phases, under two different subtasks.

Subtask 1 will assess the proportionate retroactive application of the certification specifications for CRFSs to existing rotorcraft fleets and/or to the future production of already type-certified rotorcraft. If supported by the outcome of that assessment, a proportionate retroactive requirement will be proposed.

The publication of the corresponding Notice of Proposed Amendment (NPA) for public consultation is expected by the end of 2022.

5.2 Conflict zones

As a consequence of the downing of Malaysian Airlines flight MH17, there is general consensus that States should improve the sharing of information on possible risks in conflict zones. Passengers world-wide are experiencing higher levels of uncertainty with respect to security issues, especially for journeys over conflict zones. The threat of terrorism to civil aviation is likely to remain high in the foreseeable future. High aviation safety and security standards and real-time information are therefore imperative for the functioning and competitiveness of the air transport system.

In the current climate of political unrest in many parts of the world, airlines have expressed a need for a consolidated picture of the safety/security situation. The safety of passengers, and aircraft crews, can be effectively improved if timely and accurate information is made available to all stakeholders.

EASA acts as coordinating entity for activities not directly under Member State or European Commission responsibility and initiates the drafting, consultation and publication of Conflict Zone Information Bulletins or EASA Information Notes both in cases of availability and unavailability of a common EU risk assessment.

EASA acts also as the Administrator of the European Information Sharing and Cooperation Platform on Conflict Zones.

In case of availability of a common EU risk assessment when a “high” risk level has been concluded, EASA will initiate the drafting of a Publication of Conflict Zone Information Bulletin (CZIB) which, in some cases, may contain an operational recommendation. Such recommendations are non-mandatory and do not constitute flight prohibitions.

In case of availability of a common EU risk assessment when a risk level lower than high has been concluded, the drafting of a CZIB highlighting the availability of national publications, when there are some, could be considered.

For circumstances that may require a rapid reaction, available information will only be shared on the ‘Need-to-know’ principle within the RCZ Network, and in coordination with the European Commission.

As a result of a safety recommendation requesting the Agency to further develop the European Information Sharing and Cooperation Platform on Conflict Zones by expanding the available information without losing rapidity, including analysis and recommendations to member states, airlines and other stakeholders, the Agency issued the following reply:

The European Union Aviation Safety Agency (EASA) further developed the European Information Sharing and Cooperation Platform on Conflict Zones, in particular:

- On 25 February 2021 the Agency launched a trial version of the European Information Sharing and Cooperation Platform on Conflict Zones (the Platform). The trial version of the Platform was implemented in order to fine tune its scope and to design the required IT functionalities in partnership with the Members of the Platform. The overall purpose of the Platform was to support the existing EU Conflict Zone Alerting System and particularly the ‘Integrated EU Aviation Security Risk Assessment Group’.
- The Platform provides access to relevant, credible and accurate information for aviation operators and states to complement their own risk assessments and is a means of exchanging timely information and alerts between EU Institutions, EASA Member States and air carriers.

Overview of key safety topics processed and actions carried out in 2021

- Between 10 and 21 May 2021, the Agency conducted an assessment of the Platform through a survey addressed to the Members of the Platform (EU air carriers, EASA Member States and EU institutions). The outcome confirmed the usefulness of the mechanism to improve the risk assessments conducted by States and operators (over 96% of respondents indicated that they were either satisfied or extremely satisfied with the Platform). Furthermore, the members requested that EASA ensure the continuity of the Platform given its relevance for information sharing and risk assessments.
- A virtual Conflict Zone Platform Evaluation workshop was held on 17 June 2021 to give the members an additional opportunity to express their expectations and to discuss possible ways forward regarding the future of the Platform, taking into consideration the operational interests of the various aviation stakeholders.
- Considering the positive feedback and the interest of the European aviation community in the services provided by the Platform, the Agency launched a procurement procedure aimed at implementing the European Information Sharing and Cooperation Platform on Conflict Zones as a long-term solution, following completion of the trial period. The contract for the Conflict Zones Platform has since been awarded for a period of four years, and is expected to commence in February 2022, paving the way for the implementation of a long-term solution. In the meantime, the trial version of the Platform will continue to operate.
- The Agency is committed to ensuring a smooth transition between the trial phase and the long-term solution, as well as to further streamlining information sharing and cooperation, so that the relevant information on conflict zone developments potentially affecting the safety of flights can be shared without delay among the Platform members.

5.3 Airborne collision risks - collision avoidance systems for aircraft below 5700 MTOW

The Agency has received a number of safety recommendations aimed at offering a solution to equip aircraft with less than 5700 kg MTOW with collision avoidance systems. This category of aircraft is not currently required to carry such equipment and the safety benefits of doing so have been studied extensively. A wide range of operations are performed with this category of aircraft such as aerial work, air taxi operations and recreational aviation and the impact of mandating such equipment across the whole category has been seen challenging, also by the users of the aircraft. The evolution of unmanned aviation and the increased number of operations in this category has created additional challenges for airspace management, for which novel solutions have been studied and started to develop. The Agency had previously committed to including the topic in its rulemaking programme but after an evaluation of the whole spectrum of airspace users, the strategy was changed. The Agency's reply to the safety recommendations on this issue was the following:

The European Plan for Aviation Safety (EPAS) 2020-2024 foresees the rulemaking task (RMT) RMT.0376 Anti-collision and traffic awareness systems for aircraft with maximum take-off mass less than 5700 kg or less than 19 passengers, through which the European Union Aviation Safety Agency (EASA) intended to set-up a framework for reducing the risk of airborne collisions.

Before initiating RMT.0376, EASA undertook a detailed review and assessment of the airborne collision risk. The outcome of the assessment was summarised in a Best Intervention Strategy (BIS) that has been validated through a survey and a stakeholders' consultation.



Overview of key safety topics processed and actions carried out in 2021

The BIS concluded that a broader use of iConspicuity solutions and improvement of their interoperability together with a better airspace utilisation and design, while ensuring compatibility with the U-space regulatory framework established under Implementing Regulation (EU) 2021/664, should be at the heart of the future actions.

iConspicuity (or in-flight electronic conspicuity plus) means in-flight capability to transmit position of aircraft and/or to receive, process and display positions of other aircraft in a real time with the objective to enhance pilots' situational awareness about surrounding traffic. It is an umbrella term for a range of technologies and solutions, regardless whether airborne or on the ground, that can help airspace users and other affected stakeholders to be more aware of other aircraft in their vicinity or in a given airspace.

Therefore EASA decided that RMT.0376 will be removed from the EPAS and replaced by a strategy composed of a set of EPAS tasks compounded of existing rulemaking tasks which will be implemented through new safety promotion (SPT), research (RES) and member state tasks (MST). The best safety benefits are expected to be achieved through synergies of all proposed actions, while utilising the U-space regulatory framework as a catalyst for safety improvements.

The following bullet points summarize the collective actions which are planned to be implemented for Anti-collision and traffic awareness systems for aircraft with maximum take-off mass less than 5700 kg or less than 19 passengers:

- EASA, with support of technical partners, to demonstrate and validate feasibility of achieving interoperability of different iConspicuity devices/systems through network of stations while respecting data privacy requirements.
- EASA to analyse 'Net Safety Benefit' and 'Operational Safety Assessment' concepts for the use of iConspicuity devices/systems in Flight Information Services.
- EASA to facilitate installation of iConspicuity devices in all EASA certified aircraft types and promote their use by airspace users at user affordable cost.
- EASA to actively support initiatives enhancing interoperability of iConspicuity devices/systems.
- EASA to promote good practices in airspace design that reduce 'airspace complexity' and 'traffic congestion' with the aim to reduce the risk of collisions involving uncontrolled traffic.
- Member States to consider 'airspace complexity' and 'traffic congestion' as safety relevant factors in airspace changes affecting uncontrolled traffic, including the changes along international borders.
- EASA to ensure technical and operational compatibility of U-space and iConspicuity solutions.
- EASA to conduct a Safety Issue Assessment (SIA) of airspace infringements.
- EASA to explore the use of iConspicuity data for enhanced safety monitoring of Airborne Collision Risk.

Collectively, the aforementioned EASA actions serve as a multi-pronged final response which address the safety concern for mitigating airborne collision risks.



5.4 Reporting of runway surface condition

Runway surface conditions affect the aircraft's take-off and landing performance. Contamination on the runway, such as water, snow, ice, or slush would need to be considered by the flight crew when determining the required take-off and landing distance since the contamination may decrease the aircraft's acceleration on the runway or decrease its stopping capability. The Agency transposed between 2019 and 2021 the standards and recommended practises developed by ICAO to European regulatory framework for aerodromes and aircraft operations and provided the following reply to two safety recommendations addressing the topic.

Aerodromes:

Commission Regulation (EU) No 139/2014 requires the aerodrome operator to provide data, relevant to the aerodrome and available services, to the users and the relevant air traffic services and aeronautical information services [ADR.OPS.A.005 (b)].

The International Civil Aviation Organization (ICAO), through Amendment 13 to Annex 14 'Aerodromes', Volume I 'Aerodrome Design and Operations' and Amendment 1 to ICAO Doc 9981 'PANS-Aerodromes', has introduced a global reporting format (GRF) for assessing and reporting runway surface conditions, with the objective of ensuring a link between the reporting and aircraft performance as published by the aircraft manufacturers.

The above-mentioned ICAO amendments have been transposed into the European regulatory framework through Commission Delegated Regulation (EU) 2020/2148 (amending Commission Regulation (EU) No 139/2014), published on 18 December 2020, and the European Union Aviation Safety Agency (EASA) Executive Director Decision 2021/003/R was published on 04 March 2021, following EASA's rulemaking task RMT.0703 'Runway safety'.

The newly introduced GRF aims to ensure the reporting of runway surface conditions in a standardised manner so that flight crews can accurately determine take-off and landing performance for the prevailing runway surface conditions. Reporting of friction coefficients is no longer applicable.

To raise awareness and support the deployment of the GRF in the Member States, EASA organised workshops on 17 March 2021 with the National Aviation Authorities and on 10 March 2021 with Industry (Aerodrome Operators, Air Operators, Aeroplane Manufacturers, Air Traffic Services Providers and Aeronautical Information Service Providers).

Aircraft operations:

The International Civil Aviation Organisation (ICAO), through amendments to applicable Standards and Recommended Practices (SARPs) and ICAO Documents, has introduced a global reporting format (GRF) for assessing and reporting runway surface conditions, with the objective of ensuring a link between the reporting and aircraft performance as published by the aircraft manufacturers.

The above-mentioned ICAO amendments have been transposed into the European regulatory framework through Commission Implementing Regulation (EU) 2019/1387 (amending Commission Regulation (EU) No 965/2012 on air operations), published on 01 August 2019, and the European Union Aviation Safety Agency's (EASA) Executive Director Decision EDD 2021/005/R, published on 23 April 2021, following EASA's rulemaking task RMT.0296 'Review of the aeroplane performance requirements for air operations'.



Overview of key safety topics processed and actions carried out in 2021

The newly introduced GRF aims to ensure the reporting of runway surface conditions (which may include contamination with slush or water) in a standardised manner so that flight crews can accurately determine take-off and landing performance for the prevailing runway surface conditions.

According to Commission Implementing Regulation (EU) 2019/1387 and the associated EDD, determination of take-off performance for wet and contaminated runways should be based on the reported runway surface condition in terms of contaminant and depth. Determination of landing performance should be based on information provided in the operations manual on the reported runway condition code (RWYCC). The RWYCC is determined by the aerodrome operator using the runway condition assessment matrix (RCAM) and associated procedures defined in ICAO Doc 9981 — 'PANS Aerodromes'.

To raise awareness and support the deployment of the GRF in the Member States, EASA organised workshops on 10 March 2021 with Industry (Aerodrome Operators, Air Operators, Aeroplane Manufacturers, Air Traffic Services Providers and Aeronautical Information Service Providers) and on 17 March 2021 with the National Aviation Authorities of the EASA Member States.

Large aeroplane certification:

On 6 December 2021, EASA issued ED Decision 2021/015/R amending CS-25 (Amdt 27) (certification specifications and acceptable means of compliance for large aeroplanes).

<https://www.easa.europa.eu/document-library/agency-decisions/ed-decision-2021015r>

This amendment ensures that certification standards for the computation of take-off and landing performance, including at the time of arrival, are harmonised with the above-mentioned ICAO SARPs.

5.5 Accidents involving the Boeing 737-8(MAX)

The accidents involving the Boeing 737-8(MAX) caused a worldwide grounding of the fleet after safety concerns over the controllability of the aircraft in certain conditions. The aviation authorities globally launched an evaluation of the conditions allowing the aircraft's return to service. The Agency carried out an extensive effort involving several experts from various domains and also collaborated with the FAA and provided the following reply in 2021 to the Ethiopian authority, in response to its safety recommendation 'to verify that the review of the aircraft flight control system related to flight controllability has been adequately addressed by the manufacturer before the release of the aircraft to operations':

The European Union Aviation Safety Agency (EASA) has performed an extended design review of the Boeing 737 MAX aircraft, as well as the conditions under which the Boeing 737 MAX may return to service in the European Union.

EASA has defined a Return to Service (RTS) strategy based on the following two aspects:

- (i) a fully independent review of all certification activities associated with the design changes required to address the direct causes of the accidents;
- (ii) an extended independent design review of the 737 MAX flight control system and associated functions.

**Overview of key safety topics processed and actions carried out in 2021**

EASA has additionally defined and agreed a set of post-RTS actions that Boeing has to complete for certain technical issues not representing an unsafe condition (i.e. not impacting the immediate safety of passengers).

The operation of the 737 MAX is indeed already considered safe with the approved changes and actions mandated in the EASA Airworthiness Directive 2021-0039 (and Safety Directive 2021-01).

The Agency published a closing report to explain its approach and the reasoning for its decisions. The report is available at the following link:

https://www.easa.europa.eu/sites/default/files/dfu/B737_Max_Return_to_Service_Report.pdf

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

CHAPTER 0

CHAPTER 1

CHAPTER 2

CHAPTER 3

CHAPTER 4

CHAPTER 5

CHAPTER 6

CONCLUSIONS

Conclusions

In 2021, the Agency received a total of 34 safety recommendations that originated from 22 occurrences (15 accidents, 6 serious incidents and 1 safety study). These were sent by the Safety Investigation Authorities of 18 different States.

- 20 safety recommendations originated from EASA Member States and 14 from non-EASA Member States;
- 70% were related to procedures or regulations, while 15% were related to aircraft or aviation-related equipment/facilities.

The number of safety recommendations that the Agency received in 2021 is slightly higher than the previous year. The number of safety recommendations addressed to EASA peaked between 2012 and 2016.

In 2021 the Agency provided 90 replies in response to 86 safety recommendations:

- 57 of these were final replies (closing safety recommendations) with 26 of these replies assessed as 'agreed' by EASA, and 21 assessed as 'partially agreed';
- The remaining 33 replies were updates providing information on the progress of the actions decided upon by the Agency and for which the relevant activities were not yet completed;
- As assessed by the originator, 29 of the responses provided by the Agency were deemed to be 'adequate' or 'partially adequate' (16 and 13 respectively), and 13 response was deemed as 'not adequate'. With respect to the 48 remaining replies sent in 2021, The Agency awaits the SIAs' assessment.

The number of replies provided in 2021 is higher than the number of replies provided in 2020. The 57 closing replies sent in 2021 translates into a modest reduction in the number of safety recommendations currently open for the Agency. Furthermore, the actions taken by the Agency in response to the safety recommendations encompassed several key safety topics that are currently part of the European Plan for Aviation Safety (EPAS) and which are included in the European safety risk management process.





**EUROPEAN UNION AVIATION SAFETY AGENCY
SAFETY INTELLIGENCE
DEPARTMENT**

Catalogue number
TO-AE-22-001-EN-N

ISBN
978-92-9210-280-7

ISSN
2599-7793

DOI
10.2822/199328

Postal address
Postfach 10 12 53
50452 Cologne
Germany

Visiting address
European Union Aviation Safety Agency
Konrad-Adenauer-Ufer 3, D-50668
Köln, Germany

Tel. +49 221 89990-000
Mail safetypromotion@easa.europa.eu
Web www.easa.europa.eu