European Network of Civil Aviation Safety Investigation Authorities

ANNUAL REPORT 2020

Version: 4.0, **Date:** 04 March 2020

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FOREWORD

BY THE CHAIRMAN OF THE EUROPEAN NETWORK OF CIVIL AVIATION SAFETY INVESTIGATION AUTHORITIES

ENCASIA was formed in January 2011. The Network now has reached its tenth year of functioning. This annual report as well as the nine preceding ones illustrate ENCASIA's achievements and remaining challenges.

The year 2020 started with the Brexit and the departure of our colleagues from the AAIB-UK who had always been fully committed to ENCASIA's endeavours. They are warmly thanked for their valuable contributions. On the other hand, ENCASIA welcomed the safety investigation authority of Switzerland who became an ENCASIA observer in 2020.

Nevertheless, the main challenge for the year 2020 was the COVID-19 pandemic faced by the whole aviation sector. It also had an impact on safety investigation authorities in terms of workload and procedures with a variety of consequences for ENCASIA Members. In these COVID times, ENCASIA's working groups have had to adapt to hold remote meetings and to postpone in-person activities.

An important ENCASIA milestone for 2020 concerns the achievements of the ad-hoc ENCASIA-EASA working group on EASA participation in safety investigations under Regulation (EU) No 996/2010. This working group finalised its works with results that have satisfied all parties and I hope that this will mark the start of a renewed constructive relationship between ENCASIA SIAs and EASA, for the benefit of aviation safety.

This annual report also contains a list of fatal accidents that occurred in 2020 to commercial aviation worldwide. The year started with the PS752 accident in Iran that echoed the MH17 shot down involving Ukraine again in a case linked to the challenges of flying over conflict zones.

Finally, I would like to thank my ENCASIA colleagues for their confidence in re-electing me at the start of 2020 for another three-year term as their Chairman.

I hope that you will enjoy reading this report and learn more about ENCASIA.

Rémi Jouty

Chairman of ENCASIA

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INTRODUCTION

The European Network of Civil Aviation Safety Investigation Authorities (ENCASIA) was established in January 2011 thanks to the entry into force of Regulation (EU) No 996/2010 on the investigation and prevention of accidents and incidents in civil aviation.

ENCASIA constitutes an independent grouping of the 27 civil aviation safety investigation authorities (SIAs) of the EU Member States.

ENCASIA is composed of the Heads of the SIAs in each of the Member States and/or, in the case of a multi-modal authority, the Head of its Aviation Branch, or their representatives, including a Chairman and a Vice-Chairman chosen among these for a period of three years.

ENCASIA puts a strong emphasis on the coordination and mutual support between Safety Investigation Authorities (SIAs), in order to generate real added value in aviation safety.

This is to be achieved by building upon the already existing cooperation between such authorities and the investigation resources available in the Member States. SIAs should be able, in each Member State, to conduct efficient and independent investigations and contribute to the prevention of accidents through their activities.

ENCASIA's mission is to further improve the quality of air safety investigations and to strengthen the independence of the national investigating authorities. Therefore, it may engage in activities such as:

- Development of training activities;
- Promoting safety investigation best practices;
- Developing a mechanism for sharing investigating resources;
- Advising EU institutions on air accident investigation and prevention matters.

This report is the tenth ENCASIA Annual Report related to the implementation of its work programme. The Report will be provided to the European Parliament and European Council, and will be made publicly available on the ENCASIA webpages, which is hosted on the European Commission's website at:

https://ec.europa.eu/transport/modes/air/encasia/activities_en or www.encasia.eu.

Chapter 1:
SIGNIFICANT ORGANISATIONAL AND REGULATORY CHANGES IN 2020

1.1) ENCASIA's Organisation

1.1.1) Elections of ENCASIA's Chairman and Deputy Chairman

Mr. Rémi Jouty (France) and Mr. Jurgen Whyte (Ireland) were respectively re-elected Chairman and Deputy Chairman of ENCASIA on 12 February 2020.

1.1.2) ENCASIA Secretariat

Mrs Simona Wist (Romania) had to leave her role as ENCASIA SIA-secretary in November 2020. Mr. Olivier Ferrante (France) replaced her as acting SIA-secretary until a new volunteer takes over. The secretariat is further supported by the European Commission through the participation of Mrs Isabel-Clara Barbero.

Note: that position was taken over by Mrs Rebekah Tanti Dougall (Malta) early 2021.

1.1.3) ENCASIA Members and observers

Following a formal request and evaluation, the Swiss Transport Safety Board (STSB) was welcomed as a new ENCASIA observer in 2020.

As of January 1, 2020, AAIB-UK ceased to be a member of ENCASIA due to Brexit. However, the members of ENCASIA have expressed the wish to invite AAIB-UK to participate in ENCASIA activities with observer status when the Brexit negotiations allow it, and provided that the conditions set by ENCASIA for the admission of observers are met at that time.

1.2) European Risk Classification Scheme (ERCS)

In 2020, the European Commission published regulations on the common European Risk Classification Scheme (ERCS) that stems from a legal obligation in Article 7(2) of Regulation (EU) No 376/2014. Its objective aims to ensure the harmonised approach in risk classification of occurrences across the European Union Member States.

The ERCS is a methodology to categorise the overall safety risk of an occurrence according to the worst likely accident outcome of the occurrence and to the likelihood of this potential outcome to occur.

Although optional for the Industry, it is mandatory for the authorities responsible for classifying occurrence reports. The ERCS has been enshrined:

- in a Delegated Regulation that defines the ERCS and provides the main methodology features in a Technical Annex, and
- in an Implementing Regulation of Regulation (EU) No 376/2014, which adopts the provisions for its implementation and an Annex that contains a conversion procedure from RAT/ARMS scores to ERCS classification.

For SIAs, it is important to note that the ERCS addresses the safety risk of an occurrence and not its actual outcome: Therefore, the output of the ERCS is not a classification as 'accident' or 'serious incident'. The classification of an occurrence as 'accident' or `serious incident´ according to the definitions of Article 2 of Regulation (EU) No 996/2010 remains with the SIAs.

1.3) New UAS rules and their impact on safety investigations

The new Regulation Framework for the operation of Unmanned Aerial System (UAS) that entered into force at the end of 2020 has an impact on the investigations of UAS occurrences.

Regulation 2019/945 (Design and manufacture of UAS) and Regulation 2019/947 (Operation of UAS) are interrelated. The latter deals with the different categories of UAS operations: Open, Specific and Certified. There are many links between operational requirements and design requirements.

The open category mainly concerns the operation of small drones within visual line of sight (VLOS) below 120m from the closest point of the surface.

For the specific category, the operator needs to provide a risk assessment. To help operators in this task, EASA has developed standard scenarios based on detailed mitigation measures easy to be implemented as well as on a "Declaration" provided by the UAS operator. Such "Declaration" is related to operational matters and is different from the 'declaration' found in the Basic Regulation and in the amended Article 5 of Regulation (EU) No 996/2010, which is related to design aspects. The specific category also introduces the concept of a light UAS operator certificate (LUC).

For high-risk scenarios a type certificate would be required in the specific category. For those operations where it is not possible to implement mitigation measures in the specific category, the operation has to be classified under the certified category and a type certificate would become mandatory.

The criteria to investigate UAS occurrences are in the amended Article 5 of Regulation (EU) No 996/2010, with the clarification provided in recital 85 of the new Basic Regulation. In summary, SIAs should have the obligation to investigate accidents and serious incidents involving high-risk operations in the specific category, as well as operations undertaken in the certified category. The other cases would depend on the level of injuries or the involvement of manned aircraft.

1.4) ENCASIA common table for ICAO's EFOD

Update on Electronic Filing of Differences (EFOD). In 2020, ENCASIA updated the development of the standard table for the Electronic Filing of Differences between ICAO Annex 13 and Regulation (EU) No 996/2010, by including amendments 17 and 18 to Annex 13. This document aims to help SIAs to fill in the online ICAO EFOD database and to determine which items would be best addressed by national law, policies or procedures.

1.5) Investigations in COVID times

ENCASIA members provided feedback on the impact of the COVID crisis through the ECAC ACC forum and during the ENCASIA plenary meeting on 1 December 2020.

Despite less aviation activity during the spring lockdown, several SIAs reported high numbers of General Aviation accidents for the year 2020 and even for a number of countries an increase in the number of fatalities. During the lockdown, SIAs had worked on their respective backlogs of final reports.

The ECAC ACC published a guidance note on conducting investigations during a pandemic, based on the numerous inputs received in 2020. This guidance is available on the ECAC website[1]. It focuses on air accident investigation-specific issues to minimize the risks of catching or spreading the coronavirus.

[1] https://www.ecac-ceac.org/documents/10189/121604/ACC+Guidance+Note+on+Conducting+Investigations+during+a+Pandemic+%28DGs+consultation%29.pdf/4e53a24c-f96a-4ac1-9f03-7500bc46cced

Chapter 2:
EASA PARTICIPATION IN SAFETY INVESTIGATIONS UNDER REGULATION (EU) No 996/2010

The special EASA-ENCASIA working group had been established in response to a letter sent by the European Commission to the ENCASIA chairman in January 2019. That letter conveyed difficulties raised by EASA relating to their participation during some major safety investigations. The objective of this group was to identify the best way forward in order to arrive to a complementary and fruitful cooperation between EASA and SIAs. Within the limits of the role given to EASA in safety investigations by Regulation (EU) No 996/2010, its scope included the following areas:

- Notifying EASA of occurrences of interest to EASA;
- Informing EASA of on-site activities and off-site activities, such as examination and testing which may be of interest to EASA, and the process for agreeing on EASA participation;
- Clarifying how EASA will get access to the information needed to fulfil its continued airworthiness duties;
- Clarifying how EASA will interact with an investigation where multiple Member States SIAs are involved;
- Clarifying how EASA will supply SIAs with requested information, advisers and equipment in investigations available at EASA and agreeing on the involvement of EASA specialists and
- Consulting EASA on draft reports and documenting the processing of the comments received.

The group concluded its works in December 2020 by producing a report, which included a compromise found for the consideration of EASA comments (the last point of the list that had been the most discussed). All other above-mentioned points raised by EASA and SIAs had already been successfully addressed by the group and developed in the report.

The compromise was based on the proposal to open the possibility for EASA to appoint multiple advisers, not limited to the EU SIA leading the investigation, so that the Agency could better convey the messages of its experts. In addition to an adviser to the SIA leading the investigation, appointed according to article 8.1.a of Regulation (EU) No 996/2010, EASA could also, when appropriate and on a case-by-case basis, appoint an adviser to another EU SIA having accredited representative status, in accordance with ICAO Annex 13 standard 5.24. If the investigation is led by a third country, the EASA adviser has to be appointed to an EU SIA having ACCREP status.

Whist being in line with international standards and recommended practices, that approach recognizes EASA's special role in Europe for which EASA and the European Commission were thankful. The quality of discussions and open-mindedness of WG participants were greatly appreciated by all and show that the ENCASIA forum has always been a good place to share lessons learned on the implementation of Regulation (EU) No 996/2010 as well as on specific investigations put forward by SIAs.

Chapter 3:
ECCAIRS 2.0 AND SRIS 2.0

Article 18 of Regulation (EU) No 996/2010 requires member states to record in the European Common Repository (ECR) all safety recommendations issued in accordance with Article 17(1) and (2). A decision was made by the European Commission in 2017 that support of the ECR would be transferred from the DG-JRC (Joint Research Centre) to EASA on 1st January 2021.

The new ECR supporting software, ECCAIRS 2.0, which is referred to as E2, is based on modern IT technologies and will allow a more efficient central ("Web based") architecture combining "national" and "ECR" data. It will be used to manage the European Reportable Events database required by Regulation (EU) No 376/2014, as well as the European Safety Recommendation database (SRIS), required by Regulation (EU) No 996/2010.

The E2 project[2] started back in October 2017, and a Key User Group (KUG)[3] was set up to establish the functional specifications (business requirements) of the system.

The project completed Phase II in the fourth quarter of 2018. This phase was dedicated to the Technical Analysis and the Design of the Solution Architecture of E2; it was based on the inputs received from the KUG during the workshops, which lead to the Functional Specifications document made in Phase I.

Administrative issues prevented EASA from proceeding with Phase III, until the third quarter of 2019, when a Framework Contract (FWC) with an IT service provider was finalized and product development started.

The target was to reach a Minimum Viable Product (MVP = all the core functionalities ensuring E2 runs similarly to the legacy ECCAIRS) by June 2020 for E2-ADREP (related to the ADREP taxonomy used by the occurrence reporting system) and by September 2020 for E2-SRIS.

On top of these specific features, the redesign of ECCAIRS would have brought new features and technical enhancements that could enhance the overall performance of the system and the user experience.

The following new features are envisioned for SRIS2:

- New web based architecture, including the possibility for an SIA to set up custom settings, custom fields, personal notes, roles and user management without requiring the installation of any components on a local server.

[2] ECCAIRS 2.0 was being developed in these phases:
Phase I – Functional specification
Phase II – Detailed technical analysis and architecture
Phase III – Development
Phase IV – User acceptance testing
Phase V – Data migration

[3] ENCASIA has been active in the Key User Group (KUG) and has assisted in defining the key requirements for the recording of safety recommendations and for the management of SIA's events databases to ensure that the current and future anticipated needs will be met.

- Versioning of the records, allowing an SIA to publish the version of a Safety Recommendations while still being able to work on intermediary draft versions, not visible to others.
- Full control on when to 'release' safety recommendations to the ECR-SRIS and to the Public SRIS (including responses).
- Feature which could allow an SIA to electronically address a safety recommendation to an E2 registered organization (EASA MS NAA's).
- Possibility to export data to external analytical tools (Excel, 'Tableau', etc.).
- Powerful search and query function of occurrence reports directly integrated into the SIA's local environment and possibility to link these occurrences to a safety recommendation.
- Other features currently under development in coordination with ENCASIA WG6.

In terms of project planning, the focus had been, initially, on developing the features related to the occurrence reporting process, as the migration of 32+ local databases was, at first, more complex than the migration of SRIS data, which was all contained in one single database.

In addition to the development team, which consists of more than 45 staff/consultants, a network of +60 Local Project Managers has been established with NAA's and SIA's that have been involved in this process.

Their responsibility was mainly to ensure a smooth change within their own organization and to prepare the data migration, as well as to ensure a minimum of administration that will be required (creation of users, assigning to roles, etc.).

ENCASIA WG 6 has been actively involved in the project with the participation of its members in the ECCAIRS Steering Board, Steering Committee, EASA Network of Analysts (NoA) and KUG in order to assist in a smooth transition to the new system.

Unfortunately, the COVID-19 pandemic had a negative impact on the project timeline. Furthermore, some technical issues and bug resolutions caused further delays to the development phase III. Nevertheless, a revision of the deadline on the termination of the legacy system was not possible.

Despite the great effort that the EASA E2 team had put into the development of this project, approaching the end of year 2020, serious concerns had arisen on the possibility of avoiding a discontinuity in the Safety Recommendation management, as per Regulation (EU) No 996/2010.

Within ENCASIA, in the event of a discontinuity in the Safety Recommendation management, mitigating actions have been taken through the WG6, by:

- disseminating instructions to all SIAs on how to create local databases in which to save their own safety recommendations, their responses and all the relevant data that had been inserted into the legacy SRIS,
- carrying out close coordination with the E2 team in order to reach sufficient maturity with the new system as soon as possible, to minimize the undesirable outcome of disruption of the SRIS functionalities,

- providing to the heads of SIAs constant updates on the project development and timeline.

The way ahead for the initial period of 2021 includes:

- quality checks (already ongoing) in order to evaluate not only the quantity of data (number of SRs) but also the quality of data transferred (responses, notes, attachments, etc.);
- training of SIAs' personnel to operate the system and to be able to transfer data from existing data bases and load new recommendations or update existing data;
- further improvement and continuous monitoring of the system development.

Chapter 4:
ENCASIA'S WORK PROGRAMME

4.1) Working Group 1: Communication

WG1 deals with Internet presence and ensures that the content of the ENCASIA webpages are regularly reviewed by SIAs in order to have at least their respective webpage updated. This was notably the case for recent changes in Croatia and Greece.

The group has also explored possible improvements to share documents on a restricted web-based platform to overcome recurrent issues with the Drupal system that has become unreliable because of changes in the EC internal IT system that may affect its reliability.

4.2) Working Group 2: Cooperation

In 2020, Mr Jens Friedemann (Germany) replaced Mr. Arnaud Toupet (France) as WG2 Chairman. The group has worked on short procedures on handling, coordinating and sharing data as well as on a major accident check-list proposal. It also dealt with discussion papers on:

- Drafting the final report (how to draft a report for a non-major investigation)
- Analytical methodologies (list of tools used by SIAs, what kind of investigation corresponds to which tool, pros and cons, practical examples)
- When to investigate drone accidents (see paragraph 1.3 in this report)

The other on-going topics have been developing best/good practices on report drafting as well as finding a common way to deal with comments after the consultation period and to append them to final reports.

4.3) Working Group 3: ENCASIA Mutual Support System

WG3 aims to develop the ENCASIA Mutual Support System (EMSS). It has worked, in cooperation with WG4 and WG5, on a roadmap that contains three distinct phases for the upcoming 10 years.

- Phase 1: Development and introduction of a system to maintain information on key SIA capabilities and investigator competencies.
- Phase 2: Establishment of an ENCASIA accreditation system for assisting IICs and group leaders.

- Phase 3: Introduction and consolidation of an operational EMSS.

Phase 1 is already well underway with the development of an ENCASIA Resource Map (ERM). The concept of operations of Phase 2 is in progress. Phase 3 is very dependent on the previous phases, even if the concept of a weekly roster of European safety investigators ready to provide immediate assistance to an SIA facing urgent needs, notably in relation to a major investigation, could be the way forward.

4.4) Working Group 4: Planning and Resources

WG4 mainly deals with logistical support of ENCASIA activities.

The tasks of WG4 usually include:

- determining the best suitable way to organize and finance the events decided in the ENCASIA work programme;
- finding contractors to provide the services needed for the implementation of the events;
- advertising the events across the ENCASIA community to ensure a broad participation;
- serving as point of contact between the ENCASIA participants/hosts and the contractors for the event;
- monitoring the cash flow between ENCASIA a.s.b.l. and the contractors to ensure conformity with the provisions of the grant.

In 2020, the COVID-19 restrictions have heavily impacted the planned ENCASIA activities. The ENCASIA Plenary held in Brussels on 12 & 13 February 2020 was the last presence event for this year. From the first wave of Member State restrictions and lockdowns onward, presence activities have been cancelled altogether and some essential activities (plenary and working group meetings) have been carried out via teleconferencing, with the technical support of the EC. The need of organizational support from WG4 was subsequently limited in 2020 and the resources were used to support other ENCASIA activities.

ENCASIA activities supported by WG4:

<u>EMSS exercise</u>

The preparations for the EMSS exercise with focus on the relation with judicial authorities, to be kindly hosted in Rome by the ANSV on 26-27 May 2020, had started according to plan in early 2020. A company specialized in negotiating contracts for meetings and events, Conference Direct, had been tasked with the search for an appropriate accommodation in proximity of the Rome-Fiumicino airport, while the premises for the exercise had been kindly made available through the ANSV by the airport operator Aeroporti di Roma (ADR).

In March 2020, the decision to postpone the event had been taken due to the developing COVID-19 sanitary crisis across the EU and the related travel restrictions. The exercise is still on the ENCASIA agenda and is set be organised as a presence event as soon as the sanitary situation in relation to the COVID-19 pandemic will permit safe travel abroad.

Other activities involving the support of WG4

Extension of ENCASIA Grant 6 & 7: The ENCASIA Grant 6 & 7 was set to end on 30 June 2020. Due to the postponement of the EMSS exercise in Rome with focus on the relation with judicial authorities, ENCASIA decided to apply for an extension of the running grant in order to complete the remaining activity on the work Programme. WG4 prepared the application letter for a six-month extension of the ENCASIA Grant 6 & 7, which was approved by the Commission on 11 June 2020 through an amendment of the ENCASIA Grant 6 & 7.

Application of a new grant: By the end of 2020, when it became clear that the COVID-19 pandemic would impact the ENCASIA activities for an undetermined time and would prevent presence events to take place in near future, it was decided to close the ENCASIA Grant 6 & 7. As it was not possible to complete the Work Programme, the remaining activity has been deferred to a later date under a new grant. In order to steadily carry on the activities of the network and be prepared for upcoming events in the post COVID-19 era, ENCASIA decided to apply for the new ENCASIA Grant 8 & 9. Further to traditional ENCASIA activities (meetings, workshops, training, peer reviews), the grant application includes a position for web-based services to provide alternative means for organising meetings and events during times of restrictions. WG4, together with ENCASIA asbl, prepared the grant application forms, which were sent to the EC on 29 October 2020. Both parties signed the contract for the ENCASIA Grant 8 & 9 at the end of December 2020. The first ENCASIA activities are projected to be organised by mid-2021 at the earliest, if the COVID-19 pandemic is under control by then.

4.5) Working Group 5: Peer Reviews

In 2020, the Peer Review report Phase 1 (2014-2018) was sent to the European Commission and published on the ENCASIA website. It is available at:

https://ec.europa.eu/transport/modes/air/encasia/activities/events/peer-review-phase-1-report-2014-2018-0_en

In preparation of the further development of the Peer Reviews, WG5 took on board the outcome of the Warsaw workshop by focusing on the identified shortcomings of

the previous questionnaire; in addition, the Peer Review Phase 2 should be more focused on qualitative aspects.

WG5 also considered:

- the EMSS and compliance with Regulation (EU) No 996/2010;
- the focus on notifications and early actions in order to be better prepared to face a major civil aviation accident;
- the review of the SIAs role in the national emergency plan (to address the provisions of article 21 of the Regulation (EU) No 996/2010), or the SIAs NIMPs or any other SIAs national plans.

The main objective of Peer Review Phase 2 should be: "How do you handle a major accident investigation in a timely manner in compliance with Regulation (EU) No 996/2010?"

After fruitful discussions within the WG5 and with ENCASIA members at ENCASIA Plenary meetings, the conclusion was to split the upcoming Peer Review process in two phases: Phase 2A and Phase 2B. Peer Review Phase 2A will focus on quantitative information and a questionnaire with data forms will be elaborated and disseminated to SIAs.

Then, Peer Review Phase 2B will address the way the SIAs handle a major accident investigation in a timely manner in compliance with Regulation (EU) No 996/2010 and will focus on qualitative information covering most of the following areas associated to a major investigation:

- Logistics and funding;
- Getting access and managing technical competencies and investigation means;
- Managing investigation teams;
- Relation with EASA in a major investigation;
- Communication to public (timely release of information);
- Communication to families;
- Access to information;
- Relations with Justice/sharing information with judicial authorities;
- Writing and consultation of reports.

4.6) Working Group 6: Safety Recommendations

4.6.1) Overview

In 2020, WG6 continued to support other organisations with the development and testing of the new European Safety Recommendation Information System (SRIS) and the migration of the European Central Repository (ECR) database. The members of

WG6 are, in fact, actively participating in the ECCAIRS Steering Board, ECCAIRS Steering Committee, EASA Network of Analysts (NoA) and E2 KUG.

Furthermore, WG6 focus has been oriented toward following areas:

4.6.2) ECCAIRS 2 / SRIS 2 project

Throughout 2020, WG6 has been extensively engaged in coordinating the handover between the legacy and the new SRIS2 within the E2 project.

Beside the specific ECCAIRS meetings (ESB, ESC, NoA, etc.), the topics related to the SRIS2 were thoroughly discussed during the frequent WG6 teleconferences, where both the JRC and the E2 project managers attended, providing their contribution and technical expertise.

Unfortunately, due to the delays in the overall E2 project, described in Chapter 3, the concern that the system might not be ready by the end of the year posed on WG6 the challenge to explore mitigating actions (i.e. disseminating to all SIAs instructions to create a local database in order to avoid losing any data prior to December 2020).

Furthermore, the late and limited availability of the SRIS2 for testing by the WG6 members and the SIA's operators, severely reduced the amount of feedback that could be given before the legacy SRIS was terminated.

As the closure of the legacy SRIS became imminent and before the last batch of the database was transferred to EASA, SIAs stopped inserting/editing data in the system. While the JRC was then making a copy of the database to be handed to EASA, WG6 ran the last queries to extract statistic data for this report, which was still based on the legacy system.

4.6.3) SRIS questionnaire

Approaching the end of service for the legacy SRIS, WG6 developed a questionnaire in order to be able to set a benchmark after over 10 years of experience in developing and operating this system.

The questionnaire, which has been distributed among all SIAs within ENCASIA, had a dual purpose:

- To understand SIAs perception of the legacy system in order to optimize guidelines for the standardization of data insertion and management of SRs and their responses.
- To take a picture of how the legacy SRIS was perceived and operated by SIAs during its final period, in order to prioritize the development of the new system features and, in the future, to be able to conduct a comparison with SRIS2.

A similar questionnaire will be distributed when SRIS 2 is considered sufficiently mature, in order to evaluate the system improvements.

The main takeaways from the responses received to date were:

- 69% thought the current SRIS response classification system was satisfactory;
- 77% said they did not need further guidance on how to use SRIS;
- 85% said SRIS would be a better tool and more user-friendly, if only English Language was used;
- Slightly more than 50% are not using SRIS as their primary SR tool and 79% use an additional (own) system to manage SRs;
- 50% of SIAs had difficulty using the search functionalities of the current SRIS system.

WG6 will insert above feedback into the future development of the SRIS2 in order to further improve the system.

4.6.4) Training workshop 2021

After the very positive feedback received by the participants to the training workshop on safety recommendations held on 25 and 26 February 2019 in Cologne, WG6 has planned a similar event for 2021.

The limitations imposed by the pandemic emergency induced some delays in the organization. Nevertheless, in order to increase the chances of being able to have an in-person workshop, dates have been set to 19-20 October 2021. It will be open to industry participation and will hopefully be held, with attendees physically present, in Toulouse (France) with the support of Airbus.

The focus will be on SIA-Addressee dialog during the whole safety recommendation process and will offer an opportunity to provide further training on the SRIS2 system.

4.6.5) EU-China Aviation Partnership Project (APP) -19 Nov 2020

WG6 participated in a teleconference as part of a larger EU-China aviation safety cooperation program within the EU-China Aviation Partnership Project.

The project is funded by the European Union and this event has been coordinated by EASA with the participation of representatives from the Chinese Accident Investigation division of OAS (Office of Aviation Safety) and the Aviation Accident Investigation Centre, from the EASA Aviation Safety Office and from ENCASIA WG6.

The topic for discussion was on civil aviation accident and incident investigation experience exchange and focused on the safety recommendation process.

Beside the ENCASIA architecture and objectives, the virtual meeting also highlighted the independence of SIAs' investigations, the high standards in the conduct of the investigations and the training of investigators. Furthermore, WG6 described the process that led to the public SRIS and how the public nature of the safety recommendation process has provided strong incentives for a constructive and transparent dialogue on safety matters between SIAs and addressees, contributing to the overall improvement of aviation safety.

Particular interest was shown on the ENCASIA process to assess addressee's responses and on the public SRIS. The cooperation with the Chinese authorities will, most likely, continue in the future.

Chapter 5:
DATA ANALYSIS OF THE SAFETY RECOMMENDATIONS INFORMATION SYSTEM

ENCASIA is required by Regulation (EU) No 996/2010, Article 7.3(g), to analyse the safety recommendations that have been entered onto SRIS and to identify important Safety Recommendations of Union Wide Relevance (SRUR). This analysis is carried out by WG6.

While this Annual Report refers to data that was entered into SRIS up to 15 December 2020, the analysis of the data was carried out by WG6 on data available on SRIS up to 24 November 2020.

5.1) SRIS overview

As of 15 December 2020, 3,755 safety recommendations had been recorded on SRIS, of which 243 were issued in 2020.

The following charts provide a summary of the safety recommendations on SRIS.

Chart 1 shows the total number of safety recommendations issued by each state (orange) and the SRs recorded on SRIS in 2020 (blue).

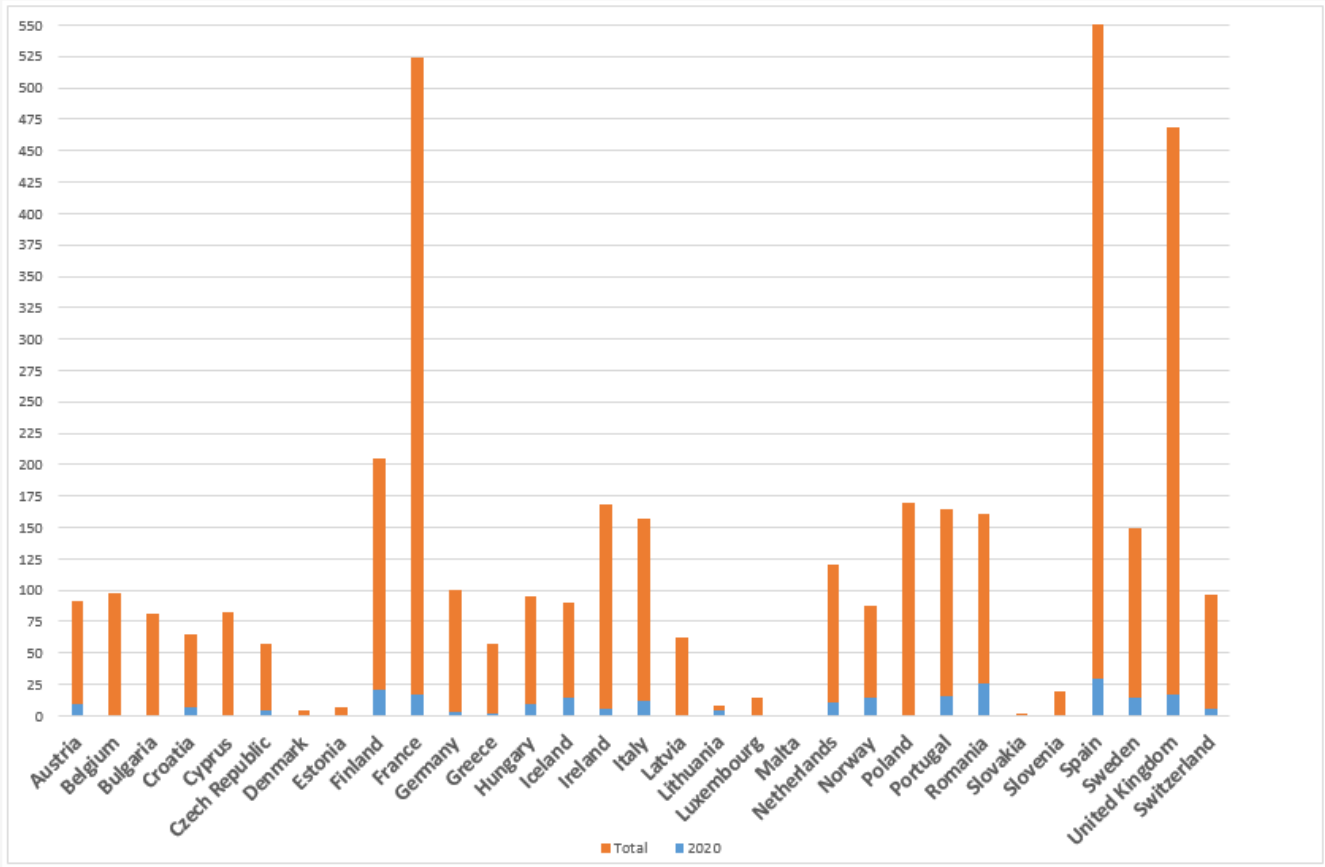

Chart 1. Summary of safety recommendations recorded on SRIS by State.

Chart 2 shows the number of safety recommendations recorded on SRIS by year.

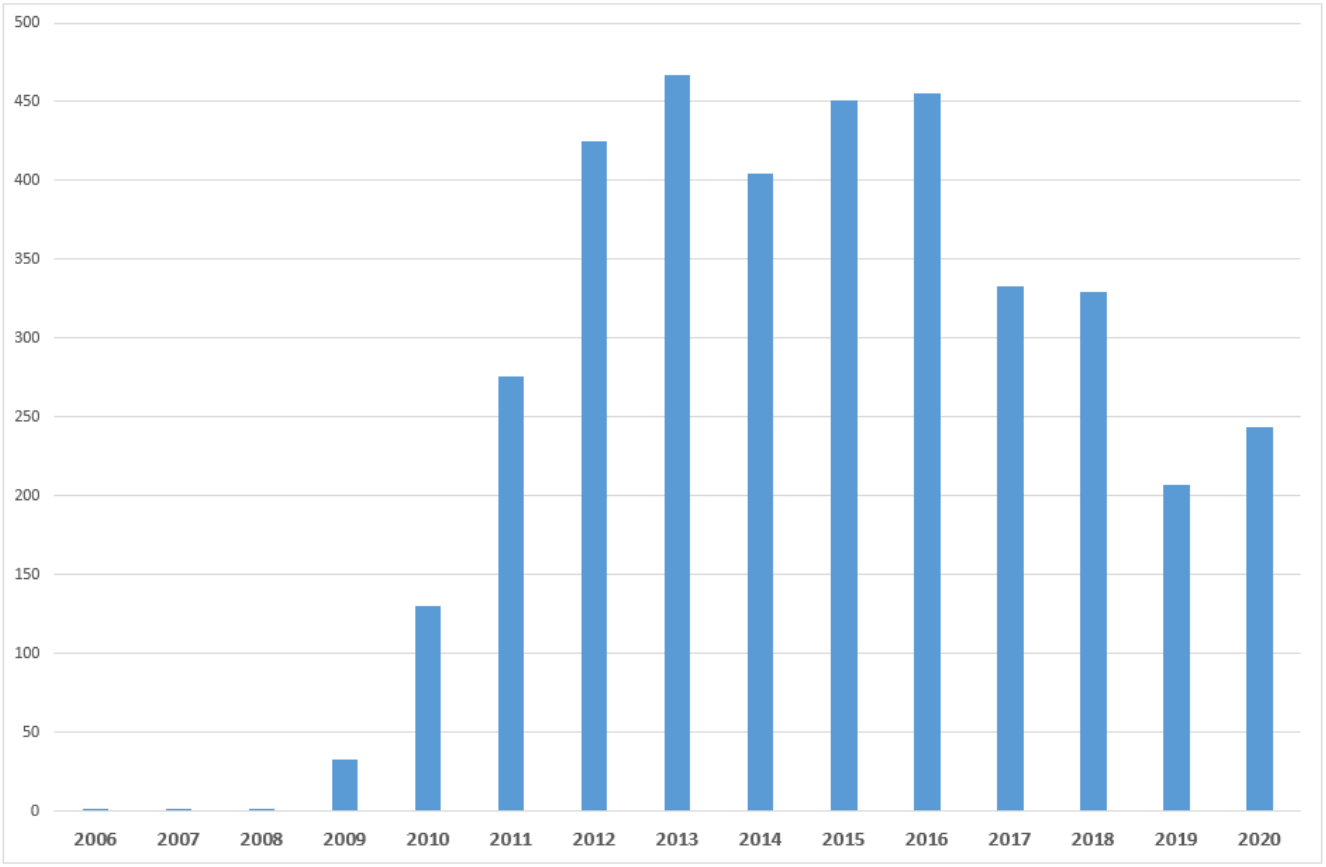

Chart 2. Number of safety recommendations recorded on SRIS by year.

It should be noted that there is usually a delay in the entry of SRs into SRIS by SIAs. This generally leads to an increase of the previous year's SR number by approximately 15% within the first months of the following year. WG6 has noted an overall increment in the number of safety recommendations recorded on SRIS in 2020.

5.2) Safety Recommendations of Union-wide Relevance

A Safety Recommendation of Union Wide Relevance (SRUR) is defined as meeting one or more of the following criteria:

- The deficiency underlying the safety recommendation is systemic, not related to a specific aircraft type, operator, manufacturer component, maintenance organisation, air navigation service and/or approved training organisation, and is not solely a national issue, or;
- There is a history of recurrence across Europe of the relevant deficiency.

In 2020, there were 15 safety recommendations that were assessed as being a SRUR and covered the following safety issues, which are expanded in Appendix 2:

- Request for medical certificate.
- Titanium rotor-grade critical parts: Review and in-service inspection, certification, design and quality process;
- Definition of "spin", "incipient spin", "developed spin" and modification to EASA Part-FCL related to the "stalling and recovery at the incipient spin stage (stall with excessive wing drop, about 45°)";
- Warning system for alternator malfunction;
- Parachute operations - pilot training and aircraft certification;
- Require retroactive application of the current improvements in fuel tank crash resistance in rotorcrafts;
- Requirement for piston aircraft to have carbon monoxide detector with active warning.

5.3) Safety Recommendations of Global Concern

Most of the Safety Recommendations of Union-wide Relevance issued in 2020 by ENCASIA member States were also classified as being of Global Concern, as specified in Appendix 2.

WG6 notes the new ICAO Safety Recommendation of Global Concern (SRGC) definition published in ANNEX13 Twelfth Edition, July 2020.

5.4) Safety Recommendations topics

Each safety recommendation is assigned a topic that best indicates the area that the safety recommendation addresses. The topics are allocated to three levels, with Level 1 being the highest and covering four topics. Each Level 1 topic is further broken down into sub-topics.

Chart 3 shows the Level 1 topics with the number of those assigned to each category. From Chart 3, it can be seen that most of the safety recommendations raised during 2020, as in previous years, were related to procedures or regulations.

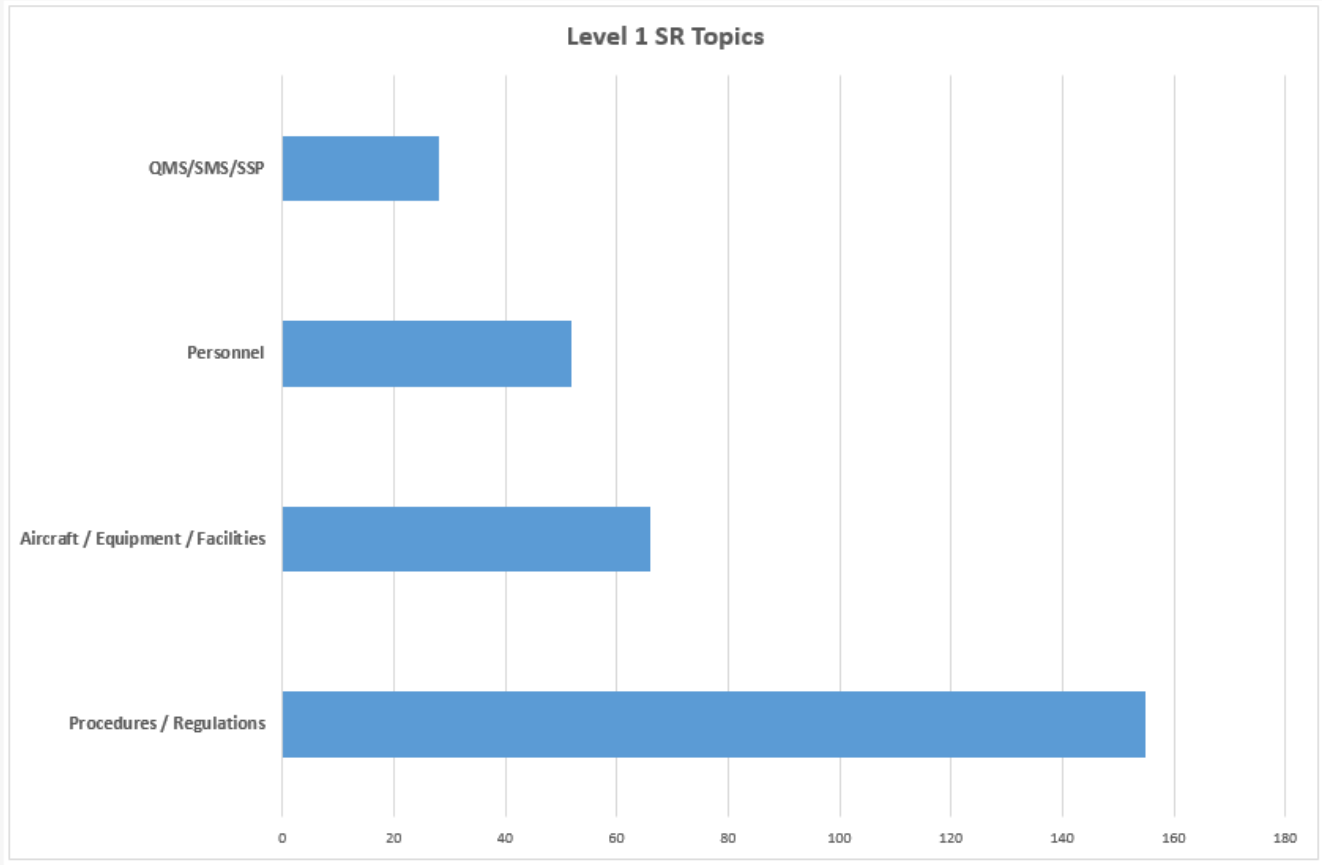

Chart 3. Level 1 safety recommendation topics.

Charts 4, 5, 6 and 7 show the Level 2 topics for each of the higher level 1 topics. Chart 8 shows a further breakdown of the topics related to aircraft equipment, with the majority of these related to aircraft systems and powerplant.

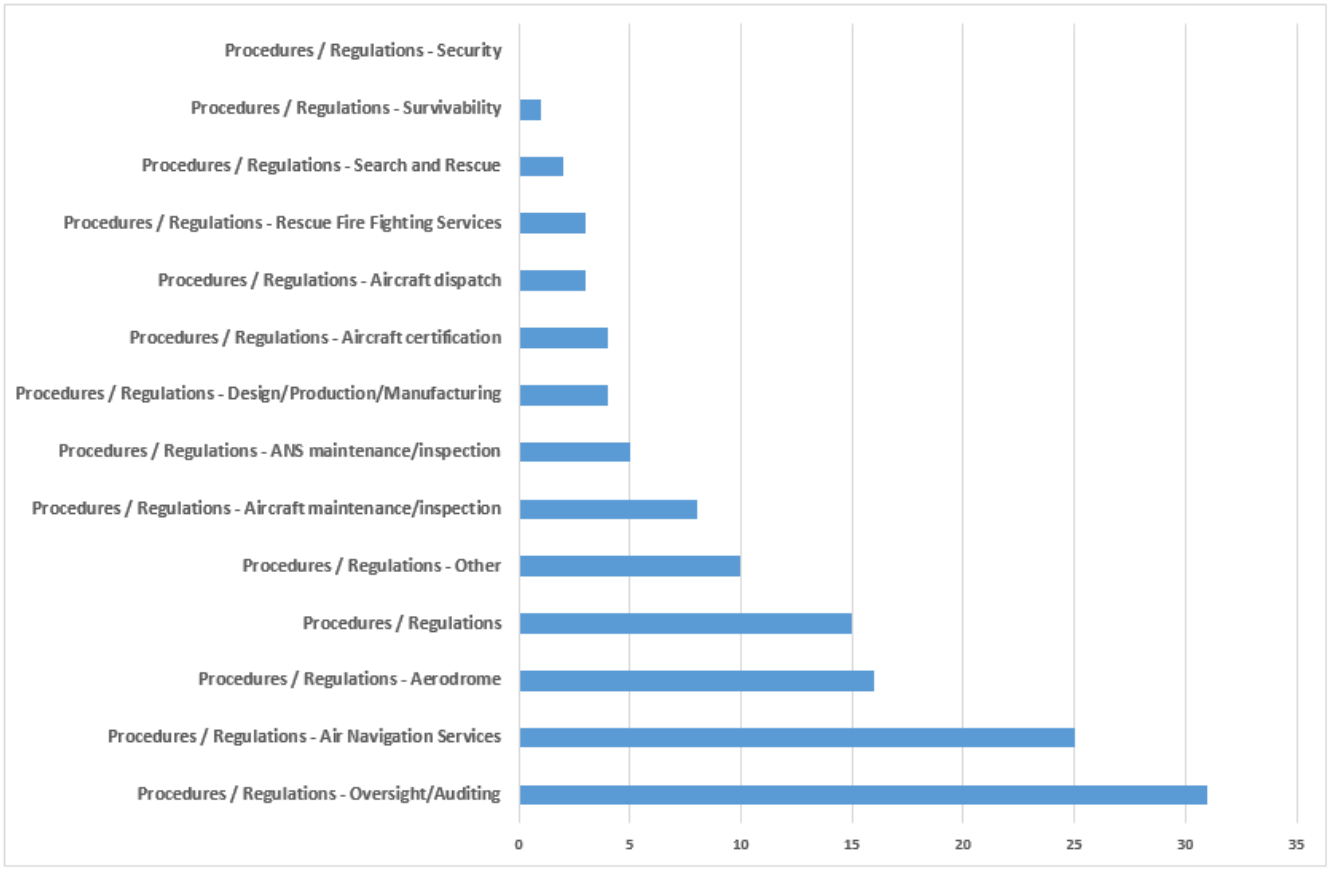

Chart 4. Level 2 safety recommendation topics relating to Procedures and Regulations.

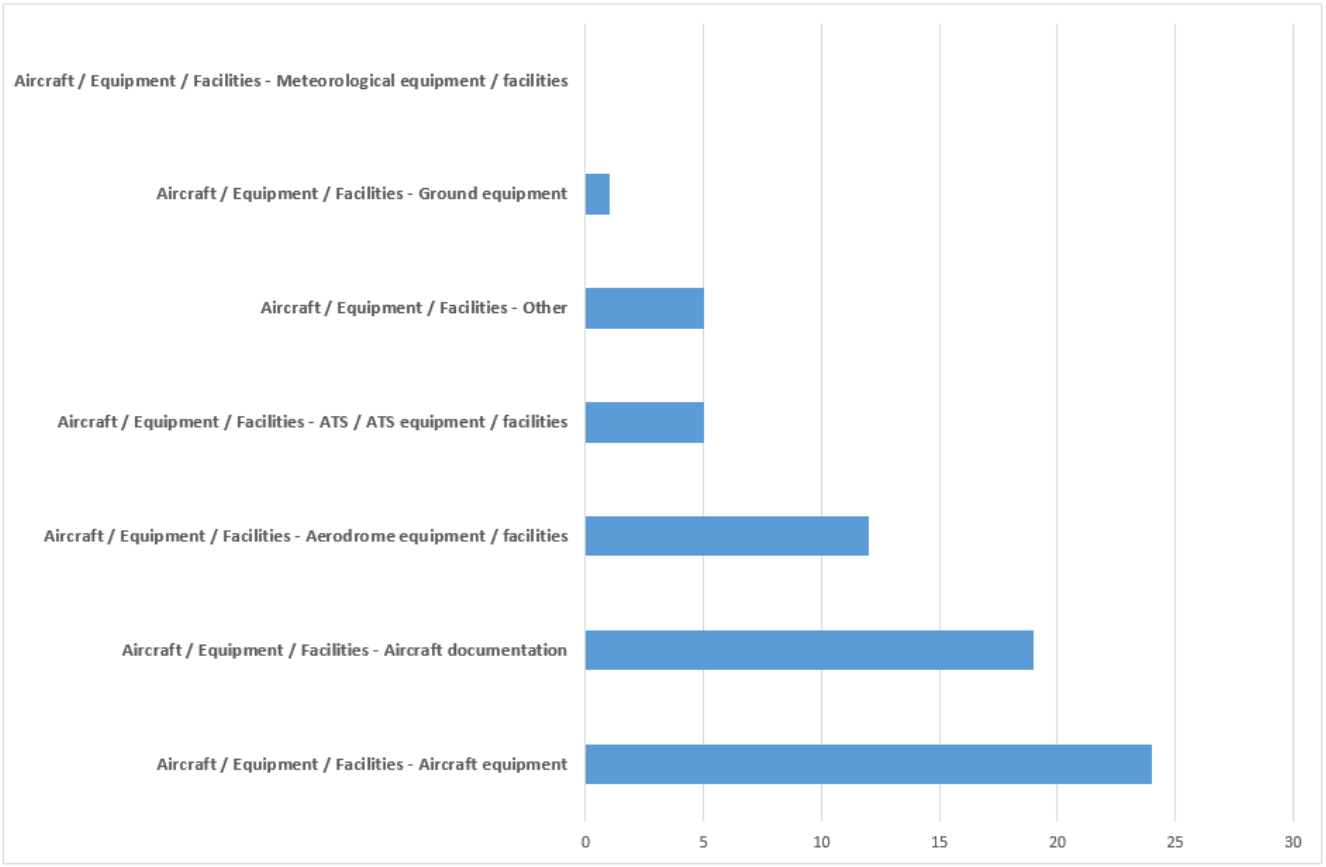

Chart 5. Level 2 safety recommendation topics relating to aircraft / equipment / facilities.

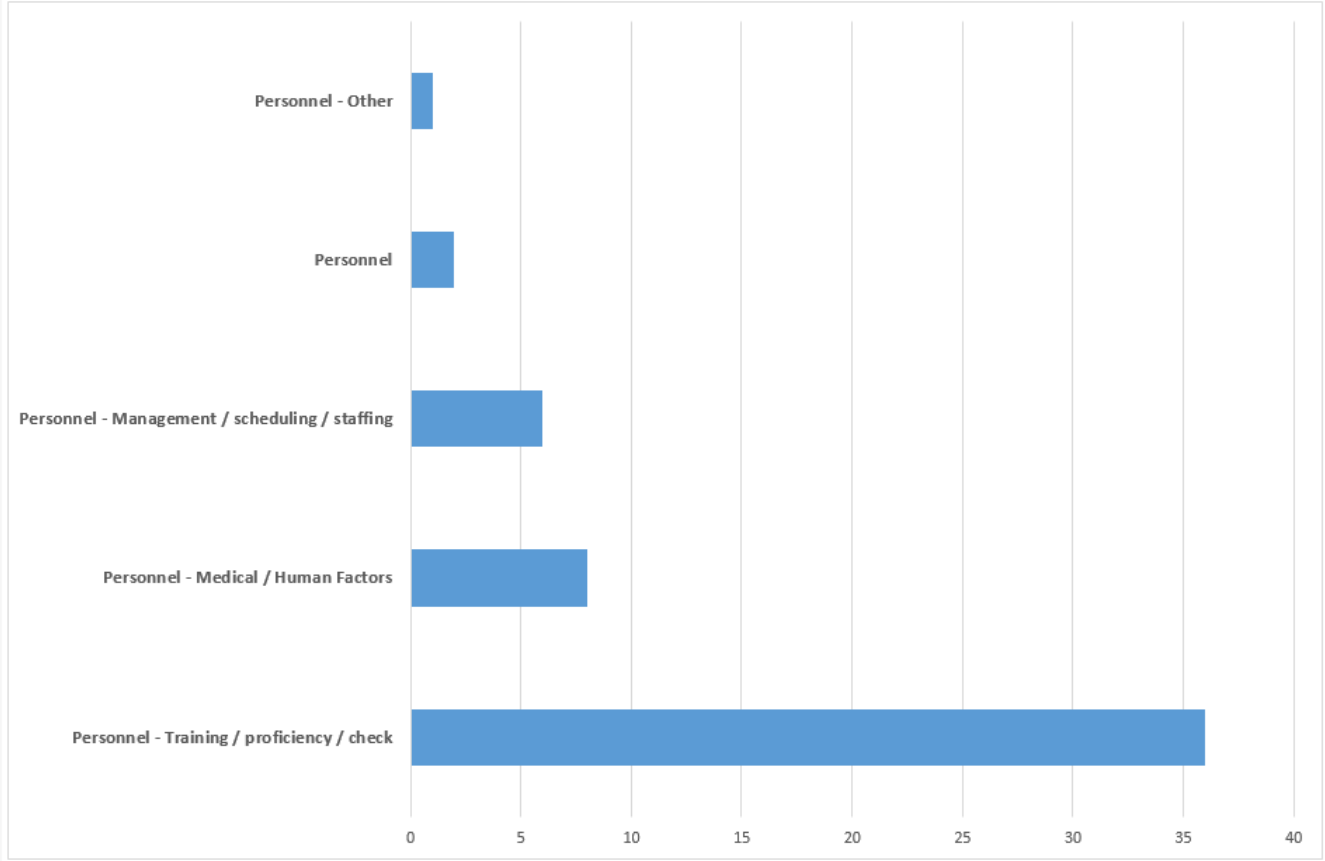

Chart 6. Level 2 safety recommendation topics relating to Personnel.

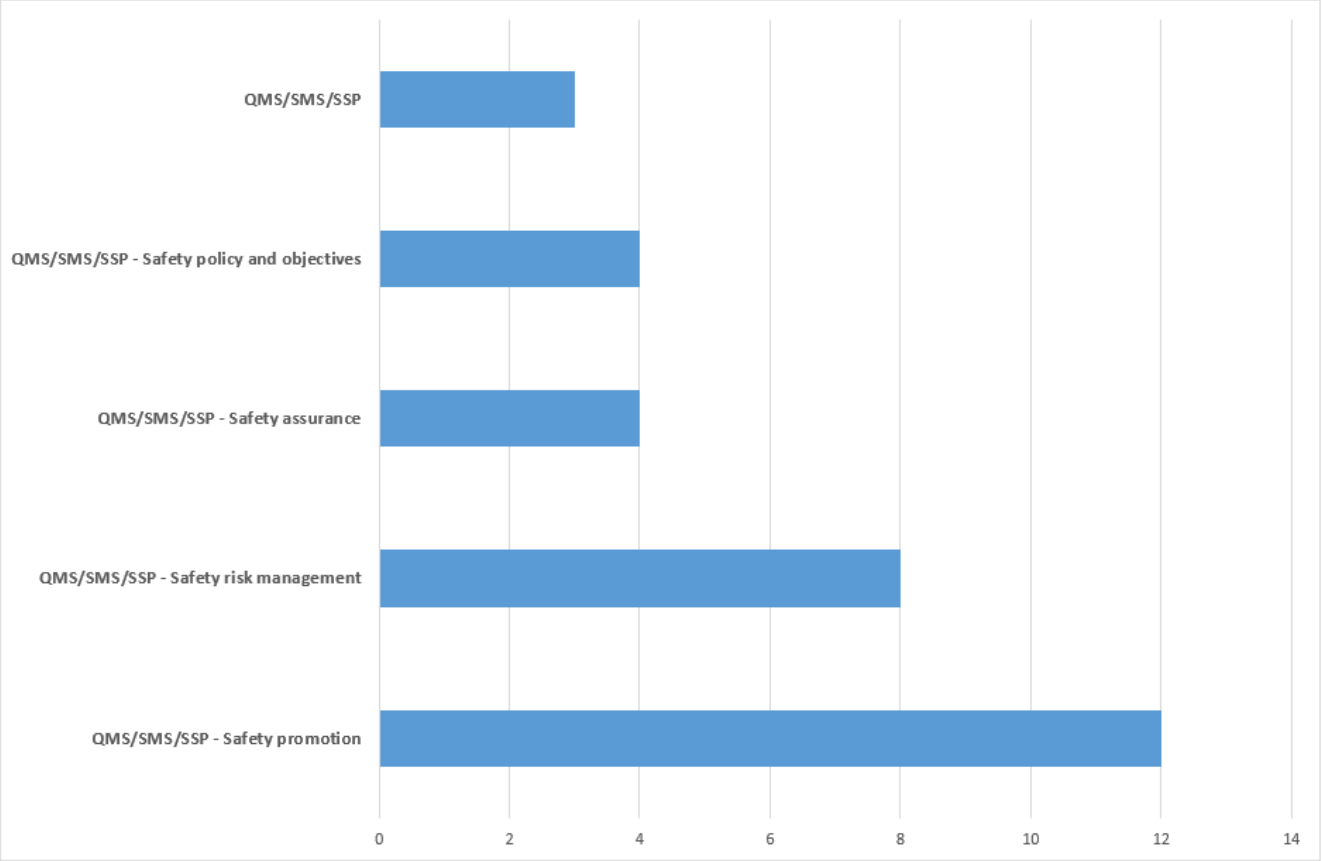

Chart 7. Level 2 safety recommendation topics relating to QMS/SMS/SSP.

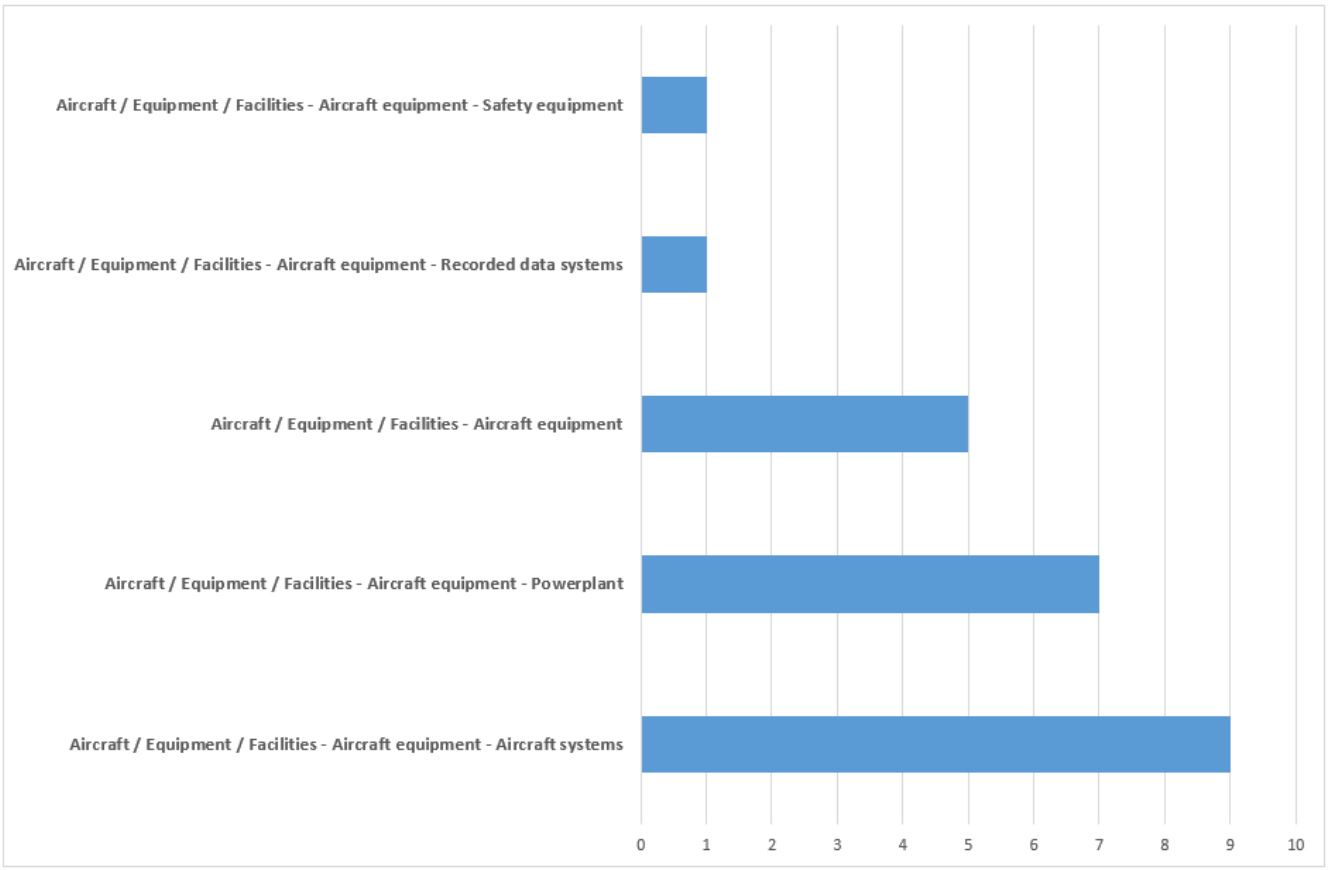

Chart 8. Level 3 safety recommendation topics relating to Aircraft equipment.

5.5) Safety Recommendations addressees

Most of the safety recommendations issued during 2020 were addressed to Civil National Aviation Authorities (NAA) (29%), followed by Aircraft Operators (23%) and National Authorities (14%). The term 'National Authority' is used to refer to authorities that are not involved in the regulation of Civil Aviation. The number of safety recommendations addressed to EASA decreased from 38 in 2019 to 17 in 2020 (7% of total SRs). WG6 reviewed this data by cross referencing with EASA, which reported 20 safety recommendations addressed to the agency in 2020 by ENCASIA member states, meaning that some SIA might still have to update the SRIS.

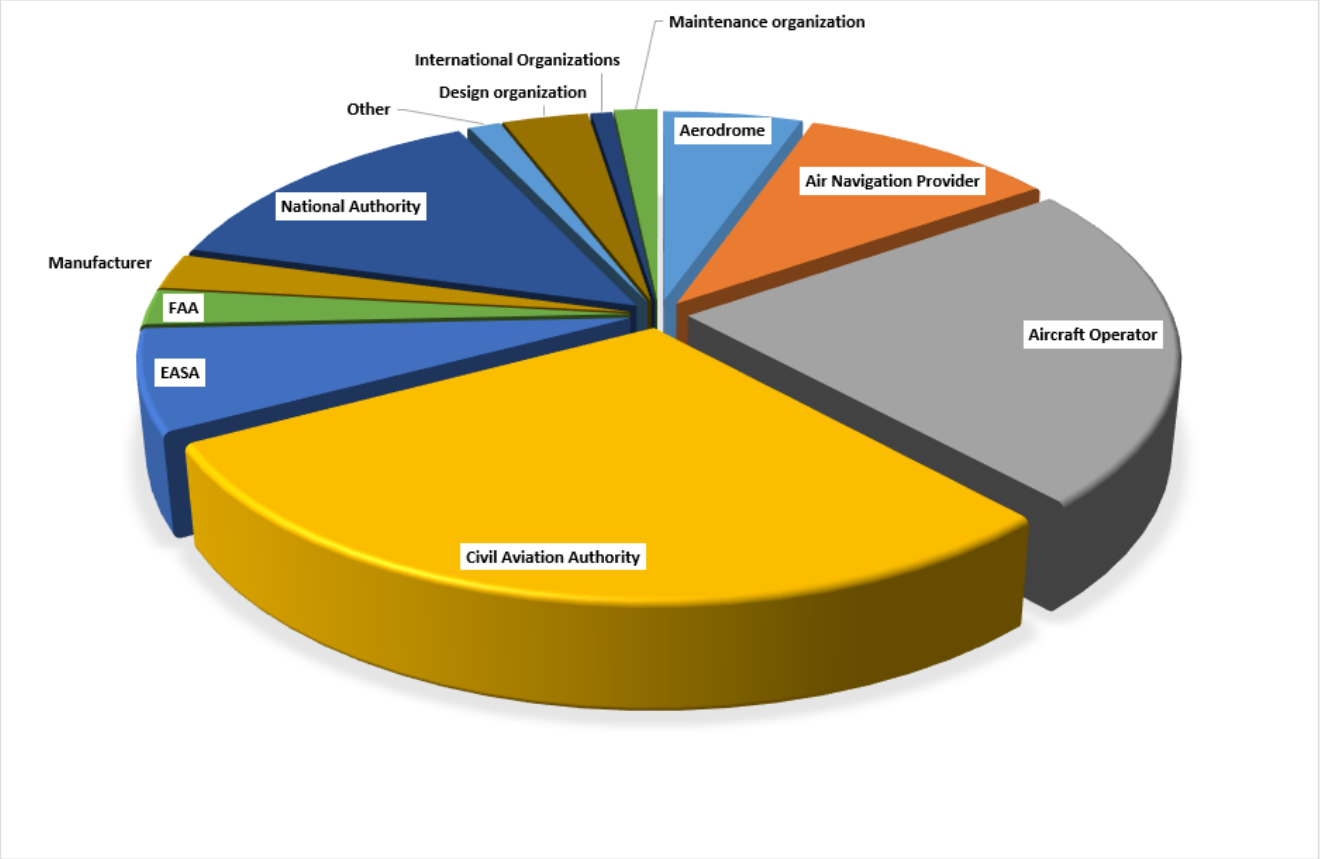

Chart 9. Addressees of Safety Recommendations issued in 2020.

5.6) Safety Recommendations response assessment by SIA

Article 18 of Regulation (EU) No 996/2010 requires addressees to respond within 90 days of receiving a safety recommendation. Within 60 days of the receipt of the reply, the SIA shall inform the addressee whether or not it considers the reply adequate and give justification when it disagrees with the decision to take no action.

Of the 243 safety recommendations issued in 2020, 186 (76%) are still awaiting a response, while only 14 responses are still awaiting the assessment of SIAs. In 2019 the number of responses awaiting the assessment of SIAs was 26 and, in 2018, this number was 35.

A breakdown of the SIA's assessment of responses to safety recommendations issued during 2020 is summarised in Chart 10.

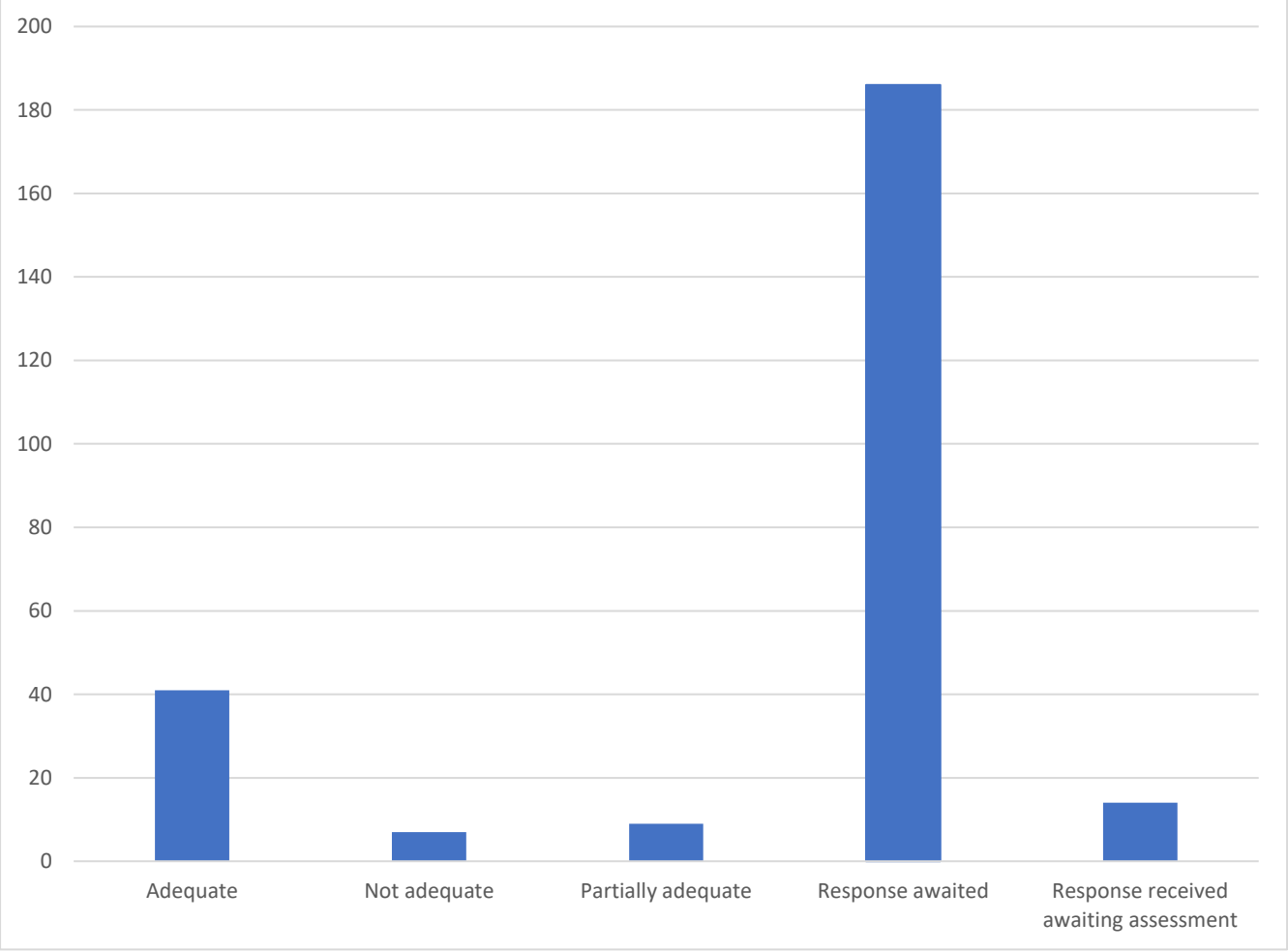

Chart 10. SIA's assessment of responses to safety recommendations issued in 2020

Chart 11 shows the current response assessments for previous years.

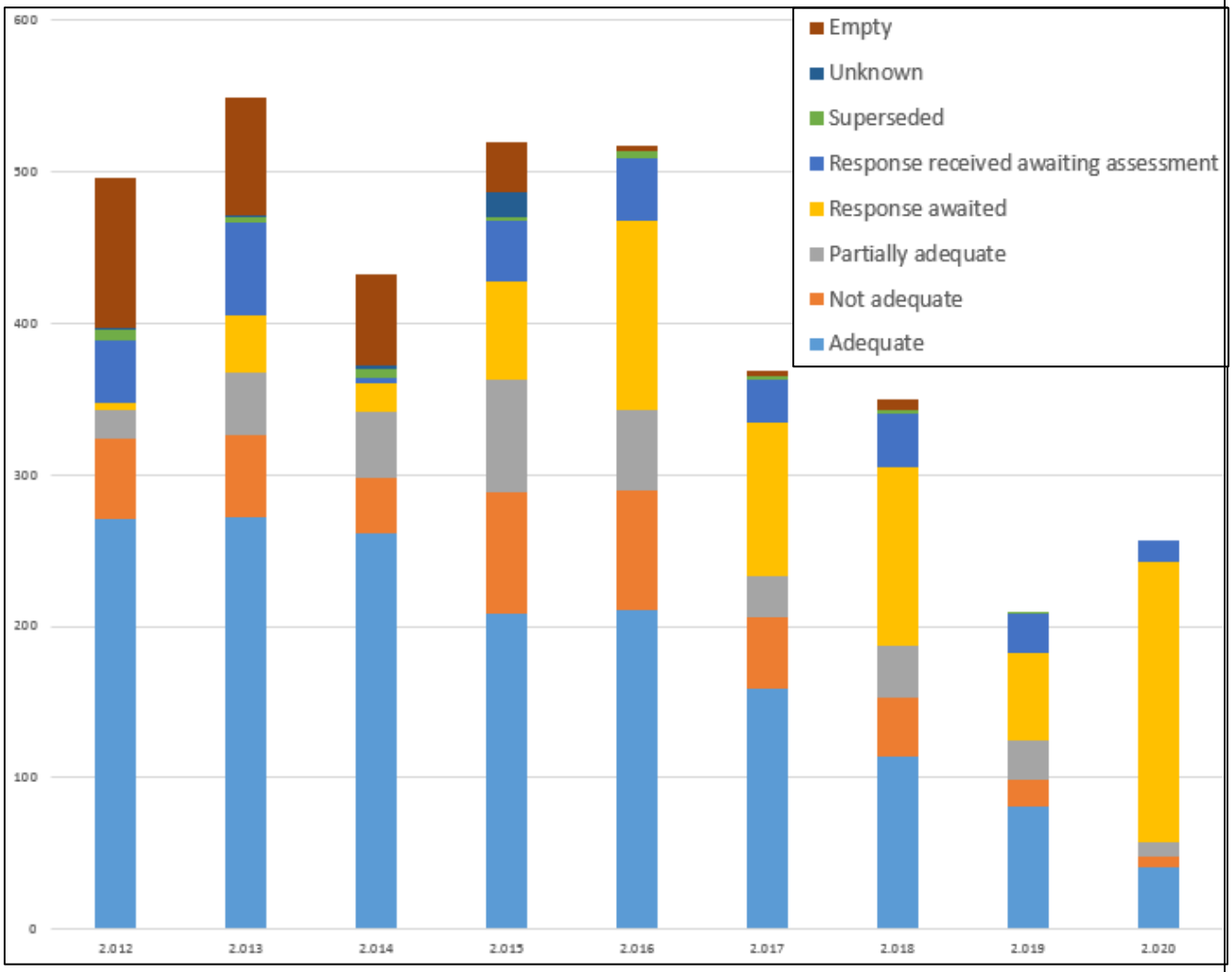

Chart 11. Response assessments for safety recommendations

Of note is the significant percentage of responses with the status of "awaited". WG6 is continuously monitoring the situation and working with the relevant states to understand the reasons for the delay/lack of responses while the delays in originator's assessment observed in the previous years has been reduced in 2020.

5.7) Update on 2019 Safety Recommendations

The ENCASIA Annual Report for 2019 stated that as of 31 December 2019, 140 safety recommendations had been recorded on SRIS for 2019. An additional 67 safety

recommendations for this period were entered during 2020, for a total of 207 safety recommendations recorded on SRIS as having been issued in 2019.

5.8) Safety studies

During 2020, one safety recommendation has been generated from a safety study carried out by AAIU IE on Incorrect Weight and Balance Moment Arm for Pilot and Passenger in Aircraft POH (IRLD2020005).

CONCLUSIONS (THE WAY FORWARD)

ENCASIA has an ambitious work programme for the coming years in particular with the ongoing development of EMSS and with the new cycle of peer reviews. ENCASIA's way forward will be linked to the restoration of mobility and to the speed of the aviation system recovery from the COVID-19 crisis.

The subject of data analysis will remain prominent with the ongoing development of ECCAIRS 2 and the new SRIS database. Although this project has faced delays, it should be completed and gradually become fully operational in 2021.

The organisation of another workshop on safety recommendations with an enlarged participation involving manufacturers will represent an opportunity to further reinforce the process of issuing safety recommendations by notably listening to the views of other addressees concerned by these safety recommendations issued by ENCASIA Members.

At ICAO level, there has been strong emphasis on the concept of Regional Accident and Investigation Organisations (RAIOs). The current ICAO guidance[4] on RAIOs is expected to be reviewed in 2021 and could be updated to include the different concepts of Regional Accident Investigation cooperation (RAI) mechanisms. This approach should encourage more States to cooperate in a pragmatic manner that suits their geographical, cultural, political and/or legal environment. In this area, ENCASIA should share its experience through a number of practical examples of cooperation, although the European Union has a specific and unique system that could be difficult to replicate on a global scale.

Finally, ENCASIA has also begun to review its statutes, with a possible future change of legal personality to cope with the recent changes in the Belgian system of non-profit associations and to become more robust from a financial standpoint.

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[4] Doc 9946, Manual on Regional Accident and Incident Investigation Organization

APPENDICES

Appendix 1: List of 2020 fatal accidents involving commercial activities

Appendix 2: Safety Recommendations of Union-wide Relevance and of Global Concern

Appendix 1: List of 2020 fatal accidents involving commercial activities

The Aviation Safety Network (ASN) database showed that during 2020 there were 8 fatal accidents involving civil aircraft of which the basic model has been certified for carrying 14 or more passengers that resulted in 314 fatalities. Four of these accidents involved cargo flights and 4 were commercial passenger flights.

Eight fatal accidents are the fewest on record for a full year. The safest year in aviation history was 2017 with 10 fatal accidents and 44 lives lost.

The global COVID-19 pandemic had a severe impact on the aviation industry in 2020, causing a significant drop in the number of flights operated, notably passenger flights. Industry studies suggest that worldwide air traffic in 2020 was about half of that in 2019. Just over 19 million flights were operated last year, which is about the same number as were flown in 1999, when ASN registered 43 fatal accidents resulting in 689 fatalities.

#	Date	Location	Aircraft type	Air carrier	No. of fatalities
1	8 January	near Tehran, Iran	Boeing 737-800	Ukraine Int. Airlines	176
2	5 February	Istanbul, Turkey	Boeing 737-800	Pegasus Airlines	2
3	17 March	NW of La Crosse, KS, USA	Cessna 208B Super Cargomaster	Planemasters	1
4	4 May	near Bardale Airstrip, Somalia	Embraer EMB-120RT Brasilia	African Express Airways	6
5	22 May	Karachi, Pakistan	Airbus A320-214	PIA	97
6	7 August	Kozhikode, India	Boeing 737-800	Air India Express	21
7	13 August	near Bukavu, DR Congo	Let L-410	Doren Air Congo	4
8	22 August	near Juba, South Sudan	Antonov An-26B	South West Aviation	7

Table 1. List of 2020 fatal accidents involving commercial activities

Note: Military transport aircraft accidents were not included in the table.

Appendix 2: Safety Recommendations of Union-wide Relevance and of Global Concern

Request for medical certificate.

The BEA (France) opened a safety investigation for the accident that occurred to an AS 350, registered F-HLBT, during a commercial sightseeing flight out of La Baule – Escoublac aerodrome, with the pilot and five passengers.

At the end of the flight the pilot was suddenly hit by vertigo after lowering and then raising his head to observe the ground. He then limited his inputs on the controls to avoid making the situation worse. The path was unstable and random and the helicopter collided flat with the ground, with a high vertical speed, a slow forward speed and a shallow bank angle to the right. Six persons were injured, four of whom seriously, and the helicopter was destroyed.

The investigation revealed that, to request a class 1 or 2 medical certificate, the applicant must complete a form which contains a closed questionnaire in table format with yes or no tick boxes and a small "remarks" section with the indication that it is to be used to give details. This Application Form for a Medical Certificate, imposed by regulation (EU) No 1178/2011 and given in AMC1 ARA.MED.135 (a) thus constitutes a somewhat closed tool for collecting information, oriented by aeromedical areas of interest. The pilot is put in a quite passive and defensive position in having to submit to a questionnaire rather than in an active and responsible position encouraging him to express himself. The applicant for a medical certificate may, like anyone else, ignore his real state of health. He may also hesitate in giving his answers and ensure that he obtains his medical certificate to continue his activities by not declaring any perceived symptom, however small it may be. Certain types of illness such as a cardiac pathology or asthma, for example, can be discovered during a medical examination. Other information, such as a loss of consciousness can only be acquired on the basis of a declaration, being difficult to detect during a medical examination. The Application Form for a Medical Certificate does not allow AeroMedical Examiners (AME) to check the actual substance of the declarations made by an applicant for a certificate or to check for a possible decrease in medical fitness in light of a health event not mentioned on the form.

Consequently, the BEA (France) recommended that*, to encourage pilots to declare in the most exhaustive way possible, the health events that they have experienced, and the knowledge of which might be useful in the assessment of their fitness, EASA modify the Application Form for a Medical Certificate AMC 1 ARA.MED.135 (a):*

- *so that a pilot is invited to declare health events in an explicit manner in the form of free text, and the existence or absence of a new health event since the last visit;*
- *so that the AME can certify that he has taken into consideration the pilot's declarations made in his presence.*

[Safety recommendation: FRAN-2020-014] (SRUR)

Titanium rotor-grade critical parts: Certification, design and quality process. Review and in-service inspection.

On Saturday, 30 September 2017, the Airbus A380-861 operated by Air France, was carrying out scheduled flight AF066 from Paris (France) to Los Angeles (USA). It took off at 09:50. At 13:49, while the crew were changing en-route flight level, they heard an explosion and observed asymmetric thrust from the right side of the aeroplane, immediately followed by severe vibrations. The “ENG 4 STALL” and then the “ENG 4 FAIL” messages nearly simultaneously appeared on the ECAM. The crew diverted to Goose Bay airport (Canada) where they landed at 15:42 without any further incident.

A visual examination of the engine found that the fan, first rotating assembly at the front of the engine, along with the air inlet and fan case had separated in flight leading to slight damage to the surrounding structure of the aircraft.

The investigation conducted by the BEA (France) revealed that, up until the failure of the (GP7270) engine No 4 fan hub, the titanium alloy, Ti-6-4 was not considered sensitive to the cold dwell fatigue phenomenon. Certain alloys such as IMI 685 or Ti-6242 had already shown predispositions to this phenomenon in the 1970s, whereas Ti-6-4 had accumulated significant in-service experience without the occurrence of any incident identified as being linked to this phenomenon.

Sizing

The investigation was able to show that the maximum stress level observed in the fracture zone of the F-HPJE fan hub (slot bottom) was less than 80% of the material’s yield strength. The investigation also brought to light that the failure of the fan hub occurred after a number of cycles that was four times less than the hub’s minimum life. The methods for estimating the pure fatigue life developed by the engine manufacturer and accepted by the FAA, forecast an incipient crack at twenty times the number of cycles of engine No 4, without taking into account the cold dwell fatigue. It was accepted that cold dwell fatigue was not significant at these stress levels.

However, the volume of the test specimens for cold dwell fatigue along with the dwell times applied in tests are not sufficiently representative of an actual part to activate large macro-zones. In fact, to reduce test times, the specimens are subject to shorter dwell times and greater stress compared to actual parts. It is not known what effect these different dwell times and stress levels have on the part’s life. The actual in-service stresses and dwell time seen by the part are significantly different. Lastly, the initiation of a cold dwell fatigue crack generally occurs in a macro-zone. The probability of having an intense macro-zone in a test sample is by nature less than in a larger part. The service life debits obtained by dwell effect during tests on specimens are therefore, at the current time, difficult to transpose to in-service parts. A lack of knowledge of both the activation envelope of the cold dwell fatigue phenomenon on Ti-6-4 and the conditions conducive to the appearance of intense macro-zones meant that a cold dwell fatigue crack was initiated at a stress level lower than that accepted up until now by only taking into consideration pure fatigue, and at a significantly lower number of cycles.

Manufacturing processes

The investigation found that a crack started and then progressed in the subsurface of a slot bottom, in a macro-zone quantified as being one order of magnitude (x10) larger and more intense than the average MTR observed by the manufacturer. Its unusually large size and its orientation, perpendicular to the hoop loads, probably contributed to the initiation of a crack although the stress levels were below 80% of the yield strength.

Cold dwell fatigue cracks are initiated in macro-zones, the presence of which is inherent to the manufacturing process of forged titanium parts. The macro-zones generally appear during the process to convert an ingot into a billet and are then reduced during the subsequent forging process, by means of various successive thermomechanical treatments.

The risk of macro-zones appearing increases with the size of the billets. For small billets, the considerable plastic deformation (strain hardening) during the conversion and forging phases reduces the size and intensity of the macro-zones. Large engines with a high bypass ratio require larger diameter fan hubs to improve effectiveness; these hubs require larger billets. The parts forged from large billets may not benefit from the same deformation levels as those parts which come from smaller billets. This may contribute to the risk of macro-zones of a large size and intensity being present.

Production check

At the present time, it is not possible to detect in a reliable way, the presence of macro zones using non-destructive methods, whatever the stage of the manufacturing process. The EBSD technique characterizes the grain crystallographic orientation and thus reveals a macro-zone, but this is a destructive examination. The suspected zone has to be isolated, removed and prepared by polishing before the examination.

Methods for predicting the presence of macro-zones in finished parts by digital simulation are starting to emerge but are not yet reliable enough. It is currently possible to predict macro-zones in a test sample but transposing this prediction to an actual part is still in progress.

Ultrasonic measurements are carried out during the part manufacturing process in order to principally detect based type anomalies or process induced cracks. To date, the ultrasonic inspection method does not detect macro-zones.

Thus, today, macro-zones may be naturally present in forged critical parts made of Ti-6-4, and are not covered by rejection criteria as no reliable non-destructive detection method exists, and because the current manufacturing processes do not reliably control the risk of them appearing. The tendency to increase the size of engine fans to reduce engine fuel consumption may lead engine designers to try and substantiate higher acceptable stress levels, to limit the weight of these engines. This may lead to an increase in the risk of a cold dwell fatigue incipient crack in a macro-zone. The size criteria during the design phase, for forged critical parts made of Ti-6-4 should thus be adapted to improve the control of the cold dwell fatigue phenomenon, taking into account the risk of macro zones appearing in production, given that these macro-zones may contribute to this phenomenon, and the limits of the macro-zone detection capabilities.

In-service monitoring

The presence of an intense macro-zone in a titanium part, not detected during production, may lead to the initiation of a crack in service. The current non-destructive inspection methods detect subsurface cracks or voids. The initiation of a cold dwell fatigue crack can only be predicted by taking into consideration both the characteristics of the macro-zone (size, position and orientation, intensity) and local loading (stress level, dwell time, temperature). A crack may start in a zone with low stress due to the presence of an intense macro zone or due to the length of dwell time.

The continuing airworthiness of critical parts made of the titanium alloy, Ti-6-4, which undergo a manufacturing process likely to lead to the presence of intense macro zones and for which the risk of failure due to a cold dwell fatigue phenomenon has not been sufficiently taken into account during design, may require the implementation of appropriate means to detect in-service cracks before the failure of the part.

Consequently, the BEA (France), in its final report, recommended that:

- *EASA and the FAA ensure that the design and sizing criteria and methods along with the manufacturing processes and in-production checks of engine rotor-grade critical parts made of α/β titanium alloy, and in particular the titanium alloy Ti-6-4, are such that the risk of failure of these parts due to the cold dwell fatigue phenomenon is controlled. [Recommendation FRAN 2020-006 and FRAN 2020-007] (SRUR/SRGC)*
- *EASA and the FAA carry out a review of engine rotor-grade critical parts made of α/β titanium alloy, and in particular the titanium alloy Ti-6-4, which undergo a manufacturing process likely to lead to the presence of intense macro-zones and for which the risk of failure due to a cold dwell fatigue phenomenon has not been sufficiently taken into account during the certification. EASA and the FAA will subsequently make sure, where appropriate, that an adapted in-service inspection programme is implemented to detect possible incipient cracks which might lead to the failure of the part. [Recommendation FRAN 2020-008 and FRAN 2020-009] (SRUR/SRGC)*

Definition of "spin", "incipient spin", "developed spin".

During a PPL training mission, in which the crew was supposed to perform some spin recognition and avoidance maneuvers, the aircraft entered an uncontrollable spin and crashed on the ground. At the impact, the aircraft caught fire and both the flight instructor and the student pilot were fatally injured.

The analysis of the documentation collected by ANSV during the investigation highlighted that there is–in particular within the EASA Part-FCL and Certification Specification (EASA CS-VLA and CS-23)– a unique technical definition of "*spin*", "*incipient spin*" and "*developed spin*". Above all, the reference to the incipient spin maneuver, as described in the EASA Part-FCL in relation to exercise 11 required for obtaining the PPL (A) license, is not unequivocally reflected in the approved flight manual of the aircraft, where reference is made only to the intentional spin, as otherwise defined in EASA CS-23. This lack of feedback represents a criticality in terms of flight safety, as, in line with the provisions of EU regulation no. 1178/2011 (Part-ORA, ORA.ATO135), flight schools, having to demonstrate to the competent authority

that the aircraft used for the various training maneuvers are suitable, could be mistakenly led to use, in real life, recovery maneuvers for incipient spins, in aircraft not certified to perform intentional spins.

Consequently, the ANSV (Italy), in its initial report, recommended EASA to:

- *Take appropriate initiatives to define, in a clear, complete and unambiguous way, what is technically meant by "spin", "incipient spin" and "developed spin", similar to what the FAA has done, in order to not create confusion and allow flight schools to use the aircraft only for the exercises and maneuvers for which they have been certified. [Recommendation ANSV-1/0092-20/1/A/20] (SRUR/SRGC)*

Modification to EASA Part-FCL related to the «stalling and recovery at the incipient spin stage (stall with excessive wing drop, about 45°).

The above investigation has also highlighted that, in the EASA Part-FCL regulation, only for some exercises provided for in the training syllabus is expressly specified "*if a suitable aircraft is available*". In particular, for the "*spin prevention*" exercises, where it is required to "*stall and recover to the incipient spin phase (stall with excessive wing drop equal to about 45°)*", it is not specified that the maneuver can be carried out using recovery from an incipient spin only if there is the availability of a suitable aircraft.

This lack, associated with the impossibility of finding a clear and unambiguous definition of incipient spin in the EASA legislation, ends up by mistakenly directing flight schools to use any aircraft to carry out the recovery maneuver from incipient spins, including aircraft not certified for intentional spins. Furthermore, in line with the provisions of EU regulation no. 1178/2011, flight schools, having to demonstrate to the competent authority that the aircraft used for the required training maneuvers, including ""spin recognition and avoidance"" maneuvers and the ""stalling and recovery at the incipient spin stage"", are suitable , can be mistakenly led to use, in recovery maneuvers from incipient spin, aircraft not certified for carrying out intentional spins. The incipient spin, in fact, as defined by the FAA, is one of the stages of the spin and therefore turns out to be a spin itself; as such, it must only be carried out with suitable aircraft, i.e. certified for intentional spinning.

Consequently, the ANSV (Italy), in its initial report, recommended EASA to:

take appropriate steps to add to EASA Part-FCL, in correspondence with all exercises that envisage "stalling and recovering from the incipient spin phase (stall with excessive wing drop equal to about 45°)" , the phrase "if a suitable aircraft is available", as already reported for the other spin training maneuvers, in order not to create confusion and to allow flight schools to correctly use the aircraft only for exercises and maneuvers for which ones have been certified.

[Recommendation ANSV-2/0092-20/2/A/20] (SRUR/SRGC)

Introduce a warning system that clearly indicates that the battery is not being charged by the alternators.

The SHK (Sweden) opened a safety investigation for an accident which occurred at Malmo Airport on 17 November 2019 involving the aircraft SE-LUX of the type Beechcraft 95.

After about 16 minutes of flying, radar vectors were initiated for practicing an instrument approach to RWY 17. At the same time the aircraft lost all electrical power, which caused all installed navigation equipment, radio communication with air traffic control and intercommunication to cease functioning. It was dark outside under visual flight conditions.

At touch down the landing gear collapsed. The plane landed on its belly and skidded over 300 meters before stopping.

It has not been possible to determine the reason why the loss of electrical power occurred.

Among the contributing factors highlighted in the final report, was the lack of a warning system that clearly indicated that the battery is not being charged by the alternators.

Consequently, the SHK (Sweden) recommended EASA to:

- *Evaluate and decide whether a warning system that clearly indicates that the battery is not being charged by the alternators can be introduced as an operational requirement for aircraft operated under instrument flight rules or in darkness. [Recommendation RL 2020:11 R1] (SRUR)*

Introduce a formal training programme for pilots in parachute operations and review the approval procedures of mass and balance documentation when certifying aircraft approved for parachute operations.

The SHK (Sweden) opened a safety investigation for the accident occurred at Storsandskär, Västerbotten County, on 14 July 2019 involving the aeroplane SE-MES of the model GA8-TC 320, in conjunction with parachuting activities at Umeå Parachute Club.

Just over a kilometre from the airport where the jump point was located, the aeroplane suddenly changed direction to the left and began descending rapidly in almost the opposite direction. The aeroplane then travelled just under one kilometre at the same time as it descended 1,500 metres, which is a dive angle of over 45 degrees.

The aeroplane broke up in the air as both the airspeed and the g-forces exceeded the permitted values for the aeroplane. From an altitude of 2,000 metres, the aeroplane fell almost vertically with a descent velocity of around 60 m/s. All those on board remained in the aeroplane and died immediately upon impact.

It is SHK's understanding that the lack of formal training, absence of a system for determining the centre of gravity and lack of support for flight operations have been decisive factors in terms of how the flight developed into an accident.

Consequently, the SHK (Sweden) recommended EASA to:

- *Consider introducing a formal training programme for pilots in parachute operations. (See section 2.7 of final report). [Recommendation RL 2020:08 R1] (SRUR)*

- *Review the approval procedures of mass and balance documentation when certifying aircraft approved for parachute operations. (See section 2.6.3 of final report). [Recommendation RL 2020:08 R2] (SRUR)*

Require retroactive application of the current improvements in fuel tank crash resistance in rotorcrafts.

On September 5, 2019, a Eurocopter AS350 B2 helicopter, registered CS HFT, during a wild firefighting operations at Sobrado, in the Valongo municipality, suffered a collision against high voltage powerlines with the suspended bucket and the aircraft rotor, leading to the loss of control and crashing.

The investigation into the accident facts revealed, among other findings, the need to adopt, in rotary wing aircraft, available technical solutions that would increase the probability of occupants' survival in case of collision with the ground.

Consequently, the GPIAA (Portugal) recommended that EASA:

- *follow its Rotorcraft Safety Roadmap publication principles, producing rulemaking documentation requiring retroactive application of the current improvements in fuel tank crash resistance for rotorcraft certified before the new certification specification for type design entered into force. Helicopters used for Commercial Operations shall be subject to this additional airworthiness requirement for operations. [PT.SIA 2020-016] (SRUR/SRGC)*

Require piston aircraft to have carbon monoxide detector with active warning.

The Air Accidents Investigation Branch (AAIB) became aware on 21 January 2019 at 21.22' hrs that the aircraft Piper PA-46-310P Malibu, registration marks N264DB, had gone missing at approximately 20.16' hrs. The wreckage was located on 3 February 2019 on the seabed approximately 22 nm north-north-west of Guernsey, within 100 m of the last secondary radar point recorded by the radar at Guernsey and at a depth of 68 m. There was one body present in the wreckage, which was recovered. The body was subsequently identified as that of the passenger.

The investigation determined that the pilot lost control of the aircraft during a manually-flown turn, which was probably initiated to remain in or regain Visual Meteorological Conditions. The aircraft subsequently suffered an in-flight break-up while maneuvering at an airspeed significantly in excess of its design maneuvering speed. The pilot was probably affected by carbon monoxide poisoning.

N264DB was not fitted with a CO detector with an active warning which might have alerted the pilot to the presence of CO in time for him to take measures to reduce the risk to himself and his passenger. Although regulators encourage the use of carbon monoxide detectors, they do not require their carriage in General Aviation aircraft. Many pilots still do not appear to understand the hazard and risk and, at best, only carry a strip or spot detector, which does not have an active warning to gain the attention of the pilot.

Regulators rely on two main barriers to control the risk posed by a leak of carbon monoxide: initial design, and regular in-service inspections. Some manufacturers have chosen to fit detectors to new aircraft, but it is not a requirement, and this will not address the large fleet of ageing piston aircraft. There is considerable evidence that regular inspections are not entirely effective as a barrier because cracks can occur between inspections; periodic inspections can help reduce risk but will not catch all events.

Even the minor effects of CO poisoning can have a fatal consequence when operating an aircraft. As the existing two barriers to prevent CO poisoning (design and inspections) are not always effective, there is a need for a third barrier to alert pilots to the presence of CO in the cabin in time to take effective action.

Consequently, the AAIB (UK) recommended that:

- *the Federal Aviation Administration require piston engine aircraft which may have a risk of carbon monoxide poisoning to have a CO detector with an active warning to alert pilots to the presence of elevated levels of carbon monoxide. [Recommendation GB.SIA-2020-0006] (SRUR/SRGC)*
- *the European Union Aviation Safety Agency require piston engine aircraft which may have a risk of carbon monoxide poisoning to have a CO detector with an active warning to alert pilots to the presence of elevated levels of carbon monoxide. [Recommendation GB.SIA-2020-0007] (SRUR/SRGC)*
- *the Civil Aviation Authority require piston engine aircraft which may have a risk of carbon monoxide poisoning to have a CO detector with an active warning to alert pilots to the presence of elevated levels of carbon monoxide. [Recommendation GB.SIA-2020-0008] (SRUR/SRGC)*

Prevention of unintentional use of adjacent rudder pedals - EV97.

The SIA (Finland) opened an investigation for an ultra-light aircraft accident that occurred in the Tampere-Pirkkala airport on 31 July 2019.

The Safety Investigation Authority issued a safety recommendation to the Light Aircraft Association of the Czech Republic (LAACR) due to the accident risk identified during the investigation:

- *The LAA ČR to issue a mandatory service bulletin for the installation of a barrier between the pedal assemblies of Evektor-Aerotechnik EV-97 aircraft. The modification would prevent the pilot from operating the adjacent pedal assembly. [Recommendation L2019-05 [2019-S50]] (SRUR)*

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