



EUROPEAN PLAN FOR **AVIATION SAFETY**

(EPAS) 2023-2025

VOLUME I

Strategic priorities



Foreword by the Executive Director

Welcome to the new, revamped European Plan for Aviation Safety! We have adjusted the plan this year to be more targeted, by focusing on a shorter three-year time-period and setting clear priorities for that time. The aim is to create a greater stability over this three-year period thereby allowing for greater focus and faster, smoother implementation.

Such stability was needed by our stakeholders after the turbulence created for aviation by external shocks, the most visible of which were the COVID-19 pandemic and the Russian invasion of Ukraine.

The aspirational goal of the EPAS remains unchanged:

maintain collectively the pre-pandemic high aviation safety level throughout the recovery phase and improve safety post-recovery'

We are also maintaining the goal for the EASA Member States to demonstrate effective State Safety Plans (SSPs) by 2025. This is three years ahead of the deadline set by the Global Aviation Safety Plan – and for good reason. Europe strives to champion the efforts of States to increase safety.

This EPAS is published at a time when the industry is in a period of rapid change, driven by the compelling need to become more sustainable. Sustainability is no longer a “nice to have” but a business imperative. There are some clear links between safety and sustainability – and a great many less visible factors that require our attention as the industry collectively seeks to become greener and to counter the impacts of climate change.

A plan with the breadth of the EPAS is instrumental in ensuring an integrated approach of planning and programming so that sustainability solutions will not come at the expense of safety.

While actions may be triggered by a driver other than safety – such as efficiency/proportionality, level playing field or environmental protection – their primary objective is to ensure that the intended changes in the aviation system will not adversely impact aviation safety. It is essential that we manage these interdependencies.

The crises of recent years have highlighted the importance of resilience within the system to mitigate external and internal shocks. Competence of personnel is an important enabler for resilience and is therefore assigned an elevated priority ranking within the EPAS strategic priorities for 2023-2025.

Safety is always a collective task – requiring focus and attention from all actors in the aviation community to stay ahead of the game and maintain the strong safety reputation of our industry. EASA commits, once again with this EPAS, to work with all parties to do everything possible to maintain and improve our joint safety record.

Patrick Ky



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Acronyms and Definitions

A list of EPAS acronyms & definitions is available here:

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

1. Executive Summary



1. EXECUTIVE SUMMARY

The EU aviation system has been emerging from the pandemic without having lowered its high safety record. To a large extent, this could be achieved owing to the established risk management capabilities at regional, State and industry level, including the ability to activate mechanisms for crisis coordination and emergency response quickly and effectively. Whether COVID-19-related safety issues resulted from a specific problem faced by one domain or from systemic or human factors' issues affecting all aviation personnel, the crisis demonstrated that it is vital to get all actors focus on the goal of delivering safe operations throughout the entire recovery phase and beyond. While the aviation industry is still recovering from the COVID-19 crisis, it is now also exposed to significant disruptions and economic consequences of the military invasion by the Russian Federation into the territory of Ukraine.

Accordingly, the overall strategic theme for the new EPAS reference period is to **foster a safe, secure, sustainable and resilient aviation system, capable of coping with disruptive events of any type**. This will be achieved by building on the lessons learned from COVID-19 as well as from major accidents, fostering safety management implementation at State and industry level, as well as promoting the establishment of an emergency/crisis management function as part of the State Safety Programmes (SSPs) and SMS.

For this new reference period EASA conducted a comprehensive review of Volume I. This review was performed in cooperation with the Member State Advisory Body (MAB) and the Stakeholder Advisory Body (SAB), in consideration of the new operational context. Information on the operational context and the economic outlook is included in Section 2.2., which also provides sector specific information and relevant standardisation data.

Main changes

The EPAS reference period is reduced to 3 years. The strategic priorities and objectives are to remain stable throughout the reference period. Considering the current uncertainties and highly volatile economic and geopolitical context affecting the aviation industry, an intermediate review may be performed as deemed necessary. EPAS Volume II with all actions and Volume III providing the safety risk portfolios will continue to be reviewed and updated annually, in line with the established action planning and safety risk management cycles, thereby ensuring compliance with the EASA Basic Regulation.

Within 'systemic safety & resilience', the strategic priority 'integrated risk management' is further substantiated by addressing a broader set of risks that have the potential to adversely impact aviation safety. This strategic priority now labelled '**manage risk interdependencies**' aims at fostering capabilities to effectively identify and manage interdependent risks, by allowing better visibility on and enhancing the understanding of such risks to define the most effective strategy to cope with those interdependencies. Within this priority two new strategic goals are included: 'manage the impact of climate change on aviation safety' and 'manage the balance between aviation safety and other societal needs'.

'**Competence of personnel**' is elevated to become a stand-alone strategic priority, as an important enabler of systemic safety & resilience through the implementation of competency-based training assessments (CBTAs) across domains and the promotion of a more evidence-based, data-driven approach to aviation training and examination. Moreover, the scope of strategic priorities within 'operational safety', currently addressing CAT & NCC, Rotorcraft and General Aviation, is extended to address key risks in all domains for which a safety risk portfolio (SRP) is or will soon be available. This will ensure a closer link between key risk areas (KRAs)¹, safety issues and strategic priorities.

Other new priorities are included, such as removing obstacles for a well-functioning single market, ensuring proportionate rules for 'business aviation' (CAT/NCC boundary), and ensuring the safe integration of new business models in air operations.

Building on the lessons learned from the Boeing 737 Max and similar accidents, a new strategic goal is included with the operational safety priorities to improve the safety assessment of human factors in aircraft certification.

1 Key risk areas (KRAs) are the feared accident outcomes the European aviation system should strive to avert.

1. EXECUTIVE SUMMARY

ATM priorities include the creation of a system-based licensing system for ATCOs and the preparation for SES2+. Important EPAS deliverables for 2023 will be the Opinions on ‘Conformity assessment (RMT.0161) to create a certification system for ATM/ANS ground-based equipment, and for the implementation (RMT.0682) of the regulatory needs in support of the SESAR deployment respectively.

Strategic priorities in the area of **emerging technologies and concepts** are confirmed and further developed with 10 distinct items now addressed, ranging from artificial intelligence, novel air mobility and propulsion solutions, to unmanned aircraft systems (UAS). Work is ongoing in all those domains to ensure their safe and sustainable integration into the aviation system, however not all of those priorities will lead to new EPAS actions initiated in 2023.

Strategic priorities for **environmental protection** are maintained to support the implementation of the European Green Deal which sets an ambitious goal for the EU to be climate neutral by 2050. This is reflected in the European aviation initiative ‘Destination 2050 – A Route to Net Zero European Aviation’². The pandemic and its drastic reduction in operations acted as a catalyst, leading to a significant push for a more sustainable aviation system, be it in the context of State aids and public relief packages for the aviation sector, the expectations of the travelling public or from industry itself. Coming under pressure from all those angles, industry is anticipating or accelerating their plans to adopt more sustainable solutions. The EPAS will continue to be instrumental in ensuring an integrated approach of planning and programming so that such solutions will not come at the expense of safety.

2 <https://www.destination2050.eu/>

2. Introduction



2. INTRODUCTION

2.1 General

Regional aviation safety planning

The EPAS constitutes the regional aviation safety plan (RASP) for EASA Member States, setting out the strategic priorities, main risks affecting the European aviation system, and the necessary actions to mitigate those risks to further improve aviation safety. The main objective of the EPAS is to further improve aviation safety and the environmental performance of the aviation system throughout Europe, while ensuring a level playing field, as well as fostering efficiency and proportionality in regulatory processes. Accordingly, while EPAS actions may be triggered by an EPAS driver other than safety, namely efficiency/proportionality, level playing field or environmental protection, the primary objective of any such action is to ensure that the intended changes in the aviation system do not adversely impact aviation safety.

The EPAS is a key component of the safety management system (SMS) at European level as outlined in the European Aviation Safety Programme (EASP)³. The EASP is managed by the European Commission and describes the integrated set of regulations at Union level, the relationship between the various plans and programmes, as well as the activities and processes used to jointly manage the safety of civil aviation at European level.

In addition to being developed in accordance with the processes, roles and responsibilities described in the EASP, the EPAS is consistent with the ICAO global plans in the area of aviation safety and air navigation and the European ATM Master Plan (MP).

The European Commission and EASA work in partnership with the ICAO Regional Office for the Europe (EUR) region to provide a RASP for the entire ICAO EUR region, leveraging on the processes established for the EPAS. The regional approach complements national approaches offering a more efficient means of discharging State obligations for safety management in the EU/EUR aviation system.

Regulation (EU) 2018/1139 (the EASA ‘Basic Regulation’)⁴ includes a dedicated chapter on aviation safety management, thereby creating a strong legal basis not only for the EASP and the EPAS, but also for the establishment and maintenance of the SSPs and State Plans for Aviation Safety (SPAS) at Member State level. Basic Regulation Article 8 requires EASA Member States to develop a SPAS which shall consider relevant risks and actions defined in the EPAS, and to provide justification where such risks and actions are deemed not relevant within their SSP. EPAS Volume III, introduced with the EPAS 2021-2025, provides visibility to key safety risks and underlying safety issues affecting the European aviation system as a whole and thereby supports safety management at regional, State and industry level. Within Volume III, KRAs and safety issues are described and prioritised for the various aviation domains, constituting domain SRPs.

3 [EUR-Lex - 52022DC0529 - EN - EUR-Lex \(europa.eu\)](#)

4 <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1139&from=EN>

2. INTRODUCTION

EPAS development

The EPAS is developed in close cooperation with aviation stakeholders, represented in the EASA Advisory Bodies (ABs), and with the support of various working groups. Strategic priorities and objectives are discussed with the Stakeholder Advisory Body (SAB) and the Member State Advisory Body (MAB), EPAS Volume II is consulted with all EASA Advisory Bodies. The SRPs in Volume III are established and maintained with the support of domain Collaborative Analysis Groups (CAGs).

Additional information on the various groups and bodies supporting EPAS development and implementation is available here: [Working groups and Bodies having a role in EPAS](#)

Further details on the EPAS development, including on how EC Better Regulation principles are applied in its development, can be found here: [How the EPAS is developed](#).

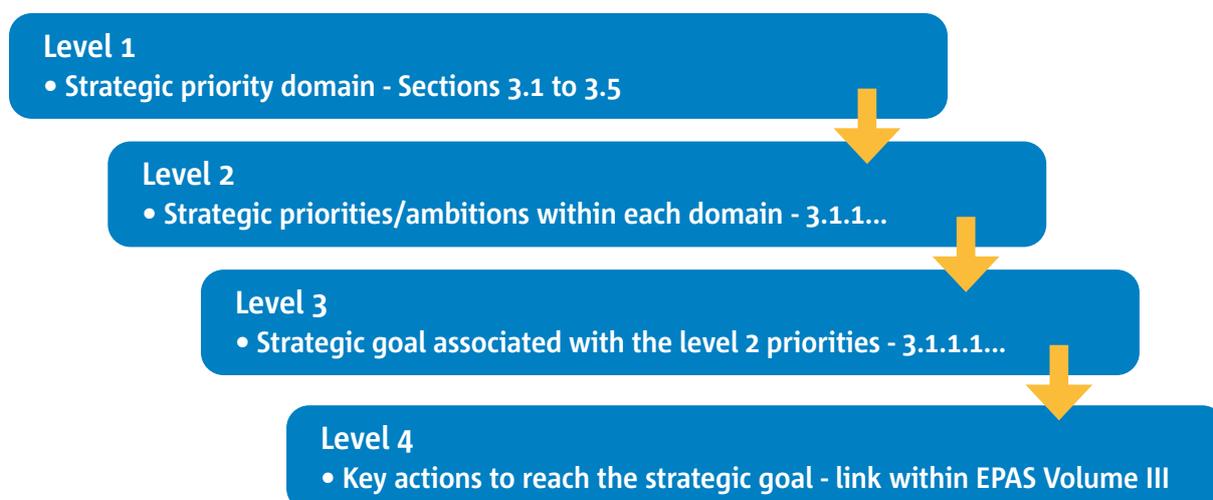
EPAS structure and reference period

The EPAS comprises three distinct volumes, each with its own page and chapter numbering:

- **Volume I** provides the executive summary, the introduction, information on the operational context and sets out the strategic priorities.
- **Volume II** contains the detailed list and description of all EPAS actions.
- Information on the different types of actions is provided in a dedicated supporting document, available here: [EPAS action types and templates](#).
- **Volume III** provides the overview of the main safety risks affecting the European aviation system and underlying safety issues, in the form of domain SRPs.

The EPAS covers a 3-year time frame (EPAS ‘reference period’). Starting with 2022 a 3-year review frequency is adopted for Volume I. An intermediate review may be performed within this reference period as deemed necessary. In line with Article 6(1) of the Basic Regulation, Volumes II and III, continue to be reviewed and updated on a yearly basis.

EPAS strategic priorities in Chapter 3 are structured as follows:



The 2022 EPAS planning cycle led to the publication of the EPAS 2023-2025 Edition of Volume I together with the EPAS 2023 Edition of Volumes II and III. The subsequent annual planning cycles will result in the publication of the ‘EPAS 2024 edition’ and the ‘EPAS 2025 edition’ of Volumes II and III respectively.



2. INTRODUCTION

EPAS monitoring

[Section 4.1](#) outlines how safety performance is monitored against EPAS strategic priorities and the high-level safety objective set out in the Basic Regulation to ‘establish and maintain a high uniform level of civil aviation safety in the Union’. Operational safety priorities are monitored as part of the EASA Annual Safety Review (ASR) process. The efficiency of actions included in the EPAS in relation to environmental protection are monitored as part of the European Aviation Environmental Report (EAER - refer to [Section 4.2](#)).

Safety management, including safety action planning at State level and oversight, is monitored as part of the EASA standardisation programme, now encompassing dedicated SSP implementation assessments. States are encouraged to use their SPAS to report on action implementation and provide justification where EPAS risks and actions are not considered⁵.

⁵ In line with Basic Regulation Articles 6 and 8, States are required to review their SPAS at least annually and where their SPAS is not updated annually, to maintain records of the annual review as well as of the implementation of relevant EPAS actions, including justification where such actions are not considered relevant.

2. INTRODUCTION

2.2 Operational context

2.2.1 Introduction

With the COVID-19 pandemic which had a dramatic impact on the world population and global economy in 2020 and 2021, hitting particularly hard some industry sectors such as aviation, there are increasing global threats such as, climate change, the sudden rise of inflation and the increasing public financial debt.

Other significant events, in particular the Russian invasion of Ukraine, have imposed operational strains due to the resultant air space closures and the impact of the sanctions against Russia. Their broader macroeconomic impact, including supply chain issues, commodities' shortages and inflation, is also taking its toll on the industry. At the same time, the industry needs to reinvent itself to meet the societal demand for a more environmentally friendly aviation.

Considering more generally the ever-increasing level of uncertainty any trend estimates beyond 2022 must be interpreted with extreme caution.

2.2.2 Operational context — General

2.2.2.1 The macro-economic perspective

The following macro-economic indicators reflect the downward trend of the GDP growth in 2022 after a recovery in 2021⁶ and a significant upward trend of the inflation rate compared to 2021.

	2020	2021	2022	2023
Gross Domestic Product (GDP) annual rate				
Worldwide ⁷	-3.1 %	+6.0 %	+3.2 %	+2.7 %
EU ⁸	-5.7 %	+5.4 %	+3.3 %	+0.3%
Annual inflation rate⁹				
Worldwide	+3.2 %	+4.7 %	+8.8 %	+6.5 %
EU	+0.7 %	+2.6 %	+9.3 %	+7.0 %
Annual unemployment rate				
Worldwide ¹⁰	+8.9 %	+8.3 %	+7.5 %	+7.2 %
EU ¹¹	+7.2 %	+7.7 %	+6.8 %	+7.2 %

► Table 1: Operational context - macro-economic indicators

6 These estimates per groups of countries represent averages: they do not indicate the wide diversity of the different country situations within these groups.

7 IMF, 2022: <https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022>
<https://www.imf.org/-/media/Files/Publications/WEO/2022/Update/July/English/text-en.ashx>

8 EC Autumn 2022 forecasts: https://economy-finance.ec.europa.eu/economic-forecast-and-surveys/economic-forecasts/autumn-2022-economic-forecast-eu-economy-turning-point_en

9 Same sources as for the GDP.

10 <https://www.imf.org/en/Publications/WEO/Issues/2022/07/26/world-economic-outlook-update-july-2022>

11 See footnote above on EC Autumn 2022 forecasts.

2. INTRODUCTION

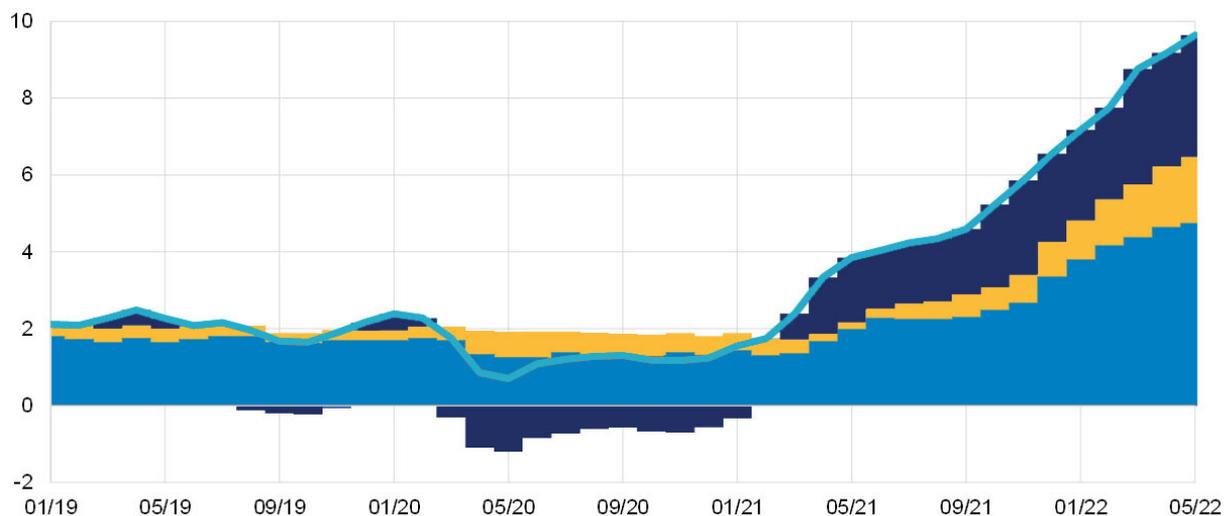
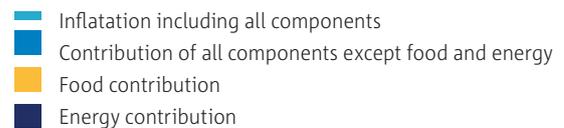
For several months now headwinds to economic growth have intensified: the rising inflation was already noticeable in the increase in energy and food prices, and due to disruptions in global supply chains — three factors significantly compounded by the war in Ukraine. Consequently, the purchasing power of households is being eroded, calling for monetary policy intervention. The increase of energy costs influenced the prices of goods and services, and this increase is expected to last for a longer period.

The following graph, taken from the ECB Economic Bulletin Issue 5 (2022)¹², provides an overview of the weight of the different contributors to the consumer price inflation in the Organisation for Economic Co-operation and Development (OECD) countries.

OECD consumer price inflation

(year-on-year percentage changes; percentage point contributors)

Sources: OECD, Haver Analytics and ECB calculations.
Note: The latest observations are for May 2022.



► Figure 1: Operational context - OECD consumer price inflation – May 2022

Regarding the job market in the EU¹³, it remained resilient in the first half of 2022. However, the three factors quoted above are expected to weaken the economic activity and as a consequence the ‘employment growth is projected to be lower during the second half of 2022, given lower labour demand in the wake of supply bottlenecks, high inflation, and heightened uncertainty’.

¹² <https://www.ecb.europa.eu/pub/economic-bulletin/html/eb202205.en.html>

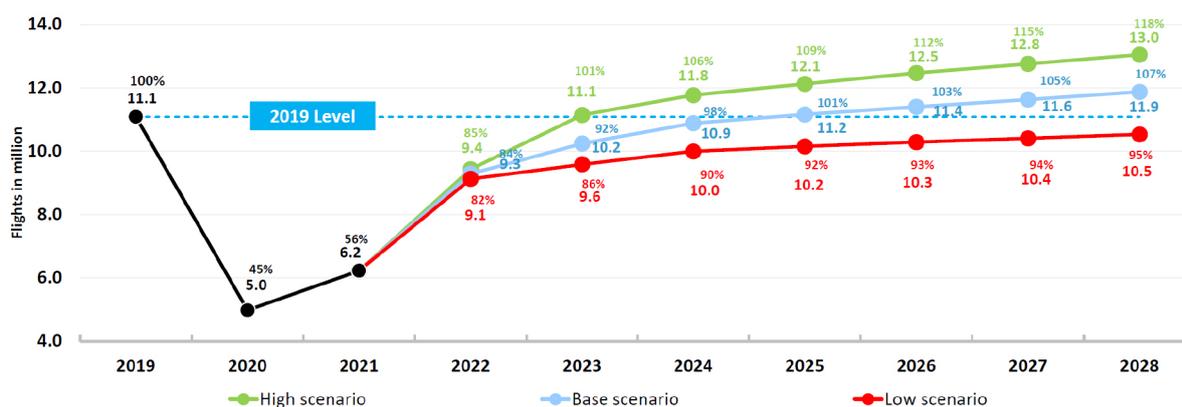
¹³ https://www.ecb.europa.eu/pub/projections/html/ecb.projections202209_ecbstaff~3eafaaee1a.en.html

2. INTRODUCTION

2.2.2.2 The aviation perspective

The summary on the aviation perspective is based on information from IATA¹⁴ and EUROCONTROL¹⁵.

IATA foresees that despite the current socio-economic challenges, the aviation industry will strongly recover, and the recovery is forecast to continue through 2022 and beyond. It is expected that pre-pandemic (2019) performance in terms of revenue passenger kilometres (RPK) will be achieved by 2024; this expectation is shared by EUROCONTROL in its base scenario as regards the 2022-2024 forecast with actual and future IFR movements, % traffic compared to 2019.



Note: * Europe = ECAC 44 Member States

► Figure 2: Operational context - EUROCONTROL STATFOR 7-year forecast for Europe* 2022-2028 (October 2022)

After decoupling during the pandemic the increase in traffic demand may revert back to being closely related to the GDP growth once the pandemic is over. The recovery has been supported up to now mostly by leisure travel, including vacations and visiting friends and relatives. Business travel provided by airlines is recovering at a lower pace. Online meetings and homeworking are societal trends reinforced by the pandemic. For a certain category of airline business travellers, business jets are now a more affordable and reasonable choice because of recently improved utilisation of seat capacity, faster check-in and security checks as well as reduced need for connections in crowded terminals and point to point connectivity resulting, among others, in time savings. According to EUROCONTROL, the flights of the market segment “Business Aviation” increased by 12% in October 2022 versus 2019¹⁶.

Following the significant workforce decrease in 2020, the industry is trying to increase its staffing levels, albeit pre-pandemic levels have not been reached yet because recruitment and training take time. Staff shortage has been a constraint on the effort to meet the increased demand for air travel.

On the working methods, some of the solutions implemented in the aviation sector during the pandemic have proven to be usable and efficient to remain in place in parallel to the traditional approach. This applies particularly to the use of distance learning and remote auditing techniques for compliance verification, not only within the approved organisations but also for competent authorities.

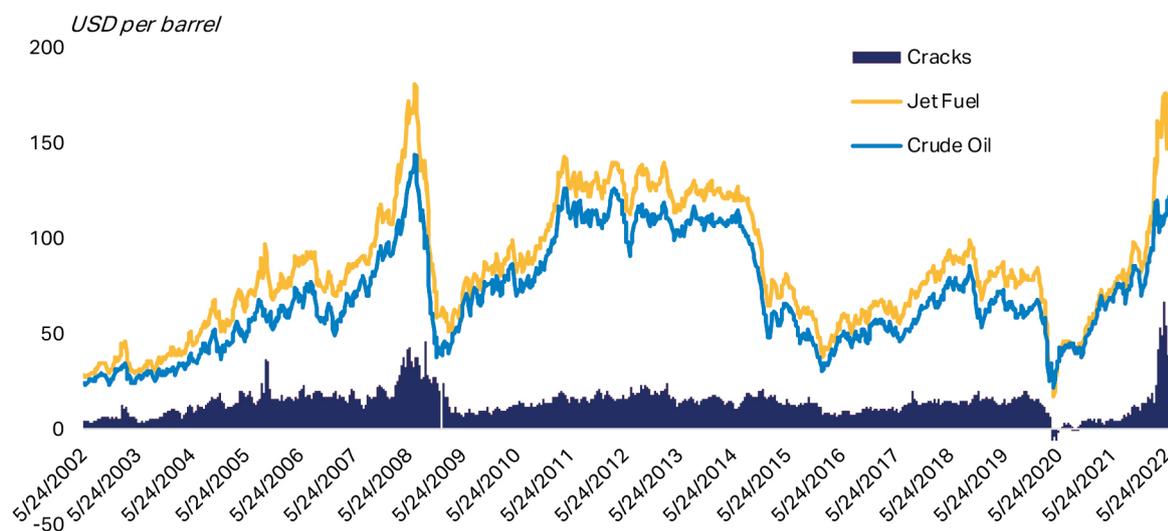
14 IATA: Global Outlook for Air Transport — Times of Turbulence. June 2022. Available at <https://www.iata.org/en/iata-repository/publications/economic-reports/airline-industry-economic-performance---june-2022---report/>.

15 EUROCONTROL: <https://www.eurocontrol.int/publication/eurocontrol-forecast-update-2022-2028?fbclid=IwAR1HkdLXa0JEZi7MVX6kvt50jjiQqoekki6SH2hKnKmO18EeND12e7i7xo>.

16 <https://www.eurocontrol.int/sites/default/files/2022-10/eurocontrol-comprehensive-air-traffic-assessment-20221027.pdf>

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Fuel is one of the main operating costs for airlines. In the course of 2021 fuel prices had increased significantly, followed by a further surge in the first half of 2022, in the aftermath of Russia's invasion of Ukraine. However, the oil price trend changed for a declining path. While it is difficult to forecast the oil price trend, the market expects the oil price to continue trending down until at least next year¹⁷.



Source: IATA Economics using data from Platts.

► Figure 3: Operational context – Evolution of Jet Fuel and Oil Prices since 2002 (source IATA)

Increasing energy, food and ticket prices have so far had only a limited negative impact on air travel after travel restrictions were lifted thanks to COVID-19 vaccination campaigns. However, higher inflation, greater geopolitical and economic uncertainty, and the volatility of crude oil and jet fuel prices from the second half of 2022 onwards may negatively impact the aviation sector.

As a direct consequence of the war in Ukraine, airspace is partially closed within Europe and between Europe and Asia. The uncertainty as to when these closures may be lifted remains high.

2.2.3 Operational context per aviation domain

2.2.3.1 Commercial air transport (CAT) — Aeroplanes

Similar to the recovery of the industry in the summer of 2021, the summer of 2022 was as challenging. This situation will probably continue over the reference period (2023-2025).

The pandemic forced airlines and other aviation stakeholders to reorganise, cut costs, reduce their workforce due to lower activity levels, and change their business models, networks and rostering practices. The rapid recovery of air travel in the summer of 2022 put an extreme pressure on all industry actors, and primarily the airlines, leading to the increased use of wet-leased aircraft.

While airlines must ensure they employ properly qualified and sufficient flight and cabin crews for their operations, the industry is looking to hire additional staff to cope with the current recovery and future increase in air travel. Despite the fact that the aviation industry remains attractive in terms of employment, aviation jobs are today more in competition with job offers from other economic sectors compared to the pre-COVID situation.

17 <https://www.iata.org/en/iata-repository/publications/economic-reports/soaring-jet-fuel-prices-now-trending-downward/>

2. INTRODUCTION

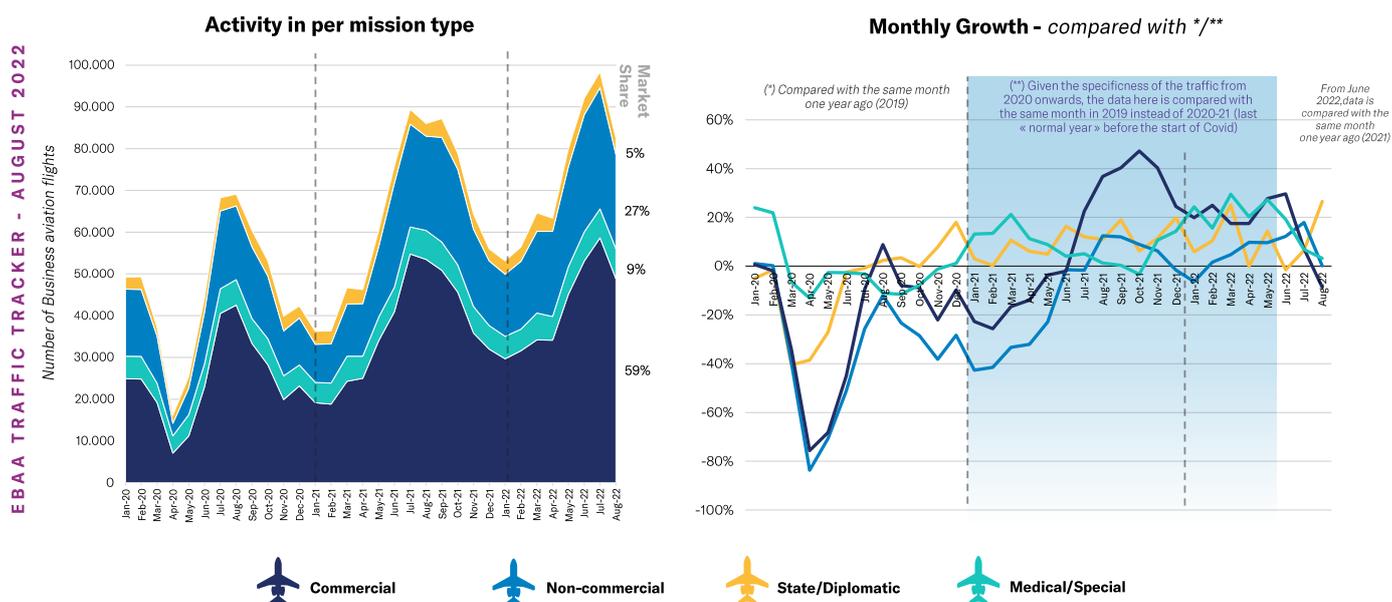
Airlines have been experiencing qualified aviation staff drain leading to staff shortages. Staff turnover is highly dependent on the time it takes to qualify new staff considering the regulatory prerequisites in terms of education, training, qualifications, and experience.

Coupled to this, reduced incomes in 2020 and 2021 combined with the need to maintain staff qualifications and to invest in new technologies to respond to environmental challenges are increasing the financial pressure on airlines. These challenges lead airlines to phase out the older share of their fleets faster than anticipated.

Therefore, the operational context for 2023-2025 has potential to worsen compared to that in 2022, depending on the evolution of a wide range of factors.

2.2.3.2 Non-commercial operations with complex motor-powered aircraft (NCC) — Aeroplanes

Since there is a lack of specific data about NCC operations in Europe, the activity of this sector was estimated based on an extrapolation of general business-aviation data. This data indicates this sector has likely seen continuously improving operational performance since the drop of the activity observed in mid-2019 (caused by the COVID-19 pandemic). The activity in 2022 is expected to exceed the pre-pandemic activity levels.



Source: EBAA with support from EUROCONTROL and WINGX ADVANCE - www.ebaa.org

► Figure 4: Operational context – Business Aviation: monthly traffic and monthly growth (EBAA)

The aircraft sales data reported for 2022 also indicates a slight increase in aircraft deliveries from European manufacturers compared to 2020-2021.

It seems the sector is keeping the momentum built upon the opportunities that arise from the new operational context created for airlines by the pandemic and later by the disrupted air connectivity due to flight restrictions caused by conflict zones.

The outlook for the sector in the coming years is positive with some uncertainties caused by historic high fuel prices, interruptions in the supply chain, and increasingly limited availability of qualified aviation personnel — all that in a wider context of known factors affecting the EU economy.

2. INTRODUCTION

2.2.3.3 Rotorcraft operations

There are indications that the observed decrease in the overall helicopter traffic during the previous years is recovering pre-pandemic activity levels.

As regards commercial rotorcraft operations, an increase in the number of helicopter AOC holders can be observed in 2022 versus 2021, following a relatively stable period from 2019 to 2021. The number of EASA registered helicopters performing commercial air transport is 1948 in 2022, slightly lower than the average between 2019 and 2021.

Orders for new helicopters and deliveries increased in 2021, as compared to previous years. The current geopolitical context with soaring oil and gas prices, may create further opportunities for helicopter offshore operations. Moreover, initiatives to further invest on sustainable energy sources, such as offshore wind farms, may have a positive effect on helicopter offshore operations thus supporting that industry sector.

In addition, temporarily decommissioned oil and gas production sites in the North Sea may be brought back into service and the production capacity of oil platforms in use might be increased since the higher production costs at those sites might be covered by the higher prices of oil and gas. Furthermore, in view of becoming less dependent on Russian gas supplies, it may be expected that offshore exploration of new oil and gas wells/fields will ramp up in other areas in Europe, e.g. the Mediterranean Sea, the Black Sea, the Irish Sea or the Baltic Sea. These factors/conditions are expected to have a positive effect on offshore helicopter operations. Yet, there are indications that offshore helicopter operators are currently confronted with a lack of availability of additional aircraft and spare parts in some areas as well as a (possibly temporary) lack of trained and experienced flight crews to fulfil the demand, which may be due in part to the backlog on training and recruiting as a result of the pandemic.

2.2.3.4 General Aviation (GA)

Following a noticeable and short-term activity reduction recorded in 2020 due to the pandemic, the sport and recreational aviation sector quickly recovered to pre-pandemic activity levels. The situation improved further throughout 2022.

In the area of aircraft production, some delays in the delivery of aircraft and other aeronautical products (spare parts or equipment) were observed in the first half of 2022 mainly due to disruptions in the global supply chain and limited availability or volatility of the cost of materials that are necessary for aircraft production. Despite that, the sector was in general able to maintain in 2022 a production level similar to that typically recorded during the previous years. At the same time, GA in general observed an increase in short-term demand. In the context of the current financial uncertainties and an unusually high inflation rate in Europe, this increase may suggest that an investment in GA aircraft or equipment appears as a good choice for many aviation enthusiasts, to allow them to continue their activity. This illustrates the volatility of the current GA market, which constitutes another challenge for the manufacturers.

The GA design activities are expected to grow steadily due to the innovation drive coming from the European Green Deal, where the GA and the UAS industry act as catalysts for innovation. Further synergies are expected to be created between these two sectors in the coming years.

Pilot training, including flight instructor training, is expected to grow slowly but steadily in the coming years due to the current pilot shortage. The initial demand for pilot training should compensate for the growing shortage of commercial pilots and subsequently support the introduction of urban air mobility operations that will require more commercial pilots. The improvements in pilot training depend on the availability of a sufficient number of qualified flight instructors and on the success of the introduction of novel training practices (e.g. virtualisation), allowing the reduction of the overall training time.

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2.2.3.5 Design and production

In the area of initial airworthiness of type design, for the period January to June 2022, EASA recorded a 21 % reduction in the number of applications received and a 29 % reduction in the number of EASA certificates issued, in comparison to the same period in 2019, suggesting that the manufacturing industry has not yet fully recovered from the pandemic impact. It is expected that within the coming years this industry will reach its pre-COVID activity levels again. It should also be noted that a growing number of applications is related to innovative projects. In terms of product-specific trends, while an overall decrease in comparison to 2019 has been observed for large aeroplanes, ETSOs and propulsion (engines and propellers), an overall increasing trend in the number of VTOL capable and GA aircraft applications has been recorded. The number of EASA design organisation approval (DOA) holders has decreased in 2021 (-10 %) compared to 2019 due to Brexit, but it started to increase again as of 2021.

Regarding continued airworthiness of type design, the lower number of occurrence reports received and closed and the number of airworthiness directives (ADs) published constitute an indication of the massive impact of the pandemic on aviation. In particular, as regards the occurrence reports received, a decrease of 8 % can be observed for the period from January to June 2022 compared to the same period in 2019, with a 19 % increase in the number of occurrence reports closed. Finally, the number of ADs published for the period January to September 2022 dropped by 6 % compared to the same period in 2021, by 1% compared to the same period in 2020 and by 12% compared to the same period in 2019.

In 2022, the number of active EASA production organisation approval (POA) holders remained at the same level as since 2019, with 46 active organisations holding an approval issued by EASA, and 598 active organisations holding an approval issued by their national competent authority.

2.2.3.6 Maintenance and continuing airworthiness management

The demand for maintenance and continuing airworthiness management organisation (CAMO) services is linked to the in-service aircraft fleets worldwide, which drastically reduced in the first half of 2020 with the high number of parked/stored/phased-out aircraft due to the COVID-19 pandemic. The recovery, which was visible but still uncertain during 2021, continued in 2022 when travel restrictions were lifted almost worldwide, and the number of flights increased significantly. Aircraft maintenance activities followed the same trend and are expected to sustain a positive growth in the coming years. The following list provides further details to complement the general considerations regarding demand for maintenance and continuing airworthiness management services:

- The positive market outlook is such that the recovery to pre-pandemic activity levels is expected by 2024/2025, with a steady growth to continue in the following years. This positive trend is leading existing actors to expand their activities and new actors to enter the maintenance business. In addition, it increases the involvement of aircraft manufacturers in the maintenance sector.
- The growth trend will have large geographical variations, with the Asia-Pacific region recovering faster due to lower labour costs and fleets being larger in number and older in average compared to other regions — factors which translate into business opportunities for maintenance.
- Certain types of maintenance activities are flourishing. This is the case for aircraft disassembly/dismantling and passenger-to-cargo conversion, with aircraft and used parts re-entering into service. Such businesses are driven by the effects the pandemic had on airlines, which have anticipated the phasing out of fleets that would not be economically viable. The aircraft dismantling activity poses new challenges as regards safety and in particular how used parts re-enter into service. The reuse of aircraft parts and the recycling of materials means less waste and sustainability has become a crucial topic following the environmental developments over the last decades.

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- Regarding aviation maintenance personnel, in the medium term it may be expected that the recovery phase will allow staff previously laid off to be re-employed with efforts needed to address experience and qualifications erosion. In the long term, that workforce could potentially be too small to support the growth in the maintenance sector.
- Aircraft health monitoring concepts, such as engine monitoring, create challenges both in terms of technology and workforce, to keep equipment and staff competencies up to date with the fast developments.
- Knowing that European airlines make use of maintenance organisations in China (either Chinese companies or European subsidiaries) travel restrictions being still effective in China are affecting the development of maintenance activities. Oversight activities to be performed in China by foreign entities are subject to limitations (for instance oversight by customers and competent authorities, manufacturers and equipment providers), with growing concerns as regards to confidence mostly due to virtual meetings that have been taking place for more than 2 years now.

In the maintenance and continuing airworthiness management domain some important regulatory developments are shaping how industry and competent authorities will work in the years to come, in particular as regards the introduction of safety management within Part-145 organisations¹⁸. A 2-year transitional period is established and will run until 2 December 2024.

Approval holders will need to develop new procedures and processes, train their staff, and ensure that safety management requirements are effectively implemented as part of their management system. Competent authorities will need to acquire new competences to assess effective implementation and adopt risk-based principles in their oversight. Finally, a new concept for continuing airworthiness management in a single air carrier business grouping, referred to as 'One CAMO', was introduced¹⁹. It allows several air operator certificate (AOC) holders to use the same continuing airworthiness management organisation (CAMO) within a single air carrier business grouping. Stakeholders who are willing to implement this new model over the coming years are expected to achieve efficiency gains through standardisation of internal processes .

2.2.3.7 Aircrew and Medical

Flight and cabin crew

Many of the aircrew-related challenges identified during the COVID pandemic and subsequent Return to Normal Operations (RNO) phase continue to exist.

Considering the rapid recovery in the summer of 2022, airlines are looking to hire additional staff to cope with the current workload and future expansion and compete with other sectors outside aviation.

EASA continuously supports national competent authorities and the industry in returning to normal operations by providing implementation support. The number of exemptions which were issued during the COVID period, aiming to reduce the severity of the disruptions, significantly reduced in 2022 and exemptions were used in justified cases and limited to what was strictly necessary.

In 2022, EASA continues to work and put emphasis on innovative technologies for use in flight and cabin crew training, on the better use of FSTDs in training by reflecting their actual capabilities and technological advancements in this regard, on digitalisation by enabling the introduction of electronic aviation personnel licensing into the EU regulatory framework, on the introduction of competency-based training and assessment (CBTA) methodologies into instructor training, and on the further development of vertical take-off and landing (VTOL) aircraft.

18 Regulation (EU) No 1321/2014 amended by Commission Implementing Regulation (EU) 2021/1963

19 Regulation (EU) No 1321/2014 amended by Commission Implementing Regulation (EU) 2022/410

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Medical

The effects of the pandemic are still visible also with regard to aircrew and ATCO medical fitness. Many licence holders were not able to consult their AMEs or other medical specialists due to limited access to medical services caused by the pandemic. Consequently, it is expected that a number of new medical conditions will be identified among the applicants in the post-pandemic years. A proactive approach to the early identification and management of health risk factors is required to ensure that aircrews and ATCOs maintain their medical fitness for as long as possible.

Several sources, such as the World Health Organization, suggest that the incidence of mental health conditions has increased in the general population during the COVID-19 pandemic. While that incidence increase may not be fully reflected among aircrew and ATCOs, measures should be considered by all relevant stakeholders to reduce mental health risk factors (such as stress and fatigue) as well as organisational and socio-economic factors (such as commercial pressure, job insecurity, and working conditions), and to enable the identification and mitigation of these health risk factors through early intervention such as support groups (beyond the aircrew scope) and consultation with AMEs/AeMCs.

The drastic reduction in the number of flights during 2020, 2021 and Q1 of 2022 impaired aircrew and ATCO resilience to stress and fatigue. Furthermore, the financial pressure airlines are facing means that rosters may have been and may still be planned without adequate buffers. Given the difficult financial situation of many airlines in a highly competitive environment frequently leading to challenging crewing and operational/roster planning, it is expected that fatigue will continue to be a significant hazard for safety. Fatigue management should be enhanced, including by allowing aircrews and ATCOs sufficient time to adapt to the changes and regain their fatigue resilience level that was in place before the flights decrease due to the pandemic.

At the same time, the availability of medical professionals — AMEs, AeMCs and NCA medical assessors — is still limited and presents a challenge at all levels, as the sector recovers from the pandemic. Measures may be required by all relevant stakeholders to ensure that the competence of medical professionals is maintained so that they can properly perform their oversight activities.

In addition to the challenges presented by the COVID-19 pandemic, the progress made in medical science needs to be considered on a regular basis and reflected in the EASA research, safety promotion and rulemaking activities.

2.2.3.8 Air Traffic Management/Air Navigation Services (ATM/ANS)

Since 24th February 2022 there is also a significant operational impact resulting from the war in Ukraine, in the form of flight re-routings, which affect, sometimes significantly, certain EU countries by having to transfer overflights between them. This additional drop in traffic for some EU countries, leading to a decrease in financial resources for the ANSPs concerned, is likely to further delay the return to normal operations and increase the financial pressure on them, with the prolongation of the effects already more generally observed in 2020 and 2021 on ongoing and planned activities to maintain and develop the ATM/ANS system. A reopening of the Ukrainian and Russian airspace is not expected any time soon, and consequently some instability in the selection of routes by airlines, and of the network as a whole, is to be expected.

In this general context of uncertainty and as the pandemic crisis is not fully over, one of the priority objectives for ANSPs remains to maintain sufficient qualified staff through retention and recruitment and to maintain the required level of staff competence through adequate training, taking into account the introduction of new ATM concepts while increasing the flexibility and scalability in staff planning and rostering. The maintenance of adequate oversight of these aspects by the NCAs and EASA will play a major role in determining the overall safety level of the ATM/ANS system.

EUROCONTROL's base forecast scenario (refer to [Section 2.2.2.2](#)) does not foresee a return to the 2019 air traffic levels before 2024, based on the assumptions that the lack of staff will not significantly prevent airlines and

2. INTRODUCTION

aerodromes from achieving pre-pandemic capacities, and that the purchasing power of travellers will not be significantly reduced by rising energy and ticket prices. If these assumptions are not met, a return to 2019 levels is expected after 2027 only.

2.2.3.9 Aerodromes and groundhandling

As regards European airports, ACI estimates that airport revenues will remain lower in 2022 than in 2019 and a full recovery not in sight until 2024²⁰. Staff shortage affects also the aerodrome domain.

The reduction in passenger flights and traffic volumes in 2022 compared to 2019 with fewer aircraft operating in Europe continues to have a negative impact on airport businesses and ground-handling operations.

As regards the groundhandling sector, the continued COVID-19 crisis in 2020 and 2021 led to some business bankruptcies and a significant reduction of staff, which were one of the factors that caused major delays in some European airports in 2022. The overall situation has hardly improved in 2022 compared to 2021.

In addition, new technologies and new types of operations, for example in the area of UAS (drones), VTOL-capable aircraft operations and urban air mobility (UAM), will affect airport operations in terms of design and operations and will require new infrastructure. With regard to unmanned aircraft operations, EASA has already developed prototype technical specifications for vertiports to accommodate such operations.

While the airport and groundhandling industries are still recovering from the impact of the pandemic, the increasing need for aerodromes to cope with aviation sustainability developments (sustainable aviation fuels (SAF), electric or hydrogen aircraft) also poses new challenges with regard to infrastructure feasibility and related investments. This is relevant for the aerodromes domain in general, including ground handling and rescue and firefighting services (RFFS).

2.2.3.10 UAS (drones) and VTOL-capable aircraft

The EU drone market continues to grow rapidly, with drone services and operations materialising in numerous use cases. The operation of drones in the ‘open’ and ‘specific’ category continues to develop under the applicable EU regulatory framework. In parallel, EASA has published a regulatory proposal to enable innovative air mobility through the operation of manned VTOL-capable aircraft and to detail the airworthiness processes applicable to certified drones operated in the ‘specific’ category.

The implementation of the U-space continues steadily through the development and testing of the required services in scenarios of growing complexity. Several conceptual frameworks, platform architectures, methodologies and practical demonstrators continue to be developed at high pace across the EU.

In the coming years, EASA, contributing to the EC’s wider ‘Drone Strategy 2.0’, will continue to foster the development of a drone ecosystem in Europe by further developing and supporting Member States with the implementation of the common operations-centric, risk-based regulatory framework that addresses societal expectations related to environmental protection, safety, and cybersecurity.

While the drones and the VTOL-capable aircraft industry is gaining experience and confidence with regard to these new types of operations, EASA is already planning the next regulatory proposal commensurate with the industry needs and planned operational capabilities. The deployment of additional operational capabilities will have to be supported by the availability of some key technological enablers not yet mature, and of appropriate technical standards.

20 <https://aci.aero/2022/10/06/the-impact-of-covid-19-on-airports-and-the-path-to-recovery/>

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2.2.4 Overview of the aviation organisations, personnel and products monitored

In support of its Standardisation duties, the Agency collects information on the number of certificates, licences and declarations for various aviation domains. In addition to the general trends identified in the previous sections, the following table provides data on the number of organisations, aviation personnel and aircraft monitored in the EASA Member States. It compares 2019, 2020 and 2021²¹.

Note: The below table considers SIS data collected in 2022Q4.

Item	2019	2020	2021	2022
AIR OPERATIONS				
AOC (A)	595	583	635	615
AOC (H)	255	247	251	258
NCC (A+H)	490	454	452	427
SPO (A+H)	778	749	687	682
AEROPLANES				
	74 920	73 359	71 885	73 550
Annex I	15 308	14 914	15 002	13 618
CAT OPS	7 021	6 745	6 593	6 623
EU CofA	33 976	34 261	34 097	34 296
Valid ARC	18 615	17 439	16 193	19 013
HELICOPTERS				
	12 379	12 699	11 884	10 286
Annex I	2 767	2 978	2 421	625
CAT OPS	2 010	2 034	2 115	1 948
EU CofA	4 521	4 673	4 653	4 687
Valid ARC	3 081	3 014	2 695	3 026
EASA flight crew licensing				
	225 303	237 316	317 973*	317 629*
Aeroplane licences	179 562	183 125	212 589*	217 170*
Helicopter licences	15 251	15 461	17 536*	17 461*
ATPL(A)	65 846	66 013	67 762	69 985
ATPL(H)	3 116	3 186	3 387	3 497
CPL (A)	39 015	41 334	44 161	46 396
CPL (H)	7 597	7 633	7 873	7 806
MPL	1 532	1 556	1 358	1 332
Other	30 490	38 730	87 848*	82 998*
PPL (A)	73 169	74 222	99 330*	100 923*
PPL (H)	4 538	4 642	6 276*	6 167*
Approved training organisations (ATOs — flight crew)	1 368	1 304	1 353	1 308
Declared Training Organisations	not applicable	not applicable	not applicable	2 042
FSTDs	981	1 051	900	939
AeMCs	86	84	87	86
AMEs	2 122	2 075	2 079	2 089

21 Comparable data across the years (without UK data)

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Item	2019	2020	2021	2022
DESIGN AND PRODUCTION				
Part 21 approved design organisations (DOA)	366	374	326***	335
Part 21 approved production organisations (POA)	621	620	616	617
CONTINUING AIRWORTHINESS				
Part-145 approved maintenance organisations	1 597	1 600	1 613	1 595
Part M Subpart-F approved maintenance organisations	424	402	179	118
Continuing airworthiness management organisations	1 584	1 549	1 299	1 120
Part-147 approved maintenance training organisations	239	231	241	236
Part-66 EASA aircraft mechanic licences	54 343	60 155	62 799	61 921
AIR TRAFFIC MANAGEMENT/AIR NAVIGATION SERVICES				
Air traffic management / air navigation service providers	537	529	514	495
EASA licensed air traffic controllers	21 626	21 408	21 535	20 664
Air traffic controller training organisations	127	130	119	113
AERODROMES				
Aerodromes with more than 5 million passengers	73	74	43	48
Number of certified aerodromes within the EASA scope	398	402	392	395
Number of exempted aerodromes within the EASA scope	111	114	126	122
Number of heliports within the EASA scope	8	12	11	10
Movements in certified aerodromes	15 059 276	13 794 513	6 721 379	9 234 729
Movements in exempted aerodromes	974 918	836 107	752 826	824 089

► Table 2: Overview of organisations, aviation personnel and aircraft monitored in EASA Member States

*Change in the statistical data collection in Germany in 2021 compared to previous years

3. Strategic Priorities



3. STRATEGIC PRIORITIES

The overall strategic direction for EPAS 2023-2025 is to build a safe, secure, sustainable and resilient aviation system, to enhance its capability to address disruptive events of any type. The EU aviation system is emerging from the pandemic without having lowered its high safety record. To a large extent, this could be achieved owing to the established risk management capabilities at regional, State and industry level, including the ability to activate mechanisms for crisis coordination and emergency response quickly and effectively. Whether COVID-related safety issues resulted from a specific problem faced by one domain or from systemic or human factors' issues affecting all aviation personnel, the crisis demonstrated that it is vital to get all actors focus on the goal of delivering safe operations throughout the entire recovery phase and beyond.

The crisis also proved the benefits of an approach to safety that goes beyond compliance, that is flexible and agile. Thus, building on the lessons learned during the COVID-19 crisis and taking stock of the work done by the various task forces and coordination groups thus far, we will be able to further strengthen those features that make out a resilient system, be it with regards to safety, security, public health or other types of risks. Effective SSPs and management systems (SMS) implemented by industry constitute the backbone of a resilient aviation system: The crisis not only acted as a catalyst for SSP and SMS implementation, it also proved the added value of previous investments in safety management capability.

With a fast-evolving aviation industry, showing a wide range of operating conditions and business models, but also in the face of disruptive events affecting the entire aviation ecosystem, it is increasingly important for aviation stakeholders to adopt a systems' view on safety. Managing safety in a complex socio-technical system such as aviation requires knowledge and understanding of how and where people work within that system and what may positively or negatively affect their performance. Focus on human factors and human performance, as an integral part of safety management, is therefore essential in building a safe, secure, sustainable and resilient aviation system.

The Agency will continue addressing COVID-19 related risks, now included in a new 'Systemic and Conjunctural' SRP, which also details the specific safety issues generated by the unprovoked invasion of Ukraine by the Russian Federation²² (refer to EPAS Volume III Chapter 2). The various COVID-19 related safety issues were assessed as part of the European safety risk management (SRM) process, and some resulted in new initiatives, such as the 'Ramp-Up – Be ready, Stay Safe Campaign', completed in 2022. Moreover, the Agency will continue addressing the interface between aviation and public health, until the pandemic subsides, in the context of EASA's emerging priority on health matters.

Ensuring the availability of safety data and safety information is another essential feature of the European safety management system. The Agency coordinates the *Data4Safety* (also known as D4S) programme, a core objective of which is to establish robust risk-management capabilities for the European aviation sector to enhance its abilities to make informed and data-driven decisions in the different domains of aviation safety. D4S is a data collection and analysis programme that aims at collecting and gathering all data that may support the management of safety risks at European level. This includes safety reports (or occurrences), flight data (i.e. flight parameters recorded on board the aircraft), surveillance data (air traffic data), weather data — these being only a few from a much longer list. Equally important, D4S organises the analytical capacity amongst all European aviation safety management system stakeholders with the objective to take the collaborative work with the industry at a scale never achieved before in Europe.

The programme allows to better identify where the risks are (safety issue identification), determine the nature of these risks (risk assessment) and verify whether the safety actions are delivering the intended level of safety (performance measurement). It aims at developing the capability of discovering vulnerabilities in the system across terabytes of aviation data. In that respect, D4S enables and augments the capacities of authorities and aviation organisations to implement the European SRM process.

22 [EASA publishes Review of Aviation Safety Issues Arising from the war in Ukraine | EASA \(europa.eu\)](#)



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An initial proof of concept (PoC) phase was launched with a limited number of partners to test the technical challenges as well as the governance structure of such a programme. This first demonstration and exploration phase was successfully completed by mid-2022. The programme is gradually opening its membership to the European aviation safety system stakeholders. The D4S Members will develop the operational version of Data4Safety, i.e. an aviation data collection and analysis programme at European systemic scale, fully integrated into the EU SRM processes.

Finally, in line with Regulation (EU) No 376/2014 on the reporting, analysis and follow-up of occurrences in civil aviation, the integration of ECCAIRS 2²³ with D4S will provide the European SRM process with increased capacities to leverage on the European Central Repository (ECR) for safety intelligence purposes (processing of the complete ECR, thanks to the D4S big data platform and data science capacities as well as the possibility to 'fuse' the ECR data with other sources of aviation data; for example, traffic data).

23 ECCAIRS (European Co-ordination Center for Accident and Incident Reporting Systems) is a digital platform integrating European NCAs and Safety Investigation Authorities. The mission of ECCAIRS is to provide a digital platform enabling the implementation of the provisions defined in EU Regulation 376/2014. ECCAIRS is supporting Aviation Authorities in collecting, sharing and analysing their safety information with as an ultimate goal to improve Aviation Safety.



3. STRATEGIC PRIORITIES

3.1 Systemic safety & resilience

Structure for level 2:

3.1.1	Manage risk interdependencies
3.1.2	Improve safety by improving safety management
3.1.3	Manage human factors and human performance (all domains)
3.1.4	Civil-military coordination and cooperation
3.1.5	Capable and streamlined oversight (previously: Oversight)
3.1.6	Ensure a level playing field

Fostering risk management capabilities that address various types of risk and are built on the foundation of effective management systems constitutes the main priority under this section. Safety management implementation at State and industry level is at the heart of this. This strategic priority will be implemented by strengthening and complementing the efforts to support SSP and SMS implementation, in particular by successfully managing the roll-out of SMS in Part 21 and Part-145 (RMT.0251). Implementing this priority will also require further efforts and initiatives to enable and promote the establishment of an emergency/crisis management function as part of SSP and of SMS.

3.1.1 Manage risk interdependencies

Structure for level 3:

3.1.1.1	Manage information security risks
3.1.1.2	Manage security risks with an impact on aviation safety
3.1.1.3	Manage the risks arising from conflict zones
3.1.1.4	Manage the risks arising from socio-economic factors
3.1.1.5	Manage public and aviation health safety (AHS) risks
3.1.1.6	Manage the impact of climate change on aviation safety
3.1.1.7	Manage the balance between aviation safety and other societal needs

Through revisions to its Basic Regulation, EASA's mandate has progressively expanded beyond safety and environmental protection certification to address wider threats to aviation, such as security with a negative impact on safety and information security. Most recently, health safety considerations entered the equation.

The COVID-19 crisis demonstrated that safety, security, health safety and other risks can no longer be managed in isolation. The aviation community has realised that continuing to develop tools and specific guidance for each situation and for each domain affected by transversal risks may delay not only the implementation of mitigation measures, but also the development of an enabling framework to support integrated, collaborative risk management. Collaboration between domains is vital at global, European and national level to look for synergies and maximise the use of resources. Operators also see the value in a single risk management system that views all risks together in a way that can present the result holistically, support decision-making and deploy the resources needed to mitigate risks effectively.

Some initial integration steps have already been taken in the safety and security domains — in accordance with ICAO Annex 17 and Annex 19 Standards and Recommended Practices (SARPs), the Contracting States are required to establish reporting systems for the analysis of security and safety information. States have been advised by ICAO²⁴

24 Refer to ICAO AVSECP/30-WP/20.



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to consider aligning their security reporting mechanisms with existing aviation safety reporting systems, in order to allow for an integrated approach to the management of risks. This should also enable the use of existing safety tools and concepts especially in relation to the appropriate protection of data and of those reporting for the benefit of aviation security, as well as foster the implementation of a safety and security culture amongst States and stakeholders.

3.1.1.1 Manage information security risks

The global civil aviation ecosystem is accelerating towards more digitalisation. This implies that any exchange of information within any digital workflow of the aviation community needs to be resilient to information security (cybersecurity) threats which have consequences on the safety of flight or the availability of airspace and beyond.

Aware of the complexity of the aviation system and of the need to manage the cybersecurity risk along the horizontal functional chains and the respective vertical supply chains, EASA is committed to having EU rules in place to address information security risks in a comprehensive and standardised manner across all aviation domains.

Moreover, it is essential that the aviation industry and authorities share knowledge and learn from experience to ensure systems are secure from individuals/organisations with malicious intent. In light of this, EASA supports the European Centre for Cybersecurity in Aviation (ECCSA) whose mission is to provide information and assistance to European aviation manufacturers, airlines, maintenance organisations, ANSPs, aerodromes (ADR), etc. in order to protect critical elements of the system such as aircraft, navigation and surveillance systems, data links, etc.

The provisions for the management of information security risks by competent authorities and approved organisations in all the aviation domains set out in Commission Regulation (EU) 2022/1645 (EASA Opinion No 03/2021) aim at the protection of the aviation system from information security attacks and their consequences. These provisions include high-level, performance-based requirements for an information security management system that will be supported by AMC & GM and industry standards. Ahead of the adoption of the new information security management system legal framework, EASA developed an implementation support roadmap, in coordination with the European Strategic Coordination Platform (ESCP) to assist the industry and authorities with their efforts and ensure effective implementation of the Information Security rules.

Key actions:

- **RMT.0720** to finalise the regulatory framework for cybersecurity covering all aviation domains, by providing the AMCs/GM to the new Part-Information Security (Part-IS).
- Support the roll-out of the new cybersecurity regulatory framework.
- Encourage aviation stakeholders to maintain a focus on cybersecurity resources investment.

3.1.1.2 Manage security risks with an impact on aviation safety

The Basic Regulation addresses some of the interdependencies between safety and security in civil aviation and requires the EC, the Agency and the Member States to cooperate on security matters, where interdependencies between civil aviation safety and security exist.

The implementation of aviation security measures can have a direct impact on safety aspects of aerodrome or aircraft operations. Airport security, aircraft security or in-flight security are the areas where the interdependencies are highly visible and where any security requirements should also consider potential impacts on aviation safety.



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Therefore, an integrated approach to the management of safety and security risks across the spectrum of aviation activities would bring benefits such as a complete overview of risks, a better sharing of security information and the closure of gaps in the security system while focusing on increasing the overall level of safety. Consequently, this would allow ensuring synergies where security measures can have an impact on safety and vice versa; thereby avoiding incompatible actions and strengthening the overall safety and security of civil aviation.

In order to achieve this objective, there is an opportunity to apply the existing European SRM process for the benefit of aviation security, focusing on any security risks with a potential impact on aviation safety. The proposed mechanism would take full benefit of the existing regulatory framework, enabling us to understand vulnerabilities in aviation security and safety consequences of security occurrences with the objective of proactively developing and implementing mitigation measures by competent authorities at State and EU level to address them, therefore contributing also to the overall level of aviation safety. It would also allow defining and analysing trends in aviation security in order to provide an additional opportunity to improve the system. Finally, it would foster the implementation of a safety and security culture amongst EU Member States and stakeholders.

Key actions:

- Ensure that security occurrences with safety relevance are fully integrated in the existing SRM process, including their analysis, identification of trends and mitigation as part of European SRM when applicable.
- **MST.0040** to ensure that EASA Member States establish appropriate coordination mechanisms between safety and security reporting systems, in order to allow for an integrated approach to the management of risks.
- Extend the use of ECCAIRS 2 to collect and store security occurrences with safety relevance.

3.1.1.3 Manage the risks arising from conflict zones

To enable information sharing about possible risks and threats in conflict zones, the existing EU Conflict Zones alerting system is in place, supported by the European Information Sharing and Cooperation Platform on Conflict Zones (the 'Platform').

Member States, EU institutions and EASA have established an alerting system with the objective of joining up available intelligence sources and conflict zone risk assessment capabilities in order to enable the publication of information and recommendations on conflict zone risks in a timely manner, for the benefit of all European Member States, operators and passengers. It complements national infrastructure mechanisms, when they exist, by adding, when possible, a European-level common risk picture and corresponding recommendations. EASA acts as the coordinating entity for activities not falling directly under Member States' or the EC's responsibility and initiates the drafting, consultation and publication of Conflict Zone Information Bulletins²⁵.

The tragic accident with the downing of Ukraine International Airlines Flight 752 highlighted once more the importance of information sharing and risk assessments. Noting the valuable actions already implemented at EU level during the past 5 years, there is a need to enhance the current capabilities for information sharing and risk assessments at EU level.

Following a successful trial period, in March 2022 the Agency launched the European Information Sharing and Cooperation Platform on Conflict Zones, an initiative which ensures that participating EASA Member States and their operators have easy access to the best information when planning flights near or over areas of conflict.

25 <https://www.easa.europa.eu/domains/air-operations/information-on-conflict-zones>



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The launch of the Platform is the latest operational step in Europe's multi-layered strategy to improve conflict zone information sharing. This was initiated in response to the tragic shooting down of Flight MH17 over eastern Ukraine in July 2014 and its momentum reinforced by the loss of Flight PS752, shot down over Tehran in January 2020.

The military invasion by the Russian Federation into the territory of Ukraine has demonstrated the importance of information sharing and risk management in the area of conflict zones. The actions taken at EU level allowed air operators to be well informed on conflict developments prior and during the aggression.

The aim of the Platform is to enable its members to carry out risk assessments and take decisions based on reliable and updated data. In addition, the exchange of information between experts is expected to enhance the confidence of those taking decisions regarding the operation of flights in conflict zone areas. EASA will ensure that the Platform remains a trusted environment and also moderate the content and discussions.

Building on positive achievements, EASA envisages to foster a wider use of the Platform with the objective of enhancing the cooperation between EU institutions, national authorities and air operators so that any relevant information on threats and risks could be shared without delay for the primary benefit of airspace users and national competent authorities (NCAs). Moreover, the Agency aims at capitalising the Platform users community to build capacity for the conflict zones alerting mechanism.

Key actions:

- **SPT.0078** to disseminate information to both air operators and NCAs in order to mitigate the risk associated with overflying conflict zones.
- Make the Platform the tool to share information among Member States and air operators, including experience and risk assessments provided by the operators.
- Promote the use of the Platform for capacity building.

3.1.1.4 Manage the risks arising from socio-economic factors

Article 89 of the Basic Regulation requires the Member States, the EC, the Agency and other EU institutions, bodies, offices and agencies to cooperate with a view to ensuring that interdependencies between civil aviation safety and related socio-economic factors are taken into account. In particular, it tackles the need to address socio-economic risks to aviation safety. EASA is also required to consult relevant stakeholders when addressing such interdependencies and to publish a review every 3 years, which shall give an objective account of the actions and measures undertaken. The first review was published on the EASA website in December 2021²⁶.

This review examined in particular the safety implications of socio-economic factors in the areas of employment and working conditions, health and lifestyle, and education.

One of the main focuses of the report is on employment and working conditions of flight crew. Several EU-wide studies suggest that there may be concerns about the possible impact of these conditions on safety culture and safety reporting. However, these reports, and safety data used by the Agency, fail to establish quantitative correlation between employment and working conditions on one side, and safety levels on the other. While the absence of quantitative correlation could be due to the lack of adequate data collection and lack of reporting from safety-critical personnel, it may also suggest that the current measures in place in the EU aviation safety system (SMS, HF, safety promotion, just culture, oversight by the competent authority, etc.) already provide adequate mitigations.

26 <https://www.easa.europa.eu/document-library/general-publications/art-89-report-2021>



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The Art. 89 Review clearly establishes that socio-economic factors impact safety and performance. We know historically that communities on lower socio-economic scale oftentimes have less access to appropriate training, health and safety protection resources. Consequently, the following actions are included in this current edition of EPAS Volume II:

- **MST.0042** aimed at improving Member States' capacity of assessing the safety culture in air operators.
- **RES.0053** to map the impact of socio-economic factors on aviation safety for all safety-critical personnel, including an assessment of the adequacy of the current data collection process to identify socio-economic risks.

Furthermore, to allow a continuous work on this type of interdependency, EASA will work on gathering more knowledge and data from various sources, consult with and seek feedback from relevant stakeholders, and engage in a transversal approach especially as regards safety culture, human factors and human performance (see 3.1.3.).

3.1.1.5 Manage public and aviation health safety (AHS) risks

The COVID-19 pandemic has shown that the harmonisation of health policies affecting aviation, and in particular in the CAT domain, has become an important topic to help overcome the pandemic. The objective is to minimise the impact of health safety threats in CAT. Health safety threats should be included in the management of risk interdependencies.

COVID-19 is unlikely to be the last pandemic we will be faced with. It is crucial to continue supporting the European aviation industry competitiveness by offering the safest aircraft interior environment to reduce the risk of disease transmission between continents and States, restore public trust and facilitate future responses to events of similar nature.

An area for development is the enhancement of crisis resilience and the mitigation of health safety threats in aviation by engaging in 'Aviation Health Safety Protection'.

A number of actions were initiated following the onset the COVID-19 pandemic with specific focus on health safety, such as, but not limited to, the EASA-European Centre for Disease Prevention and Control (ECDC) Aviation Health Safety Protocol, related Safety Directives, Safety Information Bulletins and Guidance Material, as well as standardised Passenger Locator Forms.

Future actions will include the development of protective measures to enhance crisis resilience and mitigate health safety threats for AHS. The Agency is considering assessing and recognising the performance of new sanitisation solutions when mature enough to be industrialised. The approach is similar to what was done in the past with 'design for security' gradually introducing design specifications in CS-25 after new potential security threats had been identified and confirmed. The Agency is currently active in setting up innovation partnership contracts (IPCs) with industry and assessing the need for additional EU research activities to consolidate its knowledge in the domain before considering any future rulemaking. This will help in clarifying the role of EASA for the full aviation value chain (including airports) and in identifying the necessary amendments to the EU regulatory framework and processes.

Key areas for short-term development include the assessment of passive and active disinfection means, validation of new materials and air filtering technologies. Risks associated with various disinfection and cleaning methods implemented by operators is a growing concern to aircraft manufacturers.

For example, the risks of material degradation and potentially reduced fire resistance under prolonged exposure to ultraviolet light or aggressive chemicals should be assessed. Many other parameters remain unquantified and



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will need an in-depth assessment, not only for initial airworthiness aspects, but also for continued airworthiness and maintenance.

AHS will affect the following domains:

- aircraft certification process
- research & innovation
- institutional cooperation

The Agency's technical competencies will need to be consolidated accordingly.

Possible future wider action:

- To avoid future disruption and keeping/restoring public trust in CAT, an integrated, collaborative framework for safety, security and health risk management should be considered.

3.1.1.6 Manage the impact of climate change on aviation safety

This new strategic safety goal aims at managing trends related to hazardous weather phenomena that are resulting from climate change.

Adapting to climate change is a strategic priority at global and EU level.

At the **global level**, following the introduction of a dedicated chapter on climate change adaptation in the ICAO 2016 Environmental Report as well as the publication of the Climate Adaptation Synthesis in 2018, now a guidance document on climate change risk assessment and adaptation is in preparation. The World Meteorological Organization has established an Expert Team on Impacts of Climate Change and Variability on Aviation (ET-CCV), aiming to gather information and provide expert advice to aviation stakeholders on the impacts and mitigation of climate change and variability, including extreme weather events, on aerodrome and airspace design, operations and performance as well as on airframe and engine design and aircraft performance.

At **European level**, in February 2021 the European Commission adopted a new 'EU Strategy on Adaptation to Climate Change'²⁷. The 'European Climate Law'²⁸, adopted in June 2021, requires the relevant Union institutions and the Member States 'to ensure continuous progress in enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change'. On that premise EASA performed a preliminary analysis, focusing on commercial air transport (CAT) with large aeroplanes and commercial airports.

The results of this preliminary analysis show that the effect of climate change on trends related to hazardous weather phenomena (e.g. changes to storm patterns, changes to airborne icing conditions, changing wind patterns, changing temperatures, changing precipitation, changes to biodiversity) may significantly magnify some safety risks and create new ones. In light of that, work has been ongoing to gather more knowledge and data to inform risk assessments and enhance the associated SRPs.

The management of systemic and operational aviation safety risks resulting from climate change will require further investment in research and safety analysis, to define short-, mid- and long-term priorities for action. New research actions that may be required will be coordinated with existing research to study atmospheric phenomena, such as ice-crystal formation, micro-bursts, vertical winds, or clear-air turbulence.

27 [EU Adaptation Strategy \(europa.eu\)](#)

28 [Regulation \(EU\) 2021/1119](#) of the European Parliament and of the Council of 30 June 2021, establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law').



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3.1.1.7 Manage the balance between aviation safety and other societal needs

This strategic goal aims at giving consideration to increasing **tensions between societal needs and expectations on the one hand and aviation safety on the other**, such as those related to the introduction of 5G telecommunication or the protection of aerodrome surroundings (obstacle clearance, land use, wildlife hazards).

As concerns 5G, the Agency continues discussions with industry, the Commission, EUROCONTROL and with the spectrum regulators.

As concerns aerodrome surroundings the first two issues to be tackled are to:

- ensure the safe coexistence of electrical wind turbines and aviation. Under this header we should be tackling wind-turbine conspicuity (e.g. lighting/marketing standards), study radar interference and the impact of turbine generated vortices on aviation in order to determine safe distances from aerodromes; and
- support the development and implementation of the new Obstacle Limitation Surfaces (OLS) concept developed by ICAO in order to optimise land use around aerodromes without compromising safety performance.

3.1.2 Improve safety by improving safety management

Proposed structure for level 3:

3.1.2.1	Achieve effective implementation of SSP/SPAS in Member States
3.1.2.2	Achieve effective implementation of management systems (SMS) in industry

3.1.2.1 Achieve effective implementation of SSP/SPAS in Member States

Effective implementation of SSP/SPAS at Member State level throughout Europe is maintained as a strategic priority; it is an important pillar of EU aviation safety management as outlined in the EASP. It also constitutes an essential enabler for resilience.

While the Global Aviation Safety Plan (GASP) 2023-2025 extended the target for States to achieve effective implementation of their SSP to 2028, target 2025 is maintained for the EU system (refer to MST.0001): SSP implementation in Europe benefits from the regional approach to safety management with an EU aviation safety management framework, including a European EU Safety Risk Management process and a common repository for occurrence data, among other elements. In 2022 the Agency initiated the assessment of Member States' SSPs following an extension of the SYS Standardisation domain. The EASA SSP implementation assessments are closely coordinated with those performed by ICAO within the remit of the USOAP, with a view to minimising duplication for Member States and fostering synergies between the ICAO and EASA SSP assessment programmes.

Proactive safety management considering all known safety data and information has proven essential for the ability of the aviation system to deal with disruptive events or recover from a crisis such as COVID-19. Both SSP and SPAS will be increasingly instrumental within the EU aviation safety management system, not only in ensuring that safety issues are addressed at the right level, but also in guaranteeing the availability of required data and safety intelligence to support the identification of hazards and safety issues 'in real time'. Establishing safety risk management capabilities in a collaborative manner is key to the safe development of aviation. Safety management also entails the management of human factors and human performance issues, fostering capable and streamlined oversight and establishing a safety promotion programme.

Support to States with EPAS and SSP implementation continues to be provided mainly as part of the Safety Management TeB (SM TeB) activities, the Safety Promotion Network (SPN) and the Network of Safety Analysts (NoAs). The SM TeB is a dedicated AB advising on SMS- & SSP-related rulemaking and providing a forum to exchange information. It also allows addressing EPAS/SSP implementation issues and provides advice on further actions required to support EPAS, SSP and SPAS implementation.



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Key actions:

- **MST.0001** for the implementation of the State Safety Programme.
- **MST.0028** addressing the definition and maintenance of a State Plan for Aviation Safety consistent with the EPAS.
- **MST.0002** and **SPT.0057** to encourage international harmonisation of SSP/SMS implementation and implementation of human factors and human performance principles.
- **MST.0032** to support the implementation of a robust oversight system across Europe.

3.1.2.2 Achieve effective implementation of management systems (SMS) in industry

As is the case with the SSP/SPAS deployment at State level, effective safety management at industry level is an essential pillar of the EU aviation safety management. This strategic priority is maintained and further strengthened in this edition, namely by providing support to implementation. With the introduction of management system requirements in Part 21, Part-145 as well as Part-CAMO, following completion of RMT.0251 (expected in 2023Q2), the Agency will accomplish full transposition of the ICAO Annex 19 SMS SARPs.

The existence of harmonised management system requirements across domains, encompassing safety risk management and compliance monitoring at their core will:

- support the management of aviation safety risks within the total aviation system;
- foster a comprehensive and coordinated approach;
- encourage the identification of hazards and mitigation of risks at the interfaces, in a more collaborative manner.

This strategic priority aims at the development of robust risk management capabilities, making use of all available safety data and safety intelligence, encompassing organisational factors as well as human factors and human performance management, and raising the level of awareness with regard to the most significant risks affecting the organisation. The competence of the safety practitioners is a key enabler to enhance risk management capabilities. With this, SMS should be seen as a powerful business management tool for informed decision-making. Disruptive events such as the COVID-19 pandemic have demonstrated the added value of investments in the management system.

With the accelerating pace of digitalisation, capabilities for safety data collection, analysis and exchange will be augmented for the benefit of data-driven decision-making in a more dynamic and proactive manner.

Key actions:

- **MST.0002** and **SPT.0057** to encourage international harmonisation of SSP/SMS implementation and implementation of human factors and human performance principles.
- **SPT.0126** and **MST.0003** to encourage better implementation of FDM programmes by operators as part of their management system.
- **RMT.0392** to update the AMC & GM to the FDM rules.
- Support the implementation of safety management requirements in approved design and production organisations by means of dedicated pilot projects.
- Provide implementation support following the introduction of safety management requirements into the continuing airworthiness domains.
- **RMT.0728** to introduce safety management requirements for the groundhandling domain as part of on the development of requirements for groundhandling.



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3.1.3 Manage human factors and human performance

Proposed structure for level 3:

3.1.3.1	Address human factors and human performance issues - General
3.1.3.2	Exploit new advances in medicines and health monitoring

The performance of the aviation system, including its safety performance, depends on humans and on the effective integration of the human factors into the management systems in place. Accordingly, focus on human factors and human performance should form an integral part of any safety management approach, be it at regional, State or industry level and is thus maintained as an EPAS strategic priority.

ICAO emphasised the importance of addressing human factors and human performance issues by publishing ICAO Doc 10151 'Manual on Human Performance (HP) for Regulators (first edition 2021).

Since 2020 the European SRM process has produced a dedicated safety risk portfolio (SRP) dealing with human factors and human performance. This draws upon data and information collected by EASA relating to human factors and human performance from various sources, including through occurrence reports, feedback from stakeholders, the experts in the Human Factors (HF) CAG and other regulatory and oversight activities. People design, build, maintain and operate every aspect of the global aviation system. An understanding of human factors and human performance leads to recognising how multiple influences throughout the entire aviation system can affect a service provider's safety performance during day-to-day operations.

This strategic priority is closely linked, *inter alia*, with other priority items, such as 3.1.1.4 (socio-economic factors).

3.1.3.1 Address human factors and human performance issues — general

The top three KRAs related to human factors (HF) and human performance (HP) are:

KRA 1	KRA 2	KRA 3
Airborne collision	Collision on runway	Aircraft upset

HF as a discipline has traditionally served as a special focus area in aviation safety management. With the fast-evolving aviation industry, the large variety of operating conditions and business models, but also in the face of disruptive events affecting the entire aviation ecosystem, it is increasingly important for aviation stakeholders to adopt a systems' view on safety. This requires sound knowledge and understanding of how and where people work within the aviation system and what may positively or negatively affect their performance.

The associated strategic goal is to improve the management of HF/HP issues at the level of States and industry by promoting a thorough understanding of HF/HP principles and their relevance in safety management. With this we aim at maximising the ability for humans to make a positive contribution to system performance, while reducing the exposure of the aviation system to HF-/HP-related safety issues. This will improve safety performance as well as operational performance.

In 2020 and 2021 the HF CAG prioritised a series of safety issues for a more in-depth analysis. These issues are systemic safety issues. Other CAGs address safety issues that also have HP elements. In addition to this regular process, various HF/HP aspects, including fatigue, are currently addressed within the domain SRPs as well as in the dedicated portfolio created following the identification of COVID-19-related safety issues.

The most relevant safety issues that are currently assessed and where further EPAS actions within 2023-2025 can be expected are:



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Training effectiveness and competence (SI-3011)

Despite the obvious technological advances that have made the aviation industry safer and more efficient in the last few decades, the way that those working in the industry are trained has not changed significantly: classroom-based lectures followed by the generic task-based on-the-job training are prevalent and often there is insufficient correlation between the desired competencies and their practical application in the workplace. Training delivered to aviation personnel might not sufficiently prepare them to operate safely or efficiently in their work environment. Furthermore, the onset of the COVID-19 pandemic in early 2020 has created an unprecedented situation, possible skills and knowledge degradation and reduced adherence to procedures and with it associated safety risks.

Fatigue and quality sleep (SI-3005)

Fatigue is repeatedly identified as one of the most serious challenges within the industry. The signs of fatigue are subtle and will lower human performance. The aviation industry relies on competent, trained, rested people that are physically and mentally fit to perform their duties to ensure safety and efficiency. In addition, quality of sleep is less well-regulated than the duration of a rest period, or duty time limits. As fewer personnel were available during the pandemic due to sickness / lockdown / conjunctural unemployment, others may have to work extra hours to cope with the workload.

Staff support programmes (SI-3012)

The EASA-led Task Force on Germanwings Flight 9525 identified a number of safety risks, including the need for pilot support programmes. However, humans throughout the aviation system need such support programmes. This has been highlighted in particular throughout the COVID-19 pandemic, where aviation professionals have worked under high pressure and often in isolating circumstances.

To monitor improvement in this domain, high-level and detailed HF- and HP-related event codes are applied to accidents and serious incidents, which enables the monitoring of HF-/HP-related elements to some extent. To go further in monitoring this strategic objective more specifically, the existing occurrence-reporting taxonomies will need to be augmented so that they adequately capture HF-/HP-related elements when reporting occurrences beyond accidents and serious incidents. Considering the limitations of current taxonomies, HF-/HP-related safety issues will continue to be monitored in relation to accidents and serious incidents only and will be reported in the ASR.

Key actions:

- **MST.0037** 'Foster a common understanding and oversight of human factors'.
- **SPT.0115** 'Provide Member States with a basis for training their staff in human factors'.
- **RMT.0194** 'Modernisation and simplification of the European pilot licensing and training system and improvement of the supply of competent flight instructors'.
- **RES.0006** 'Effectiveness of Flight Time Limitations (FTL) rules'.
- **RMT.0492** 'Development of FTL rules for CAT operations of emergency medical services by aeroplanes (AEMS)'.
- **RMT.0493** 'Update and harmonisation of FTL rules for CAT by aeroplane for air taxi operations and single-pilot operations taking into account operational experience and recent scientific evidence'.



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3.1.3.2 Exploit new advances in medicines and health monitoring

Health, well-being and fitness are intrinsically linked to the resilience of the aviation system. Risks in this area have increased during the COVID-19 crisis. Those risks have an impact on the performance of key personnel in the aviation system due to their effect on mental or physical state, which are influenced by multiple factors, including organisational and socio-economic ones, such as commercial pressure, job insecurity, working conditions, corporate (safety) culture, fatigue and lack of quality of sleep. Addressing these risks should be seen as a shared responsibility between the key personnel and management within aviation organisations.

As concerns medical fitness, the EPAS includes a number of actions e.g. to assess the extension of age limits as well as to evaluate new technology and advances in medicines and health monitoring. The Agency will consider the outcome of related research and evaluations to determine where current regulations should be amended, taking a performance-based approach.

Key actions:

- **RES.0041** 'Mental health for pilots and ATCOs'.
- **RES.0042** 'Pilot and ATCO fitness'.

3.1.4 Civil-military coordination and cooperation

Closer cooperation is needed between the civil and the military aviation stakeholders, including at the level of State safety management, both to reconcile the airspace needs and to achieve a safe and efficient use of airspace as well as to protect fundamental principles such as security or interoperability. Indeed, airspace should be considered as a single continuum, planned and used in a flexible way on a day-to-day basis by all categories of airspace users.

Within Europe a good example of civil-military cooperation in the ATM area is the implementation of flexible use of airspace (FUA) which is now evolving towards a more advanced concept, the so-called advanced flexible use of airspace (AFUA). While this approach is desirable and commendable, it only accounts for the ATM aspects. A comprehensive approach could be introduced to address virtually all aviation areas.

According to Article 115 of the Basic Regulation, when consultation relating to military aspects is deemed necessary, the Agency will consult the European Defence Agency (EDA) and other competent military experts designated by the Member States.

Airworthiness

While military aviation is the prerogative and the responsibility of Member States, it would be beneficial to leverage and consolidate efforts by both the civil and the military in developing their aviation capabilities, by taking elements from the civil world.

Based on consolidated expertise and experience, EASA provides effective support to military and industry applicants by going beyond adequate and prioritised technical advice for appropriate airworthiness and safety solutions.

An increasing number of European military authorities have already recognised that the civil model can, in part or fully, be extrapolated to military air systems. In those circumstances, they may move towards an 'as civil as possible, as military as necessary' approach through gradual convergence to civil standards if not adopting them for the design, manufacture and maintenance of military aircraft.



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In this regard, the European Defence Agency together with its participating Member States developed harmonised requirements for the airworthiness of military aircraft (EMARs/European Military Airworthiness Requirements) that are derived from the respective EASA PARTs and cover the initial, continued and continuing airworthiness domains.

Safety intelligence and performance domains

The timely and accurate reporting of safety information at European level and beyond is critical to verify the achievement of global safety objectives and monitor the implementation of safety programme initiatives, such as the EPAS.

Reliable military safety data sharing and analysis would allow to identify new safety risks not yet occurred in civil aviation when not specific to military aircraft or operations and means to mitigate them. Going forward, tools to allow for a comprehensive assessment of safety performance, including State and military aircraft, would be of strong benefit to the entire aviation system and would support the goal of ensuring the highest common level of safety and environmental protection for the European aviation system.

Aviation security (including cybersecurity)

There is a shared understanding and growing concern within the military community that security and especially cybersecurity may introduce considerable risk for aviation, as systems on board aircraft and the European ATM System rely on increased connectivity and system of systems integration.

Moreover, effectively mitigating cyber-related risks is key to enabling the integration of unmanned aircraft systems (UAS)/drones²⁹ into non-segregated airspace.

The strategic orientations adopted by EASA in developing its cybersecurity roadmap and the setting up of the ESCP provide the military with an opportunity to cooperate in an area of common interest in the wider context of the European aviation system.

Airspace, ANS, aerodromes open to public use

To meet the aerodrome challenges of delivering sufficient capacity, civil and military aerodromes will need to make progress to achieve a seamless airspace and globally harmonised ANS where civil-military cooperation is a crucial element to foster in the transition process.

Key to successful cooperation is the establishment of trust and transparency so that the needs and requirements of civil and military aerodromes and services providers could be fully understood and that over time an integrated model could be achieved.

With a regional approach in areas of highly fragmented airspace and aerodromes open to public use, certain facilities and services shall be arranged so as to ensure the safety³⁰, regularity and efficiency of civil aviation as well as to ensure that the requirements of military air operations are met, in particular by promoting a common understanding of key principles, sharing best practices and monitoring their practical implementation.

UAS

EASA continues developing a comprehensive regulatory framework for operations of UAS in the 'specific' (high risk) and 'certified' categories and the safe and harmonised development and deployment of U-space, in relation

29 'Unmanned aircraft systems (UAS)' is the legal and technical term used in the EASA Basic Regulation as well as in the delegated and implementing acts adopted on the basis thereof. 'Drones' is the popular term used to be understood by persons with no aviation background. Both terms are used in the EPAS and refer to the same thing.

30 According to Article 2(5) of the Basic Regulation, when an aerodrome controlled and operated by the military is open to public use, Member States have to ensure that it offers a level of safety and interoperability with civil systems that is as effective as that resulting from the application of the essential requirements set out in Annexes VII and VIII to this Regulation (without prejudice to national security and defence requirements and Article 7(5) of Regulation (EC) No 550/2004).



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to the harmonised implementation of the already adopted regulation (Commission Implementing Regulation (EU) 2021/664 of 22 April 2021 on a regulatory framework for the U-space³¹).

The military have been using these categories of UAS for several years. Therefore, civil-military cooperation in that domain should be strengthened, to benefit from the military experience, identify their needs and develop safety requirements that are as common as possible.

Research & innovation

EPAS further supports the safe integration of new technologies, innovative solutions and operating concepts into the aviation system and facilitates the emergence of such new technologies and solutions (refer to 3.4).

Many of these technologies and innovations emerging in the aviation industry bear significant potential to further improve the level of safety for the military: monitoring of multi-mission aircraft conditioned by data, anti-collision sensors in a non-cooperative airspace at low altitude, decrease in crew workload through the introduction of autonomous tasks, etc.

These research activities call for further civil-military cooperation and coordination to avoid duplication of efforts, and develop the safest means of compliance and requirements as common as possible.

Key actions:

- **MST.0001** ‘Member States to give priority to the work on SSPs’ and consider civil-military coordination aspects where relevant for their State Safety Programme.
- **MST.0024** ‘Due regard’ for the safety of civil traffic’ - Member States to report on the implementation of ‘due regard’ for the safety of civil traffic over high seas.

3.1.5 Capable and streamlined oversight

The general strategic objective is to foster the establishment of a robust system for capable and streamlined oversight. To that end, the initial oversight scope is extended with the entry into force of the UAS Regulations³² and the Agency will standardise, and report on, the oversight capabilities of the national competent authorities as regards the extended scope and assess the efficiency of the management systems applicable to all domains in the Member States.

In order to achieve a cooperative oversight, the Commission, the Agency and the competent authorities of the Member States should act, by sharing resources and working jointly, as a single European aviation safety system. The Agency should actively promote a common oversight culture and the sharing of best administrative practices. One core enabler in this regard will be the repository of information as stipulated in Article 74 of the Basic Regulation. The Agency also develops the involvement of national competent authority experts in standardisation or outsourcing activities to foster cross-fertilisation and information sharing.

The new Regulation³³ introducing the “One CAMO” concept enhances the cooperation mechanisms between different national competent authorities responsible for the oversight of the CAMO and AOC holders, when these organisations’ principal place of business are located in different Member States. This cooperation includes

31 [EUR-Lex - 32021R0664 - EN - EUR-Lex \(europa.eu\)](#)

32 [EUR-Lex - 32019R0945 - EN - EUR-Lex \(europa.eu\)](#)
[EUR-Lex - 32019R0947 - EN - EUR-Lex \(europa.eu\)](#)

33 [EUR-Lex - 32022R0410 - EN - EUR-Lex \(europa.eu\)](#)



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sharing the result of the oversight activities and encourages the performance of some oversight tasks on the CAMO by the national competent authority responsible for the operators. The use of this possibility will not transfer the responsibility of the national competent authority, which is kept by the NCA where the principal place of business of the organisation is located.

The Agency's monitoring activities with regard to the implementation of the Basic Regulation by the Member States aim to reinforce the capability of the competent authorities of the Member States to fulfil their obligations related to oversight and aim to transfer knowledge among them.

In the wake of the COVID-19 pandemic challenges, the standardisation activity monitors that the crisis does no longer affect the oversight capability of NCAs and that their oversight is commensurate with the size and complexity of the aviation industry. The Agency's standardisation process also adapts to the need to improve the resilience of the NCAs and better address new or emerging risks. This relies on the extension of standardisation to the 'Systemic enablers for Safety Management' (SYS) phase 2.0 to assess the management systems of the NCAs and ensure that the SSP fully coordinates the roles and responsibilities of all competent authorities with regard to the identification and mitigation of new risks.

SYS phase 2.0 also adopts the same methodology as ICAO with the ICAO State Safety Programme Implementation Assessment (SSPIA) to limit duplications and support EASA Member States in measuring and developing their safety performance. Standardisation also covers how competent authorities manage major changes, such as the development of UAS operations. The effective implementation of the applicable management system requirements by competent authorities is an essential enabler for the SSP.

3.1.6 Ensure a level playing field

Structure for level 3:

3.1.6.1	Address deficiencies identified through standardisation
3.1.6.2	Remove obstacles for a well-functioning single market

3.1.6.1 Address deficiencies identified through standardisation

As safety is the Agency's core business, standardisation is one of its main tasks, aimed at achieving and maintaining a high and uniform level of safety within the EU.

Standardisation activities entail assessing on a continuous basis the NCAs' ability to discharge their safety oversight responsibilities, as well as conducting standardisation inspections as necessary to directly verify the implementation of the rules.

Such inspections are prioritised, planned and performed using a risk-based approach, based on the Agency's assessment of all available indicators.

What we want to achieve

The Agency conducts standardisation activities to monitor the application by NCAs of the requirements of the Basic Regulation and of the delegated and implementing acts adopted on the basis thereof, as well as their uniform implementation, to allow for:

- passengers to fly safely across the EU;
- certificates issued by EU NCAs to be mutually recognised and trusted; and
- the EU system to be recognised by international partners.



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Currently identified weaknesses

The 2021 SAR identified the following areas of concern:

- **Lack of effective oversight.** As in the previous years, the most safety-related findings were raised in the areas of the NCAs' performance of certification and oversight tasks, showing that such essential functions remain the most challenging.
- **A two-speed system.** While some NCAs have reached a suitable and stable level of maturity, several others continue to underperform and/or struggle in achieving sustainable improvements.
- **Management systems.** While progress has been noted in the implementation of management systems at NCAs, a lack of effective oversight of undertakings' (safety) management systems continues to be of concern.
- **COVID-19-specific issues.** Whereas NCAs adapted better to the challenge of COVID-19 in 2021, the proper management of changes caused by the pandemic continued to be an area of concern. The key issues found in several NCAs relate to:
 - **management of flexibility provisions** (Article 71 of the Basic Regulation) and associated mitigations;
 - **remote oversight activities**, i.e. activities conducted remotely due to the pandemic; and
 - **resources and staffing** due to budget cuts, loss of experienced staff and lack of on-the-job training.

A number of actions are presented in **Volume II** to drive improvements in these areas of concern and more generally to support State safety management.

3.1.6.2 Remove obstacles for a well-functioning single market

Besides assessing on a continuous basis the NCAs' ability to discharge their safety oversight responsibilities, standardisation addresses a key enabler for the EU single market, i.e. the effective establishment of a level playing field among all Member States with regard to the way NCAs interpret and implement the common EU aviation safety regulations and the related EASA AMC & GM.

While certain NCAs have difficulties in performing their oversight activities, others sometimes impose additional requirements ('gold plating') or take a too strict interpretation of the rules, e.g. by 'mandating' compliance with the EASA AMC (which are a way, but not the only way, to comply with a requirement). This, in turn, has a negative impact on the EU aviation industry, especially with regard to those stakeholders that carry out their activities in more than one Member State and/or compete with stakeholders under the oversight of another NCA.

To that extent, in the context of its standardisation activities EASA monitors whether NCAs may be imposing non-justified additional requirements, and if such a case is detected, a finding is raised to address the issue.

Examples of areas which have been affected by various forms of 'gold plating' include the import of aircraft into the EU and the transfer of aircraft between EU registers. Large EU air operators have to deal with such activities on a regular basis, both from a business and safety perspective (aircraft interchange, crew interoperability, etc). However, certain NCAs set additional national requirements, which are no longer justified and have a negative impact on the single EU market. The objective is to allow EU air operators to function efficiently from a business perspective while maintaining the existing high safety standards.

In addition, sometimes the obstacle to a well-functioning single EU market is the lack of common EU requirements in a certain area. An example is the qualification of staff certifying maintenance of components; here, regulatory action to establish EU qualification standards is envisaged to amend the existing regulations in the area of continuing airworthiness, starting with Part-66.



3. STRATEGIC PRIORITIES

3.2 Competence of personnel

Structure for level 2:

3.2.1	Cross-domain priorities
3.2.2	Aircrew priorities (flight and cabin crew)
3.2.3	Priorities for ATCOs and other personnel involved in ATM/ANS
3.2.4	Priorities for aviation maintenance personnel
3.2.5	Priorities for other aviation personnel

Availability of well-trained and competent aviation personnel is paramount to the safety and resilience of the aviation industry. Therefore, it is proposed to elevate ‘competence of personnel’ to level 1.

Europe has a mature and detailed regulatory framework in place to ensure proper training, licensing, adequacy of training devices and oversight. Nevertheless, several factors are challenging this mature framework: new technologies and increasing automation are changing the safety needs for aviation personnel and new training devices are emerging. New aircraft types and technological advancements in virtual reality/artificial intelligence are revolutionising pilot training altogether.

Some of the new methods to optimise learning and recurrent training cannot work within the existing prescriptive regulatory framework. In addition, the UAS expansion will require the training of remote pilots. This, in turn, triggers the need for regulators and competent authorities to make available staff able to understand and evaluate the new CBTA-based training programmes for initial certification and to carry out efficient oversight activities. Furthermore, a new generation of instructors (‘evaluators’ in CBTA terms) and examiners needs to be formed to properly implement the new training methodologies within the training providers. Special attention to the methodology implemented for the assessment should also be paid, ensuring that an accepted and appropriate benchmark in terms of inter-rater reliability³⁴ should also be adopted.

3.2.1 Cross-domain priorities

Structure for level 3:

3.2.1.1	Improve the level of language proficiency in aviation
3.2.1.2	Facilitate the implementation of competency-based training assessment (CBTA)

3.2.1.1 Improve the level of language proficiency in aviation

The decision to address language proficiency requirements (LPRs) for pilots and air traffic controllers was first made by the 32nd Session of the ICAO Assembly in September 1998 as a direct response to several fatal accidents, including one that cost the lives of 349 persons, as well as to previous fatal accidents in which the lack of proficiency in English was identified as a contributing factor. The intent was to improve the level of language proficiency in aviation worldwide and reduce the communication breakdowns caused by a lack of language skills. LPRs have now moved beyond implementation (Assembly Resolution A38-8 refers), entering a phase of post implementation.

The implementation of LPR systems highlighted issues in the selection of suitable and appropriate testing tools that meet ICAO LPRs, which may result in safety risks.

³⁴ In statistics, inter-rater reliability is the degree of agreement among independent observers who rate, code, or assess the same phenomenon.



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Therefore, EASA supports the continuation of the LPR activities as an important aviation safety element and joins efforts with ICAO, working together in order to streamline and harmonise the LPR activities and optimise support to Member States and the industry. Building on the successful joint endeavours, ICAO and EASA, as part of the ICAO PTLP activities, are jointly working on the revision and update of LPR.

Key actions:

- **SPT.0102** to raise awareness on language proficiency requirements implementation, together with ICAO, the industry and Member States.
- **MST.0033** to share best practices to identify areas for improvement for the implementation of uniform and harmonised language proficiency requirements.

3.2.1.2 Facilitate the implementation of competency-based training and assessment (CBTA)

This strategic priority covers all regulated aviation personnel, including NCA staff.

The availability of competent and well-trained aviation personnel is essential to cope with the increased complexity of the aviation system resulting from the adoption of new business models, operational concepts, advanced technologies, and the introduction of new procedures or standards. Along with the adoption of new training methodologies such as CBTA, operators and large training providers now have access to a large volume of training data, feeding their safety management processes. As CBTA-based training will be available to all training providers regardless of their size, scope and complexity, there is a need to cater also for those providers that do not have fully developed training databases supporting their management systems. CBTA-based programmes will require a certain amount of customisation in order to accommodate the operational environment and different capacities of training providers. ICAO faces huge disparity in the maturity of Contracting States. For this reason, ICAO intends to set up provisions for the oversight system that guarantee the mutual recognition of a licence obtained in a CBTA-based course and to maintain high safety standards for approved training organisations (ATOs).

The shift from traditional, prescriptive task-based training to CBTA holds the potential for both safety benefits and operational efficiency gains once regulators, competent authorities and industry reach the maturity levels required to properly and efficiently implement the CBTA methodology.

This cross-domain strategic priority aims at the successful implementation of CBTA, for all licences and ratings, allowing adequate supply of instructors, as well as ensuring the availability of competent personnel in NCAs, taking advantage of new technology and an increasingly data-driven approach to training. The shift towards adopting CBTA within the industry presents a significant challenge for competent authorities considering the need to adjust and, in some cases refocus, their existing safety oversight programmes. Inspectors might lose the legal certainty of prescriptive rules with minimum training requirements (e.g. flight hours, classroom instruction). They will have to evaluate the effectiveness of a process or methodology, as well as the related outcome, while ensuring legal certainty of their decisions. For the inclusion of CBTA for all licences and ratings, in accordance with the future framework of ICAO Annex 1, EASA will consider a phased approach for the licensing community to gain experience before any considerations are made to amend the current requirements in terms of minimum hours or time. This will require the monitoring of how CBTA is used with a view, over time, to assessing the continued relevance of referencing experience and training in hours or time.

Key actions:

- Safety promotion regarding skills and knowledge degradation: <https://www.easa.europa.eu/community/topics/skills-and-knowledge-degradation>
- Safety promotion/implementation support on CBTA for the benefit of both industry and NCAs



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3.2.2 Aircrew priorities (flight and cabin crew)

Structure for level 3:

3.2.2.1	CBTA
3.2.2.2	Data for training

3.2.2.1 CBTA

In line with ICAO objectives, and to implement this strategic priority, among other initiatives, the Agency will work with its stakeholders to develop the authority requirements for the oversight of CBTA-based courses and the organisation requirements for ATOs willing to develop such programmes. The objective should be to set criteria against which a competent authority can demonstrate the appropriate oversight level. EASA Member States should ensure that work at the level of ICAO will lead to the development of robust international standards for CBTA.

The introduction of the new training concepts (CBTA including evidence-based training (EBT)) initially addresses pilots, through training organisations and operators. In parallel to the ongoing introduction of competency-based training, there is a need to ensure increased access to and availability of adequate FSTDs as well as development and introduction of adequate training devices which make use of the latest technological solutions (e.g. virtual reality, augmented reality). These actions will contribute to mitigating related safety issues, which have a significant bearing on aviation safety.

Key actions:

- Introduce evidence- and competency-based training and assessment in the domains of FCL and OPS, as appropriate (**RMT.0194, RMT.0599** - Opinion 02/2021³⁵ - Commission Implementing Regulation (EU) 2021/2227 of 14 December 2021 amending Regulation (EU) No 1178/2011 as regards the requirements for all-weather operations and for instrument and type rating training in helicopter³⁶ and Commission Implementing Regulation (EU) 2021/2237 of 15 December 2021 amending Regulation (EU) No 965/2012 as regards the requirements for all-weather operations and for flight crew training and checking³⁷).
- **RMT.0194** ‘Modernisation and simplification of the European pilot licensing and training system and improvement of the supply of competent flight instructors’.
- Increase availability of and access to FSTDs as well as foster greater use of VR training solutions (**RMT.0194, RMT.0196, RMT.0587, RMT.0599** - Opinion 02/2021 - Commission Implementing Regulations (EU) 2021/2227 and (EU) 2021/2237 of 15 December 2021).

35 [Opinion 02/2021 - All-weather operations and review of crew training requirements | EASA \(europa.eu\)](#)

36 [EUR-Lex - 32021R2227 - EN - EUR-Lex \(europa.eu\)](#)

37 [EUR-Lex - 32021R2237 - EN - EUR-Lex \(europa.eu\)](#)



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3.2.2.2 Data for training

Within the aircrew priorities a new item **'data for training'** is included to facilitate the use of accessible, cost-effective and protected data for aircrew training delivery and enable the use of predictive data from training.

Training evolves and is increasingly more data driven. The development of EBT meets the need of a new generation of aircraft with automated systems where traditional training has reached its limit. Pursuant to the development of EBT, data science has the potential to support more predictive training for the latest generation of highly automated aircraft with data to build the EBT data report.

At the same time the training industry is developing more global data collection and analysis in training, but there is no harmonisation to ensure quality training delivery and effectiveness. Industry also misses ethical criteria that enable the collection, sharing and analysis of anonymised/statistical training data while respecting the data privacy of individuals. EASA will seek for synergies with industry initiatives on EBT data reports to develop the training data collection and establish the adequacy and frequency of training topics in line with the new generations of aircraft on the market.

As not all organisations may have the critical mass of data to run a data analysis programme, a joint EU initiative under the leadership of EASA could be envisaged to support training programme development and ensure its adaptability to global safety threats.

3.2.3 Priorities for ATCOs and other personnel involved in ATM/ANS

Relevant strategic reflections in the last years, as the Report of the Wise Persons Group (WPGR) and the Airspace Architecture Study (AAS), have identified the limited availability and flexibility of ATCO resources as a potential blocking factor for the development of the required capacity and resilience of the European ATM network.

In the short to medium term, both the future ATM performance needs and the ongoing transition towards a digital ATM environment call for a more comprehensive approach to ATCO training standards, taking full advantage of the possibilities offered by synthetic training devices and new technologies. Furthermore, the evolution of the system architecture to allow optimised airspace configuration and use, places the evolution towards system-based training and licencing as the main long-term objective (refer to 3.4.5 'ATCO — system-based licencing system').

The evolution of the ATCO competence and training standards need to accompany the evolution of the human role in the ATM system, and therefore should build on appropriate human factor and human performance considerations and placing safety as the key element.

To achieve the above objectives, EASA aims at a combination of regulatory and non-regulatory actions.

Key actions:

- **RMT.0668** 'Regular update of air traffic controller licencing rules (IRs and AMC & GM)'.
- **RMT.0738** 'Next generation of air traffic controller licencing rules (IRs and AMC and GM)'.



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3.2.4 Priorities for aviation maintenance personnel

These new priorities for aviation maintenance personnel will initially focus on:

- improving training and examinations for aviation maintenance personnel, including consideration of unconventional aircraft (a.k.a. aircraft mainly intended for 'New Air Mobility' operations), and
- ensuring that maintenance is certified by competent personnel.

The last point will be supported by introducing common principles for increased robustness of the maintenance certification process, eliminating potential safety gaps. As an example, this may entail the clarification of the roles and responsibilities of certifying staff, support staff and 'sign-off' staff, both in line and base maintenance.

Key actions:

- **RMT.0255** 'Review of Part-66'
- **RMT.0544** 'Review Part-147'
- **RMT.0731** 'New Air Mobility', Subtask 1
- **RMT.0097** 'Functions of B1 and B2 support staff and responsibilities'

3.2.5 Priorities for other aviation personnel

This section is included as a placeholder with a view to addressing all categories of personnel within the remit of EU aviation safety regulations.

The next EPAS Volume I edition may include specific strategic priorities or goals in the domain of ADR/GH personnel in relation to competence of personnel.



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3.3 Operational safety

To support the management of safety at regional, State and industry level, it is necessary to identify the key risks or feared accident outcomes affecting the EU aviation system. Accordingly, the EPAS strategic priorities for operational safety shall take due account of the KRAs identified through the European SRM process, by using the European Risk Classification scheme (ERCS). KRAs (for example, excursion) show the areas of domain-specific risks to focus, to keep the European civil aviation system safe. KRAs are then further analysed to determine the underlying causal and contributing factors, which within the European SRM process are referred to as ‘safety issues’.

Safety issues constitute safety deficiencies related to one or more hazards and are the actual manifestation of a hazard or combination of several hazards in a specific context (for example, Approach path management, Runway surface condition safety issues are contributing to the excursion KRA). Safety issues, not KRAs, can be risk-assessed and practically managed (mitigated). KRA are controlled by assessing and implementing mitigating actions on the safety issues. Safety issues are defined across domains (e.g. for HF and HP or to address the risks stemming from the COVID-19 pandemic) or for a specific operational domain and grouped in the European SRPs, published within EPAS Volume III.

Each safety issue in the European SRPs is linked to or contributing to the worst credible KRA in terms of feared accident outcome and is scored by EASA. Mitigation is achieved through safety actions (EPAS Volume II) that strengthen existing or introduce new safety barriers within the European civil aviation system. Safety issues are managed at a tactical level with a timeline of up to 3 years. As KRAs are normally associated with several safety issues, full mitigation can be achieved when higher-score safety issues are addressed. This may take up to 10 years, considering the average age of products/technology used, the cycle of changes introduced, the rulemaking timespan from drafting to full implementation, and other aspects.

Thus, the EPAS strategic priorities for operational safety can be determined with due regard to the KRAs or feared accident outcomes the European aviation system should strive to avert. Within a given domain KRAs are ranked in accordance with the aggregated ERCS score of occurrences attributed to those safety issues contributing to a respective KRA. The ERCS score does not consider the mitigation actions introduced in the system as a result of occurrence investigation or assessment. Therefore, the KRA ranking is used for monitoring purposes to see the KRA dynamics. Refer to EASA Annual safety review (ASR) latest edition for details.

To ensure that the strategic priorities for operational safety take due account of all KRAs and underlying safety issues, their scope is extended to address all operational domains for which an SRP is or will soon be available, as follows:

Structure for level 2:

3.3.1	Ensure operational safety in CAT aeroplane operations (airlines and air taxi passenger/cargo) and NCC aeroplane operations
3.3.2	Ensure operational safety in rotorcraft operations
3.3.3	Ensure operational safety in General Aviation (GA)
3.3.4	Ensure operational safety in initial and continuing airworthiness ³⁸
3.3.5	Ensure operational safety in air traffic management/air navigation services (ATM/ANS)
3.3.6	Ensure operational safety in aerodrome operations (ADR) and groundhandling (GH)

³⁸ work has been initiated to create a dedicated SRP.



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3.3.1 Ensure operational safety in CAT aeroplane operations (airlines and air taxi passenger/cargo) and NCC aeroplane operations

In addition to addressing key risks and underlying safety issues two new objectives are proposed to be included within CAT/NCC operational priorities:

The following structure is defined for 3.3.1 (level 3):

3.3.1.1	Address safety risks in CAT aeroplane and NCC aeroplane operations
3.3.1.2	Ensure availability of high-quality geo-data to support safe increases in traffic
3.3.1.3	Enable proportionate rules for 'business aviation' addressing the CAT/NCC boundary

3.3.1.1 Address safety risks in CAT aeroplane and NCC aeroplane operations

The European SRM process has identified the following as the most important risk areas in this domain, in decreasing order of the aggregated risk score:

KRA 1	KRA 2	KRA 3
Aircraft upset	Runway excursion	Other injuries

To address these, the actions already included with EPAS 2022-2026 will continue to be deployed:

- **RMT.0196** and **SPT.0012** to review and promote training provisions on recovery from upset scenarios.
- **MST.0028** for Member States to address:
 - loss of control in flight by taking actions at national level and measuring their effectiveness; and
 - runway safety by taking actions at national level and measuring their effectiveness.
- Promote and implement the Global Action Plans for the Prevention of Runway Incursions (GAPPRI) and Excursions (GAPPRE), in support of Regulation (EU) 2020/2148.

3.3.1.2 Ensure availability of high-quality geo-data to support safe increases in traffic

This strategic goal focuses on the availability of operational data, such as data needed for flight path management, tactical decision-making, etc. including data provided by the aerodrome operator (cf. RMT.0722 'Provision of digital aeronautical data by the aerodrome operator'). The introduction of new technologies and business models will create new challenges to the availability of such high-quality data. This may also require moving the attention beyond data processing and distribution to data origination, the latter not yet being commonly regulated. To implement this strategic goal, RMT.0722 will be rescoped in a more inclusive manner so that it will address all data deployed, including data needed for 'all-weather operations' related to the availability of certain systems required for safe operation.



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3.3.1.3 Enable proportionate rules for ‘business aviation’ addressing the CAT/NCC boundary

This strategic goal considers that currently large and small operators within the full range of complex motor-powered aircraft are subject to the same requirements for an air operator certificate (AOC) as an airline. Where the particular ‘business model’ requires an AOC, the CAT requirements are considered too demanding for those operating at the lower end of CAT, which has potential to drive operators to opt for Part-NCC instead. This tendency will have a detrimental safety impact, and it is therefore necessary to enable proportionate rules by better capturing the specificities of operators in the lower CAT segment.

As many of these operators are also at the forefront of adopting new technology, including innovations aiming at reducing the environmental footprint, it is important to adapt the regulatory framework in a way that will encourage them to operate under proportionate CAT rules. The outcome of evaluation task EVT.0013 ‘Evaluation of the rules for commercial small aeroplane operations under Part-CAT and Part-SPO’ will be considered to determine where the rules may need to be adapted. Changes could then be managed as part of RMT.0392 ‘Regular update of air operation rules’.

3.3.2 Ensure operational safety in rotorcraft operations

Improving safety in rotorcraft operations remains a strategic priority in this edition. This operational domain is exposed to a high number of accidents (around 10 fatal accidents and 50 non-fatal accidents as per the 10-year annual average, meaning that on average there is one rotorcraft accident per week in Europe). The vast majority (80 %) of all accidents and serious incidents involved rotorcraft performing non-commercial operations or specialised operations.

A dedicated SRP was introduced with EPAS 2022-2026 to support the identification and mitigation of safety issues within the variety of rotorcraft operations.

The European SRM process has identified the following as the most important risk areas for rotorcraft operations (all types of operations):

KRA 1	KRA 2	KRA 3
Aircraft upset	Other injuries	Terrain Collision

In 2018 EASA initiated the **Rotorcraft Safety Roadmap**³⁹ by tasking a group of external experts from NCAs and industry to develop jointly with EASA a set of ambitious proposals. The roadmap contains proposals for actions in order to significantly reduce the number of rotorcraft accidents and incidents. The initial analysis of data showed that the activities need to focus on light conventional rotorcraft and small operators. The roadmap covers safety and transversal issues that need to be tackled through actions in various domains, including training and licensing, operations, initial airworthiness, environment and facilitation of innovation. The main elements of the roadmap were presented in several fora including the Rotorcraft Committee (R.COM) and the EASA Rotorcraft and VTOL Symposium.

The vision of the roadmap is to ‘**achieve significant safety improvement for Rotorcraft with a growing and evolving aviation industry**’. The group analysed a significant amount of data and took a very close look at the European ‘helicopter landscape’ before defining its objectives and identifying the actions to meet these objectives.

39 <https://www.easa.europa.eu/download/Events/Rotorcraft%20Safety%20Roadmap%20-%20Final.pdf>



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The following objectives were defined in order to deliver the vision stated above:

- **Improve overall rotorcraft safety by 50 % within the next 10 years (starting January 2019):** Most of the accidents can be attributed to operational causes, and it is recognised that influencing behaviour in the wider community is a complex process where step changes are difficult to achieve in the short term. However, for accidents caused by technical failures, an ambitious target is set to reduce the number of accidents caused primarily by technical failures by one order of magnitude.
- **Make positive and visible changes to the rotorcraft safety trends within the next 5 years:** The aim of this objective is to drive the rapid implementation of some actions that are identified and to rapidly progress a number of safety improvements. A key performance indicator (KPI) for the safety objectives is the number of rotorcraft accidents in Europe that result in at least a fatality or a serious injury.
- This KPI is monitored and published annually by EASA as part of the ASR. Additional KPIs will be based on the ERCS complemented by the data collection activity using D4S to build robust data on accident rates. Generally, helicopter safety performance indicators are published as part of the EASA ASR.
- **Develop performance-based and proportionate solutions that help maintain competitiveness, leadership and sustainability of the European industry:** This objective also aims at supporting the development and safe integration of new business models and at encouraging innovation.

The Agency initiated a project to evaluate and integrate the recommendations contained in the Roadmap into the EASA work programme. It was decided not to launch new RMTs but to include the inputs from the Rotorcraft Safety Roadmap in current RMTs as much as practical. The aim was to optimise the use of rulemaking resources and eventually implement the changes at a faster pace.

In 2020 and 2021 focus shifted to the RNO project and a review of the actions was performed to give priority on those supporting the industry during the pandemic. Some Roadmap actions were put on hold or delayed. In addition, because of the need to make optimal use of rulemaking resources and prioritisation, the planning of some RMTs was shifted.

The main Roadmap subjects are organised in work streams as described below (refer to the Roadmap for further details):

- **Training safety and training devices:** The use of FSTDs and the development of new training devices such as, but not limited to, VR has been strongly promoted for high-risk training scenarios. There is a wide consensus that better training is one keyway to improve safety. The changes required to improve training and training devices will be implemented as part of RMT.0194, RMT.0196, RMT.0678, RMT.0587 and RMT.0599.
- **Safety data:** EASA engages with original equipment manufacturers (OEMs), operators and NCAs to collect and consolidate exposure data and other relevant statistics, such as flight hours or number of cycles of their products.
- **Safety promotion:** To establish a sustainable and effective safety culture including the sharing of best practices, safety promotion is a fundamental activity.
- **Helicopter design improvements:** This work stream already resulted in several voluntary and mandatory design changes aiming to improve safety.
- **Certification Specifications modernisation:** This work stream will address the modernisation of the EASA CSs. Several RMTs were initiated in that respect.
- **Simplification/reduction of administrative burden for small-helicopter operators:** The Agency had contracted evaluation task EVT.0010 'Regulatory burden for small and medium-sized helicopter operators' to collect data and assess the regulatory burden in this segment. The evaluation report for EVT.0010 was delivered with a number of recommendations⁴⁰, and follow-up actions were initiated and will further continue in the future.

40 Refer to Best Intervention Strategy 'Rotorcraft – small-helicopter operators'



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Evaluation of new concepts: The following new concepts were and are evaluated:

- **Net safety benefit:** A Certification Memorandum was published in July 2021. A phased approach was taken with the publication of a first Certification Memorandum providing credit for development assurance levels. An updated Memorandum will be published to extend the credit to high-intensity radiated field (HIRF) and lightning certification requirements.
- **Continued aviation education:** The Rotorcraft Safety Roadmap had suggested the introduction of a continued aviation education (CAE) scheme to various rotorcraft personnel playing key roles in safety — the proposal being to begin with accountable managers and nominated personnel.
- A kick-off meeting was held to start the activities just prior to the ensuing COVID-19 crisis. The first action was for the participants to familiarise themselves with existing continued medical education programmes. Yet, due to the crisis, the medical world had other priorities, resulting in the CAE work stream being put on hold for the time being.
- **Safety rating:** The next concept proposed is the introduction of a voluntary rotorcraft safety rating scheme. Such a scheme is used in the automotive industry with the crash test programmes Euro NCAP⁴¹. This is a good way to give an incentive to the manufacturers to make safety improvements to their vehicles and differentiate themselves (from the competition). An initial concept evaluation and feasibility study were performed in May 2020 and presented to international audience. It was agreed with the main stakeholders to create an international working group tasked to develop such a scheme. The work started in 2021 under the umbrella of the international Vertical Aviation Safety Team (VAST). The team is co-chaired by EASA.

Key actions:

- **RMT.0710** ‘Improvements in the survivability of rotorcraft occupants’ in the event of an otherwise survivable crash (ToRs published on 16/12/2021).
- **RMT.0599** ‘Update of Subpart FC of Part-ORO (evidence-based training)’ — Opinion 02/2021 - Commission Implementing Regulation (EU) 2021/2227 of 14 December 2021 amending Regulation (EU) No 1178/2011 as regards the requirements for all-weather operations and for instrument and type rating training in helicopter⁴² and Commission Implementing Regulation (EU) 2021/2237 of 15 December 2021 amending Regulation (EU) No 965/2012 as regards the requirements for all-weather operations and for flight crew training and checking⁴³.
- **RES.0008** ‘Integrity improvement of rotorcraft main gear boxes (MGB)’.
- **RES.0009** ‘Helicopter offshore operations – new floatation systems’.

41 https://en.wikipedia.org/wiki/Euro_NCAP

42 [EUR-Lex - 32021R2227 - EN - EUR-Lex \(europa.eu\)](#)

43 [EUR-Lex - 32021R2237 - EN - EUR-Lex \(europa.eu\)](#)



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3.3.3 Ensure operational safety in General Aviation (GA)

Note: Throughout this document, the term 'GA' is used to encompass non-commercial operations with aeroplanes having a MTOM below 5 700 kg, as well as all operations with sailplanes and balloons. Operations with rotorcraft, commercial and non-commercial, for all types of rotorcraft, are addressed in [Section 3.3.2](#).

Addressing safety risks in GA in a proportionate and effective manner remains a strategic priority in this edition.

While it is difficult to precisely measure the evolution of safety performance in this domain due to lack of consolidated exposure data (e.g. accumulated flight hours), safety in GA will remain a priority considering the consistently high number of accidents and fatalities in this domain every year. Stakeholders took the initiative to provide exposure data to support the NoAs in defining safety performance indicators that would allow determining accident rates in GA.

The European SRM process has identified the following as the most important risk areas for non-commercial operations with other than complex motor-powered aircraft (NCO):

KRA 1	KRA 2	KRA 3
Aircraft upset	Airborne collision	Runway excursion

Regarding KRA 1, in the aeroplane category, parachuting operations are creating a special concern. These operations, usually entailing short flights, are exposed to a range of operational and organisational hazards (refer to SI-4023 in EPAS Volume III). The latest tragic accident occurred on 9 July 2021 in Sweden; all 9 occupants died on board the aircraft that crashed shortly after take-off.

Regarding KRA 2, the safety data indicates that airborne collision risks affect mostly pilots of smaller aircraft regardless of experience and phase of flight. However, all of them with fatal consequences involved uncontrolled flights typically in daylight and in good meteorological conditions. A collision is more likely where traffic is congested. That occurs usually close to aerodromes or along the borders of controlled or restricted airspace structures.

Thus, airspace infringements into controlled airspace are an important related safety risk. The research project RES.0031 'Interoperability of different *iConspicuity* devices/systems' initiated with EPAS 2022-2026 aims to propose solutions for this issue, ideally also in connection with the 'Data for Safety' programme. The existing EPAS actions aim at facilitating the installation of *iConspicuity* devices in all aircraft, ensuring their interoperability and promoting their use at user-affordable costs. All these actions are also important enablers for the safe integration of UAS and manned aircraft into U-space airspace.

Activity trends:

Unfortunately, the Agency does not have aggregate data concerning flight hours and number of flights in the GA domain. It is consequently impossible to evaluate the activity trend over the last 10 years. The recently initiated research project 'Interoperability of electronic conspicuity systems for General Aviation' aims to provide solutions including for this issue, ideally as part of the 'Data for Safety' programme. It should also be noted that stakeholders, mainly the International Council of Aircraft Owner and Pilot Associations (IAOPA) and the General Aviation Manufacturers Association (GAMA) have taken the initiative to run yearly surveys on GA activity.

Safety promotion

Safety promotion is the backbone for mitigations against accidents in the GA domain. The following actions have been achieved:

Various online live sessions have been organised with safety partners with over 6 000 attendees. To improve the dissemination of safety messages (MST.0025), in 2018 EASA launched the GA Community website that now



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gets in excess of 25 000 views per month and has over 8 900 members. The 2021 GA Season Opener, which was attended by over 600 people from the GA community. This event was repeated again with a two-week GA Season Opener Campaign with over 6 000 people attending the events and viewing the recorded material.

A dedicated workshop for the skydiving community was organised on 25 February 2021 as part of SPT.0121 'Improving the safety of parachuting operations'; at the same time, a dedicated Safety Promotion page for parachuting operations was launched on the GA Community website. There has also been a [Sunny Swift article published](#) on parachuting and then a safety campaign with the skydiving community will continue in 2023.

There have been 36 Sunny Swift articles published up to December 2022.

Key actions:

- **SPT.0092** to improve the dissemination of safety promotion and training material by authorities, associations, flying clubs and insurance companies targeting flight instructors and/or pilots; to create a GA Safety Promotion platform.
- **SPT.0121** to continue delivering safety promotion material to improve the safety of parachuting aircraft operations, by highlighting the most common causes of accidents and providing good practices/operational procedures that can help to mitigate the most important risks.
- **SPT.0125** with safety promotion campaigns for the development of content in coordination with NCAs and industry prior to each flying season and following each season to help maintain skills and currency — based on highlighting the most important safety issues identified through the European SRM process.
- **RMT.0727** to adapt design and production rules ('Part 21 Light') to become more proportionate to the risks.
- **RES.0021** to bring data to the GA cockpits: weather, flight information services (FIS) and traffic information data should progressively be made available in all GA cockpits (). This will be supported by facilitating the installation of iConspicuity devices in all aircraft, ensuring their interoperability and promoting their use at user-affordable costs. These actions are also important enablers for the safe integration of UAS and manned aircraft into U-space airspace (RMT.0230).
- Support the implementation of new or amended regulations.



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3.3.4 Ensure operational safety in initial and continuing airworthiness

This new strategic priority is proposed in line with the new approach which is to cover all domains within the operational safety priorities where an SRP is or will be soon available, to better link the operational safety priorities with the key risks and safety issues determined through the European SRM process.

Structure for level 3:

3.3.4.1	Address safety risks in initial and continuing airworthiness
3.3.4.2	Improve safety assessment of HF in aircraft certification

3.3.4.1 Address safety risks in initial and continuing airworthiness

For the time being, this item is proposed as a placeholder for future strategic safety goals, as an airworthiness SRP is not yet available and related KRAs have not yet been determined.

3.3.4.2 Improve safety assessment of human factors in aircraft certification

This strategic goal, associated with addressing safety risks in airworthiness, is to ensure that HF are duly considered in aircraft and system functional hazard assessments (FHAs), as well as to better integrate flight crew HF into the continued airworthiness of type design process.

Human factors considerations in aircraft and system FHAs

FHAs are key elements within the safety assessment process for showing compliance with large aeroplane Certification Specifications (see CS 25.1309). They support the compliance demonstration by ensuring that:

- the identification of failure conditions is complete,
- the severity classification of the failure conditions is correct, and
- this severity classification is adequately substantiated.

The consequences of failure conditions or functional failure scenario and their severity may be mitigated by relying on flight crew actions. Whether these mitigations trigger the expected effect directly affects the classification, and subsequently the safety objectives. The assumptions made on flight crew capability to perform the actions expected from them as well as on any additional hazards that may result from human errors while a failure condition is being managed, are at the core of the FHA and will directly influence the final assessment⁴⁴. These assumptions may be indirectly validated or verified in other processes that are not directly connected to the FHAs.

Recent experience has shown that a disparity may exist between observed flight crew behaviours and underlying assumptions about flight crew recognition, interpretation, and response that applicants have made during the design and certification process. Such disparities may invalidate the assumptions made in the safety assessment and ultimately the validity of these assessments themselves. To ensure that applicants conduct a systematic and structured activity to demonstrate the validity of assumptions, a certification memorandum (CM) is currently being developed by EASA to stress the importance of considering HF in aircraft and system FHAs.

Better integration of flight crew human factors into the continued airworthiness process

In aircraft operation it may occur that flight crew behaviours deviate from what was expected by the flight deck designers, system designers, and the certification authorities. Part of these deviations might have critical

44 From a certification standpoint, those aspects are covered by a combination of CS 25.1309(b) and CS 25.1309(c).



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outcomes and raise HF issues with possible safety impact. It is considered that, in Europe at least, the HF processes that are implemented to show compliance with HF requirements and their associated guidance are bringing a valuable framework that positively contributes to the quality of flight deck designs and therefore limits the potential for flight crew errors or any other human performance issue.

However, despite the robustness of these processes and methods, it is not realistic to pretend that all potential sources of future HF-related occurrences can be anticipated, nor that all assumptions made during a certification process can be covered and validated before the type certificate (TC) is issued. The process is highly dependent on the observed quality of the HF processes that are proposed by the applicants. The current system overall relies on the continued airworthiness process as a complementary means to the initial airworthiness process. However, as currently designed and implemented, the existing continued airworthiness system only partially covers these needs. It should therefore be reinforced and improved.

The objective of this new priority item within the strategic priority ‘address safety risks in initial and continuing airworthiness’ is thus to:

- provide applicants with a structured HF methodology to validate the assumptions made about the expected flight crew behaviours, in the aircraft and system FHA;
- improve continued airworthiness methodologies, regulatory requirements, and processes to better capture crew behaviours in operations not consistent with initial airworthiness assumptions and identify corrective actions in design, procedures and/or training.

3.3.5 Ensure operational safety in air traffic management/air navigation services (ATM/ANS)

This new strategic priority is proposed to better link operational safety priorities with the European SRM process.

Structure of level 3:

3.3.5.1	Address safety risks in ATM/ANS
3.3.5.2	Ensure the safety of ATM/ANS equipment
3.3.5.3	SES 2+ implementation

3.3.5.1 Address safety risks in ATM/ANS

Operational safety is the key objective for air traffic management activities together with ensuring the efficiency and regularity of air traffic.

Besides ensuring the necessary alignment with ICAO SARPs, activities in this area are aimed at ensuring a swift identification, assessment and management of safety issues. In this regard, following the SRM process EASA maintains an ATM/ANS Safety Risk Portfolio with the participation of the ATM/ANS CAG. The established processes ensure the definition and categorisation of the KRAs.

The European SRM process identified the following as the most important risk areas in the ATM/ANS domain:

KRA 1	KRA 2	KRA 3
Airborne collision	Collision on runway	Aircraft upset



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3.3.5.2 Ensure the safety of ATM/ANS equipment

In accordance with the EASA Basic Regulation, a new regulatory framework in relation to the conformity assessment and attestation of ATM/ANS equipment is being developed by EASA, to be introduced as of the second part of 2023. The key objective is to enable the safe, interoperable, and efficient provision of ATM/ANS. At ATM/ANS equipment level this requires a more effective and efficient introduction of new technologies, accompanying the move towards increased reliance on digital technologies and automation.

In addition, the new framework should be proportionate to the risks, making use of existing methodologies and best practices. For this, different attestation methods will be introduced, and the role and responsibilities of the organisations involved in the design and production of ATM/ANS equipment will be directly regulated, having a direct impact on the appropriate delineation of the different manufacturing and service provision activities and their respective oversight.

Through the introduction of common specifications and streamlined attestation processes, the timelines for deployment of new equipment will be shortened, while at the same time greater efficiency and market development will be achieved.

Key action:

- **RMT.0161** ‘Conformity assessment’.

3.3.5.3 SESII+ implementation

In 2021 the EC issued the amended proposal on the implementation of the Single European Sky (the so-called SES II+ recast), proposing an upgrade of the Single European Sky regulatory framework and the EASA Basic Regulation, which comes on the heels of the European Green Deal.

Furthermore, to achieve the proposed goals for a ‘Digital European Sky’, the focus should be on a scalable system and on the development of digital technology and AI that would allow for meeting the capacity on demand. The proposal calls for greater resilience and scalability in air traffic management, by making it easier to adapt traffic capacities to different demand patterns.

To secure both safe, operationally, and environmentally efficient and cost-effective air traffic management services, the EC proposes actions such as:

- strengthening the European network and its management to avoid congestion and suboptimal flight routes;
- promoting a European market for data services needed for better air traffic management;
- streamlining the economic regulation of air traffic services provided on behalf of Member States to stimulate greater sustainability and resilience;
- developing digital technologies for a scalable and resilient network system — ‘capacity on demand’; and
- boosting better coordination for the definition, development and deployment of innovative solutions.

The EC sent its SESII+ proposal to the Parliament and the Council for its first reading in September 2020. The related co-decision procedure is still ongoing. The SESII+ high-level objectives, such as strengthening the European ATM network management, establishing a European market for data services and ATM digitalisation based on new space-based systems, would call for further growing and stronger ATM oversight capabilities by EASA.

Once the SES II+ package is approved, EASA will initiate the necessary regulatory and non-regulatory actions to implement the new legislative provisions. Some of these regulatory actions could be accommodated under RMTs already included in this EPAS, while others might require the identification of additional regulatory tasks in subsequent editions of the EPAS.



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3.3.6 Ensure operational safety in aerodrome operations (ADR) and groundhandling (GH)

This new section is proposed to better link operational safety priorities with the European SRM process.

Structure for level 3:

3.3.6.1	Address safety risks in ADR and GH
3.3.6.2	Create a certification system for aerodrome equipment
3.3.6.3	Create an EU regulatory framework for groundhandling

3.3.6.1 Address safety risks in ADR and GH

For this domain the European SRM process identified the following as the most important risk areas:

KRA 1	KRA 2	KRA 3
Ground damage	Aircraft upset	Other injuries

3.3.6.2 Create a certification system for aerodrome equipment

Safety-related aerodrome equipment should be suitable for use and should not impair flight safety. The EASA Basic Regulation contains requirements for the formal recognition of safety-related aerodrome equipment and designates EASA as the competent authority for such safety-related aerodrome equipment. For the technical requirements, the Basic Regulation allows for the use of detailed specifications established by EASA to ensure compliance with the essential requirements, whenever a certificate or declaration is required. EASA will establish the regulatory framework not only for ATM/ANS systems, but also for safety-related aerodrome equipment through RMT.0161.

Key action:

- **RMT.0161** 'Conformity assessment' (Subtask 4).

3.3.6.3 Create an EU regulatory framework for groundhandling

GH is at the interface between aerodrome operations and aircraft operations, yet GH had not been included among the aviation domains regulated at EU level until Regulation (EU) 2018/1139 (the EASA 'Basic Regulation') was issued. A common framework to address GH is a prerequisite for a holistic approach to managing safety in a highly complex and interconnected system such as aviation.

Today the GH domain operates by industry standards. Some Member States cover this domain through national legislations, while some other Member States have no legislation to address safety in the ground handling domain. At EU level, there is no safety baseline established for the GH services provided by a GH service provider, no clear discharging of responsibility for the safe provision of GH services by organisations providing GH services, and no level-playing field as regards the oversight of GH activities by competent authorities. The Basic Regulation contains essential requirements covering the safe provision of GH services. The corresponding set of implementing rules, to detail how those essential requirements should be observed, needs to be developed.

EASA has also identified the main risk areas for the GH domain, and associated safety issues, which are published with EPAS Volume III. The COVID-19 crisis added another layer of safety risk to the already identified issues.



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In terms of global context, there are currently no specific SARPs in the ICAO Annexes dedicated to GH services and providers of these services. At the end of 2019, ICAO published Doc 10121 'Manual on Ground Handling', containing good-practice material, to support stakeholders and GH service providers in improving safety and creating interfaces with air operators and aerodrome operators. The 2021 ICAO High-Level Conference on COVID (HLCC) concluded that the work on the SARPs in the GH domain should aim to 'develop a flexible and balanced approach for the oversight of ground handling, taking into account views from and impact on different stakeholders', proposing that the implementation of SMS by GH service providers should be left to the discretion of each ICAO State. Most ICAO States allow industry to self-regulate; a few States have developed a GH regulation.

As for the European context, some Member States have national legislations covering the GH domain. Regulation (EU) No 965/2012, on air operations, contains only one implementing rule covering service providers in general, which practically requires aircraft operators to control and take responsibility of the safety of services provided by contractors. Industry has developed operational procedures and standards for GH services. There is, however, no harmonised way on how industry standards are recognised in the Member States. GH organisations and aircraft operators performing self-handling adopt industry standards on a voluntary basis. The future GH regulation will provide a framework that enables organisations to use industry standards. The Member States will further decide on the role of industry standards in the development of a risk-based oversight of GH organisations. This is a similar approach to the one in the air operations domain through Regulation (EU) 965/2012.

The first set of safety data analysed and discussed with the stakeholders in the GH and ADR CAG has been taken into account for the rule development. In EPAS Volume III almost all GH activities normally developed at an aerodrome during turnaround activities are identified as potential safety issues and further identified per category and with different degrees of priority.

The aim of creating a regulatory framework for groundhandling service providers (GHSP) is to increase the overall safety level of the aviation system, reduce the damages to aircraft and vehicles recorded yearly, and ensure a level playing field in the EU by establishing a safety baseline for the provision of GH services. An organisation can only prioritise safety risks and manage its resources effectively to obtain optimal results if it has a clear understanding of its role and contribution to aviation safety. Accordingly, drafting of regulations focuses on enabling GH organisations to develop and maintain a safety culture and within a management system for safety that can be easily implemented and effectively conducted at individual aerodrome level.

The draft regulation (publication of the EASA Opinion with draft AMC & GM expected early 2023) proposes requirements for the organisations of GHSPs, their oversight, and the interfaces with air operators and aerodromes where the services are being provided. Those detailed requirements will be based on the Annex VII essential requirements of the Basic Regulation.

Key action:

- **RMT.0728** 'Development of requirements for groundhandling'.



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3.4 Safe and sustainable integration of new technologies and concepts

Structure for level 2:

3.4.1	Artificial intelligence (AI) in Aviation Programme
3.4.2	Digitalisation in Aviation Programme
3.4.3	Innovative Aerial Services and other mobility and operational concepts
3.4.4	Virtual certification: modelling and simulation (M&S)
3.4.5	ATCO — system-based licensing system
3.4.6	SESAR research and development for new ATM/ANS functionalities
3.4.7	Ensure the safe integration of extended minimum-crew operations and single-pilot operations
3.4.8	Ensure the safe integration of new business models in air operations
3.4.9	Enable new propulsion technologies
3.4.10	Ensure the safe integration of higher airspace operations

This strategic priority supports the safe and sustainable integration of new technologies, innovative solutions and operating concepts into the aviation system and facilitate the emergence of such new technologies and solutions.

Many of the technologies and innovations emerging in the aviation industry bear significant potential to further improve the level of safety, e.g. by improving the collection and analysis of operational data, improved accessibility and better quality of meteorological information, etc.

At the same time new operating concepts and emerging business models, novel aircraft or propulsion systems are emerging, and their specific features may not be addressed in existing certification specifications and operational regulations (including flight crew licensing, air operations, continuing airworthiness, aerodrome operations and ATM/ANS). Some new business models such as those responding to the increased demand for flying in the cities (e.g. urban air mobility⁴⁵) or those generated by the increased digitalisation in the aviation industry (VR/AR, digital twins, gamification, etc.), the possible introduction of more autonomous vehicles and platforms, single-pilot operations and completely autonomous cargo aircraft, will challenge the way authorities regulate and oversee the aviation system.

These new business models and operations need to be performed in a safe and secure manner to maintain the confidence that citizens have in the air transport system. EASA has a key role to play in this area.

The Agency is assessing the integration into its regulatory activities of regulatory sandboxes as an enabler for industry to experiment/test/validate innovative and disruptive technology.

Digitalisation and automation are rapidly increasing in aviation systems. Whilst this has resulted overall in significantly improved safety, the trend towards increasing automation requires a renewed safety focus on the interactions between humans and automation. The next generation of automation will be using AI. This domain, no longer the province of science fiction, could well be the next ‘game changer’ for aviation⁴⁶. In the near future, new EPAS actions will be required to maximise related safety benefits, while mitigating any threats induced by the implementation of these new technologies.

45 Until now, the air travel over urban areas has been limited to very special operations, such as police operations or HEMS. New actors are seeking new business models to provide more services to citizens, ranging from parcel delivery by air within the cities to flying air taxis.

46 See AVIATION SAFETY – Challenges and ways forward for a safe future, Research & Innovation Projects for Policy, EC – Directorate General for Research and Innovation, January 2018: <https://publications.europa.eu/en/publication-detail/-/publication/b4690ade-3169-11e8-b5fe-01aa75ed71a1/language-en/format-PDF/source-75248795>.



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AI, and more specifically the ML field of AI, bears enormous potential for developing applications that would not have been possible with the development techniques that have been used so far. As concerns EASA, AI will affect most of the domains under its mandate. AI not only affects the products and services provided by the industry but also triggers the rise of new business models and affects the Agency's core processes (certification, rulemaking, organisation approvals, SRM process and standardisation). This may in turn affect the competency framework of EASA staff.

In this fast-evolving context, EASA is putting significant efforts into preparing for the future with the identification of dedicated resources to research and innovation (R&I), such as the Agency-wide AI implementation project team, the 'EASA Innovation Cell', increasing support to the development of EU aviation & aeronautics research programmes and projects, etc. **R&I** is essential to reap the safety potential of new technologies and innovative solutions, while managing related risks.

Research Agenda

Regularly EASA experts and external stakeholders suggest or request research topics that are needed to tackle the issues identified. These topics are prioritised on a yearly basis and included in the Agency's 'Research Agenda'⁴⁷ which groups the requests for a given period even without having immediate funding. The Agency Research Agenda 2020-2022⁴⁸ encompasses a series of innovation- and efficiency-related actions besides safety-focused research.

EASA and the EC signed a new Contribution Agreement towards the end of 2021 for the management of research actions delegated to EASA in the Horizon Europe Work Programme 2021-2022. These research actions are planned to be implemented through 16 new research tenders. The list of research actions was published in the Horizon Europe work programme 2021-22 for 'Climate, Energy, Mobility', in section 'Indirectly managed actions'⁴⁹.

The research projects that become part of the EPAS derive from the list of prioritised research agenda topics for which a funding source has been secured or where it is likely that the project will be funded by the start of the reference period of the given EPAS.

Further information on the Agency's research activities can be found on the EASA webpage <https://www.easa.europa.eu/easa-and-you/safety-management/research>.

3.4.1 Artificial intelligence (AI) in Aviation Programme

The next generation of automation in aviation systems is enabled and accelerated by the use of AI technologies. Whilst the trend towards increasing automation has resulted overall in improved safety, the introduction AI will likely be modifying the paradigm of interaction between the Human and the AI-based systems (reduced crew operations), and in parallel even open the path towards more autonomous types of operations (urban air mobility (UAM)).

In the near future, new EPAS actions will be required to maximise related safety benefits, while mitigating any threats induced by the implementation of these new technologies (refer to 'Key action' below).

47 [EASA Research Agenda 2019-2021 rev 1](#)

48 [EASA Research Agenda 2020-2022](#)

49 [wp-8-climate-energy-and-mobility_horizon-2021-2022_en.pdf \(europa.eu\)](#)
https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/horizon/wp-call/2021-2022/wp-8-climate-energy-and-mobility_horizon-2021-2022_en.pdf



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EASA AI Roadmap implementation

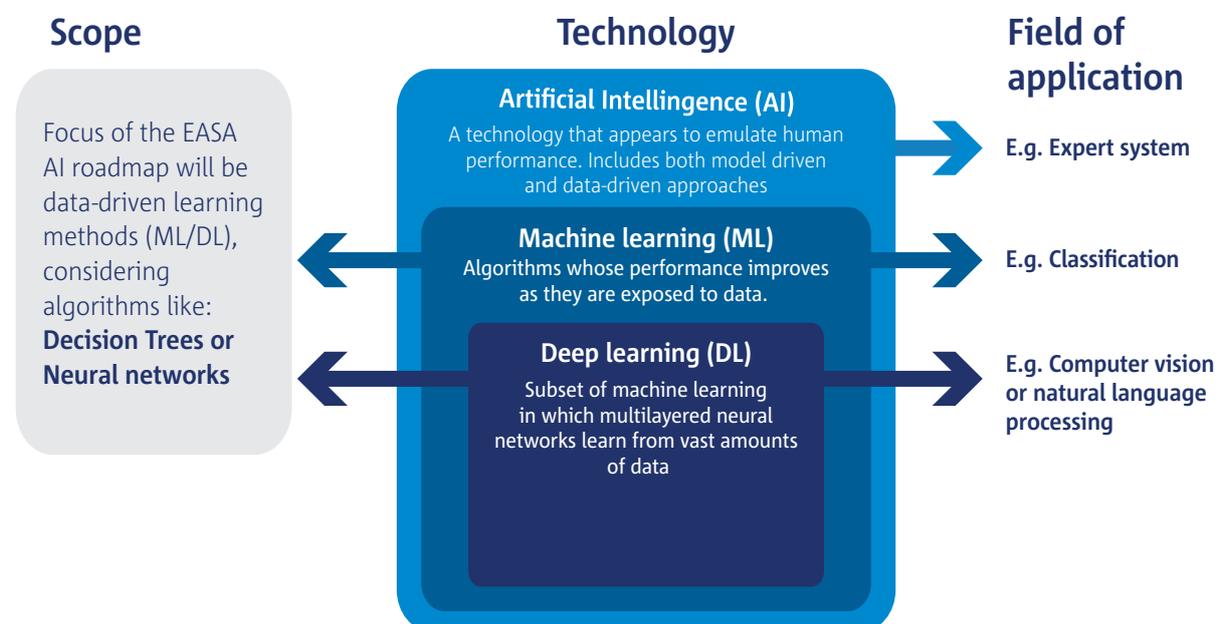
AI, and more specifically the machine learning (ML) field of AI, bears enormous potential for developing applications that would not have been possible with the development techniques that have been used so far. The deployment of AI technology has therefore become a strategic priority for the aviation industry, including for safety-related applications. This is the reason why EASA published in February 2020 the AI Roadmap 1.0⁵⁰, aimed at creating a consistent and risk-based ‘AI trustworthiness’ framework to enable the processing of safety-related AI/ML applications in any of the core domains of EASA, with the first approvals and certifications anticipated from 2025 onwards.

As concerns EASA, AI will affect most of the domains under its mandate. AI not only affects the products and services provided by the industry, but also triggers the rise of new business models and affects the Agency’s core processes (certification, rulemaking, organisation approvals, SRM process and standardisation). This may in turn affect the competency framework of EASA staff.

Scope of the EASA AI Roadmap

Version 1.0 of the EASA AI Roadmap focused on ML techniques using, among others, learning decision trees or neural network (NN)⁵¹ architectures.

The work for the development of an updated EASA AI Roadmap (version 2.0) is planned to start towards the end of 2022 and it is aimed to be published by mid of 2023. It foresees an extension of the scope, to cover additional learning techniques (beyond supervised learning), in particular unsupervised and reinforcement learning techniques. This scope extension may also be covering ‘symbolic AI’ (rule-based AI) if the use cases currently identified by industry prove to be viable approaches and raising challenges beyond the current developed guidance.



► Figure 5: AI taxonomy in the EASA AI Roadmap

50 <https://www.easa.europa.eu/domains/research-innovation/ai>

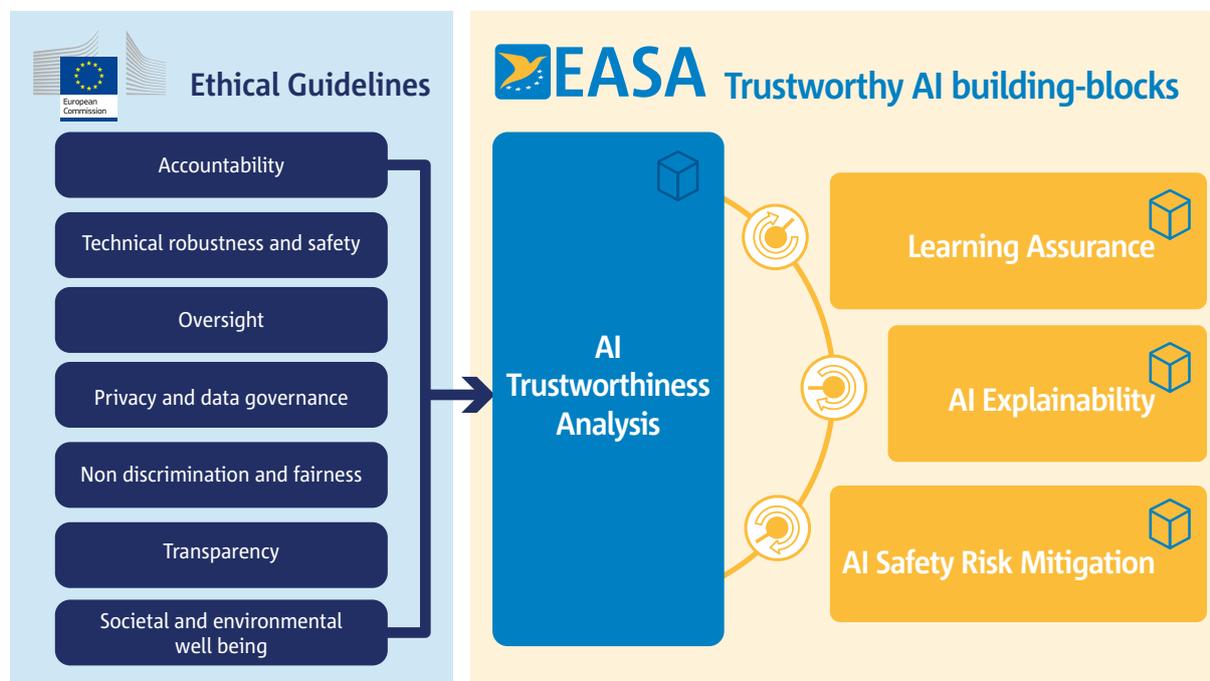
51 Neural network (NN)— A computational graph which consists of connected nodes (‘neurons’) that define the order in which operations are performed on the input. Neurons are connected by edges which are parameterised by weights (and biases). Neurons are organised in layers, specifically an input layer, several intermediate layers, and an output layer.



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Building blocks for the EASA AI Roadmap 1.0

The EASA approach is driven by the concept of ‘AI trustworthiness’ that was introduced by the EC High Level Group of Experts on AI.



► Figure 6: EASA AI trustworthiness building blocks

All four building blocks are of importance in gaining confidence in the trustworthiness of an AI/ML application.

In December 2021, EASA published its Concept Paper ‘First usable guidance for Level 1 machine learning applications’. This document provides a set of high-level objectives for each of the above-mentioned building blocks for Level 1 AI applications (human assistance/augmentation). It paves the way for future releases of guidance for Level 2 AI (human-AI collaboration) and Level 3 AI (more autonomous AI).

EASA AI Programme

In February 2022 EASA established the EASA Artificial Intelligence Programme. The Programme revolves around five objectives, implemented through the EASA Artificial Intelligence Roadmap action plan, where the actions, the key deliverables, the delivery dates and the responsibilities of the Programme are defined. These five objectives are:

- Develop a human-centric AI trustworthiness framework
- Make EASA a leading certification authority for AI
- Support European aviation leadership in AI
- Contribute to an efficient European AI research agenda
- Contribute actively to EU strategy and initiatives

The EASA AI Roadmap foresees a consolidation phase from 2024 onwards.



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Key actions:

Within this reference period various areas within the AI Programme may qualify for rulemaking, including, but not limited to:

- transforming the AI Concept Papers' guidance into a generic set of acceptable means of compliance;
- referencing this guidance in the aviation regulations of the domains impacted by AI; and
- preparing for an EU regulation laying down harmonised rules on AI.

3.4.2 Digitalisation in Aviation Programme

Digitalisation and automation have become a daily reality, and strategic multi-annual plans are in place at European level to encourage and implement electronic workflows and acceptance of electronic identifications to achieve a more flexible and efficient transmission of data and reaching the target of environmental sustainability.

The COVID-19 crisis has also revealed the increased effectiveness of digital products over more traditional, paper-based solutions and many organisations (also within the civil aviation environment) are launching a digital transformation initiative.

Digitalisation in the aviation field

Aviation is moving fast to digitalise all areas, as there are demonstrated tangible benefits in safety, economics, operations, traffic management and control, manufacturing, training and maintenance.

Automation, remote control, machine-to-machine communication, robotics: 3D printing, virtual and augmented reality, blockchain, AI/cognitive computing, ML, and sensors are among the technologies that will increasingly be used in aviation and that will impact the activity of regulators and aviation authorities.

In order to exploit the full digitalisation potential, the aviation sector needs to progress in the 'information management' dimension. Today, the fragmentation of data in terms of both taxonomy and storage does not allow a significant progress for the analysis according to the latest methodologies. These developments are increasingly challenging traditional aviation regulations and calling for an evolution towards more performance-based, technology-neutral requirements, which will enable the novel business models that emerge from the digital transformation, increasing at the same time safety and efficiency.

Besides, aviation is not only 'a business': while stakeholders invest in digitalisation to make their activities ever more efficient and competitive, society expects that aviation continues to achieve the highest possible levels of safety and environmental protection. As such, EASA needs to monitor how the EU aviation industry is digitalising its processes, to ensure that digital transformations have no undesirable impact on safety.

Such a rapid and disruptive change calls for a number of actions at different levels, involving EASA and the entire European aviation safety system:

- actions needed to keep abreast of digitalisation issues, in particular in relation to product certification and operations; and
- key EASA digitalisation activities, both for external purposes (e.g. electronic personnel licences) or internal purposes (e.g. digital repositories, digitalisation of processes); and actions needed to implement EU's digital agenda and e-government action plan.



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The following activities also fall under the Agency's Digitalisation in Aviation Programme:

- **Repository of information (REPIF)**

Article 74 of the Basic Regulation requires EASA to establish and manage a repository which aims at facilitating the exchange of information between EASA and the NCAs. EASA, together with the Member States' Task Force, continues developing the future digital repository of information based on agreed technical architecture and governance mechanisms. Following consultation of the draft rule with the Member State Advisory Body (MAB) EASA published Opinion No. 04/2022⁵². Draft specifications are foreseen to be completed and a technical IT solution established in time to start operation subsequent to rule adoption.

- **Environmental Portal**

The Agency bundles its efforts on digitalisation of its environmental activities under the EASA Environmental Portal⁵³ with a first application as regards the collection of aircraft noise and performance information (refer to 3.5).

3.4.2.1 European electronic personnel licences (EPL)

This strategic goal aims at introducing 'electronic personnel licences' for flight and cabin crew, ATCOs and aviation maintenance personnel, harmonised across Europe and globally accepted.

The main objective is to provide a cost-efficient, safe and easy-to-use service and to enable the aviation personnel to carry their licences, including medical certificates, in a fully digitised format displayed on their own self-contained mobile electronic devices.

In April 2021, following consultation of its Advisory Bodies, EASA decided that, in order to expedite the transposition of ICAO SARPs into the EU regulatory framework and ensure faster entry into service of electronic licences for pilots (referred as 'Digital Licences for Aviation Pilots' (dLAP) in the previous EPAS editions), the best strategy was to commence with a rulemaking task to amend the Aircrew Regulation (Regulation (EU) No 1178/2011) for the introduction of electronic licences for pilots to transpose the upcoming amendment to ICAO Annex 1 on the implementation of an electronic personnel licensing system, with the applicability date of 3 November 2022. The ICAO scope is wider than just pilot licences.

To expedite the transposition of these ICAO SARPs into the EU regulatory framework and ensure faster entry into service of the EPL, in the beginning of 2022 EASA performed an impact assessment and concluded that the best strategy going forward is to extend the scope to match the ICAO scope and commence with a rulemaking activity to introduce the necessary requirements regarding the introduction of EPL within the EASA Member States through amendments of the following Regulations:

- Regulation (EU) No 1178/2011 with regard to aircrew;
- Regulation (EU) 2015/340 with regard to air traffic controllers; and
- Regulation (EU) No 1321/2014 with regard to continuing airworthiness.

The extension of scope to additional categories of staff (cabin crew, ATCOs, aviation maintenance personnel) will be managed as part of the existing RMT.0737. This rulemaking task also mitigates the uncertainties on financing and will modernise the EU personnel licensing system through efficiency and security gains. EASA will closely coordinate with the ICAO Electronic Personnel License Task Force (EPL-TF). The specific objective of this RMT is to develop and establish the requirements for the introduction and implementation of an electronic personnel licensing (EPL) system within the EU regulatory framework in order to:

52 [Opinion No 04/2022 - Repository of aviation-related information | EASA \(europa.eu\)](#)

53 <https://www.easa.europa.eu/en/domains/environment>



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- enable the issue, display, validation and verification of EU EPLs on self-contained mobile electronic visual display devices in addition to the licences issued on high-quality paper or other suitable material, including plastic cards; EPLs shall be optional to the paper version, nevertheless, the Member States, national competent authorities will have the obligation to recognise EPLs issued by all other Member States;
- ensure the security, confidentiality, data protection, integrity, authentication, and accessibility as regards EPLs;
- ensure EPL system interoperability between the different issuing and verifying national competent authorities and other affected stakeholders (e.g. examiners for pilot licences); and
- transpose ICAO Annex 1 SARPs on EPLs (Amendment 178 to Annex 1) in the relevant EU regulations.

It is anticipated that NCAs (and eventually pilots/industry) will benefit from substantial cost savings due to a fully digital administration (reduced cost for printing/storing paper; reduced working time for licence processing). This is further supported by making the needed data available in the repository of information (REPIF), to ensure effective cooperation between EASA and the NCAs as per Article 74 of the Basic Regulation.

Key action:

- **RMT.0737** ‘Electronic personnel licences’ (previously: ‘Digital licence for aviation pilots’) to address the mandatory requirements regarding the introduction of EPL into Regulation (EU) No 1178/2011 with regard to aircrew, Regulation (EU) 2015/340 with regard to air traffic controllers; and Regulation (EU) No 1321/2014 on the continuing airworthiness of aircraft and aeronautical products, parts and appliances, and on the approval of organisations and personnel involved in these tasks.

3.4.3 Innovative Aerial Services and other mobility and operational concepts

Structure for level 3:

3.4.3.1	Establish a comprehensive EU regulatory framework for UAS and manned VTOL-capable aircraft
3.4.3.2	Ensure safe U-space implementation
3.4.3.3	Ensure the safe integration of other air mobility and operational concepts

3.4.3.1 Establish a comprehensive EU regulatory framework for UAS and manned VTOL-capable aircraft

Note: ‘VTOL-capable aircraft’ means a power-driven, heavier-than-air aircraft, other than aeroplane or rotorcraft, capable of performing vertical take-off and landing by means of lift or thrust units used to provide lift during the take-off and landing.

Types of UAS operations

EASA distinguishes between three types of UAS operations as follows:

- **Operations type #1:** Instrument flight rules (IFR) operations of UAS for the carriage of cargo in airspace classes A–C (ICAO airspace classification) and taking off from and/or landing at aerodromes falling under the Basic Regulation.



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- **Operations type #2:** Operations of UAS taking off and/or landing in a congested (e.g. urban) environment using predefined routes in the U-space airspace (part of the operation could be in a non-congested, e.g. rural environment). These include operations of unmanned VTOL-capable aircraft carrying passengers (e.g. air taxis) or cargo (e.g. goods delivery services).
- **Operations type #3:** Same as for type #2 operations with VTOL-capable aircraft with a pilot on board, including operations out of the U-space airspace. While this task will include considerations also for emerging technologies such as electric and hybrid propulsion as integral part of the drones' design, the dedicated RMT.0731 will address in particular the CAW aspects related to these technologies.

The safe integration on the basis of granting fair access to airspace of all new entrants into the airspace network will be one of the main challenges in relation to the integration of UAS technologies and related concepts of operation.

Enabling the safe integration of UAS (also commonly called 'drones'), being a fast evolving and emerging market segment, as well as of (initially manned) VTOL-capable aircraft, also intended for UAM operations, continue to be high-priority EASA activities. These have been largely unaffected by the COVID-19 pandemic.

Following the adoption of the U-space regulatory package, EASA is now focusing on supporting Member States and industry in their forthcoming implementation of U-space services and continues developing a comprehensive EU regulatory framework for the 'certified' UAS category.

Operations of UAS in the 'open' and 'specific' categories

Common European rules contribute to the development of a common European market while ensuring safe operations, providing a level playing field, as well as respecting the privacy and security of EU citizens.

Following the initial applicability on 31 December 2020 of Commission Implementing Regulation (EU) 2019/947⁵⁴ accompanied by Commission Delegated Regulation (EU) 2019/945⁵⁵, EASA began including these regulations in its standardisation activities.

These Regulations were amended by Commission Implementing Regulation (EU) 2020/639⁵⁶, accompanied by Commission Delegated Regulation (EU) 2020/1058⁵⁷, introducing two European standard scenarios allowing the use of a declaration submitted by the UAS operator to the NCA. The initial applicability date of the European standard scenarios was set to 2 December 2021. The EC, together with the Member States, decided to postpone applicability to 31 December 2023.

With the above Regulations the proposed EASA general concept establishing three categories of UAS operations ('open', 'specific' and 'certified' — with different safety requirements proportionate to the risk) is adopted at European level and will be implemented. Following the publication of the above-mentioned EU Regulations, EASA published the related AMC and the GM — see ED Decision 2019/021/R⁵⁸.

Key actions:

- assess the effectiveness of the EU drone regulations;
- propose an NPA in 2023 on improving the EU drone regulations in light of operational experience following their applicability;

54 <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1570893991756&uri=CELEX:32019R0947>

55 <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1570894011520&uri=CELEX:32019R0945>

56 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R0639>

57 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32020R1058>

58 <https://www.easa.europa.eu/document-library/agency-decisions/ed-decision-2019021r>



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- finalise and implement a substantially improved and simplified specific operations risk assessment (SORA) version ('SORA 2.5');
- develop new predefined risk assessments (PDRAs) on additional most common UAS use cases;
- recognise industry standards as acceptable means of compliance (AMC);
- further complement and improve the initial set of AMC & GM to the EU drone regulations;
- develop AMC & GM to address the definition of geographical zones, the standard scenarios (STS) and the syllabus for training modules for remote pilots operating in the 'specific' category.

Operations of UAS in the 'certified' category, including manned (piloted) VTOL-capable aircraft

In response to applications for the certification of small VTOL-capable aircraft, EASA developed, consulted and in July 2019 published a Special Condition (SC) that included suitable airworthiness standards to enable the certification of small VTOL-capable aircraft. In June 2021, the SC was complemented by Means of Compliance (MOC). This SC for the certification of those aircraft represents the first component of the regulatory framework to enable the safe operation of manned VTOL-capable aircraft (air taxis) in Europe.

With regard to the environmental compatibility of VTOL-capable aircraft, in anticipation of future air taxi operations in urban areas, a number of different designs of drones and small VTOL-capable aircraft have been noise-tested in the course of 2019 and 2020. The aim was to assess the particularities of the individual noise signatures through recordings of different overflights and stationary flight phases. Raw noise data was recorded for multiple flights based on which the Agency will assess the accuracy, repeatability and representativeness of different candidate noise measurement procedures as well as the suitability of potential noise assessment metrics and noise assessment reference points.

Key actions:

- A first NPA to cover operations of manned VTOL-capable aircraft carrying passengers or cargo in congested (urban) and non-congested (non-urban) environments, as well as UAS operations in the 'specific' high-risk categories. This comprehensive NPA 2022-06 was published on 30 June 2022 under RMT.0230. The subsequent related Opinion will address several aviation domains (initial and continuing airworthiness, aircraft operations, aircrew licencing, ATM/ANS and rules of the air).
- In parallel, work on the second NPA under RMT.0230 to cover operations of unmanned VTOL-capable aircraft and UAS operating international IFR has commenced.

EASA UAM Study Task Force

Until now, the air travel over urban areas has been limited to very special operations, such as police operations or helicopter emergency medical services (HEMS). New actors are seeking new business models to provide more services to citizens, ranging from parcel delivery by air within the cities to flying air taxis. These new business models and operations need to be performed in a safe and secure manner to maintain the confidence that citizens have in the air transport system.

When EASA started its work on developing new and amending existing regulations to allow more regular UAM operations, it became clear that societal concerns and citizens' expectations for these new mobility applications needed to be fully understood and addressed by the regulator, so that the right level of regulatory objectives and actions are established. It was for that reason that EASA conducted a comprehensive study on the societal acceptance of UAM operations across the European Union to guide its work. The study was carried out together



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with the consulting firm McKinsey & Company and the Arup Sound Lab between November 2020 and April 2021, with the final report published in May 2021⁵⁹.

The results reveal a general positive attitude by citizens and a readiness to try out these services, in view of the benefits they can offer in terms of faster, cleaner and better-connected mobility. However, they also highlight citizens' concerns on safety, security, environmental impact and noise of these operations that will need to be addressed.

As a follow-on activity to action the main outcomes and conclusions of the UAM Study, EASA established a dedicated EASA UAM Study Task Force, comprised of various relevant stakeholder groups, tasked with developing an action plan with additional or complementary actions to the existing ones that EASA could take to enable safe, secure, efficient and sustainable implementation of UAM in the EU. The Task Force delivered its action plan in 2022Q1. EASA will perform an additional evaluation of the scope, content, resources and timelines of the identified actions and will decide on their inclusion in future EPAS editions. Should EASA decide to pursue any of the actions listed in order to foster societal acceptance, proper considerations will also be given to concurrent initiatives launched by other authorities or institutions and to industry needs and timelines.

Vertiports

VTOL-capable aircraft will use aerodromes, heliports and the so-called vertiports. 'Vertiport' means an area of land, water or structure used or intended to be used for the landing and take-off of VTOL-capable aircraft. Vertiports are classified as aerodromes for the purpose of aerodrome and vertiport regulations. A common European approach to vertiports will be established in the scope of the drone programme.

At the first stage, in March 2022, EASA published Prototype Technical Specifications (PTS) for the design and operations of VFR vertiports for operations of manned VTOL-capable aircraft. Member States may use these PTS for developing their national regulatory framework for vertiports. Besides the positive effect of fostering the European VTOL-capable aircraft and vertiport design technology as such, the resulting harmonisation is particularly important for vertiport operators and small and medium VTOL-capable aircraft manufacturers who would have an easier access to EU markets, where vertiports have common design and organisational features.

At the second stage, for vertiports within the scope of Basic Regulation Article 2, which are open to public use, serve commercial air transport and use instrument approach and departure procedures, and for the VTOL-capable aircraft operations type #2 (unmanned) and operations type #3 (manned), EASA will develop a full package of regulations for the design and operations of vertiports, including requirements for the authority, vertiport operators and operation of vertiports, along with the certification specifications for the design and certification of vertiports.

The NPA concerning the design and operation of vertiports within the scope of the Basic Regulation will be published along with other NPAs for the 'certified category' (RMT.0230).

VTOL-capable aircraft operations type #2 and type #3 can be conducted at aerodromes when using the runways and manoeuvring areas, or vertiports designed for such purposes, while the operations at heliport facilities at aerodromes or at stand-alone heliports may only be used provided that the VTOL-capable aircraft dimensions and performance meet the design characteristics of the heliport intended to be used.

Key action:

- PTS for the design of vertiports (RMT.0230) to support the establishment of a coherent and harmonised system of design criteria for vertiports, which can be applied by Member States for those vertiports to which national rules would apply (action completed⁶⁰).

59 [EASA publishes results of first EU study on citizens' acceptance of Urban Air Mobility | EASA \(europa.eu\)](#)

60 [Prototype Technical Design Specifications for Vertiports | EASA \(europa.eu\)](#)



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3.4.3.2 Ensure safe U-space implementation

In March 2020 EASA published Opinion No 01/2020 proposing a regulatory framework for the U-space to create and harmonise the necessary conditions for manned and unmanned aircraft to operate safely in the U-space airspace, to prevent collisions between aircraft and to mitigate the air and ground risks. The EC adopted the U-space regulatory package in April 2021. This is a major achievement for the implementation of the EU drone policy and Smart Mobility Strategy.

The U-space regulatory package consists of three regulations:

- Commission Implementing Regulation (EU) 2021/664 of 22 April 2021⁶¹ on a regulatory framework for the U-space;
- Commission Implementing Regulation (EU) 2021/665 of 22 April 2021⁶² amending Implementing Regulation (EU) 2017/373 as regards requirements for providers of air traffic management/air navigation services and other air traffic management network functions in the U-space airspace designated in controlled airspace; and
- Commission Implementing Regulation (EU) 2021/666 of 22 April 2021⁶³ amending Regulation (EU) No 923/2012⁶⁴ as regards requirements for manned aviation operating in U-space airspace.

The applicability date of the Regulations is 26 January 2023.

Following the publication of the above-mentioned U-space regulatory framework (Regulation (EU) 2021/664), in December 2021 EASA published proposals for associated AMC and GM, for public consultation through NPA 2021-14, including the necessary means in support of the implementation of the U-space regulation.

Key actions:

- Publication of 3 EASA Decisions including AMC & GM in support of the implementation of the U-space Regulation (ED Decisions 2022/022/R, 2022/023/R and 2022/024/R).
- A first NPA to cover operations of manned VTOL-capable aircraft carrying passengers or cargo in congested (urban) and non-congested (non-urban) environments, as well as UAS operations in the 'specific' high-risk categories. This comprehensive NPA 2022-06 was published on 30/06/2022 under RMT.0230. The subsequent related Opinion will address several aviation domains (initial and continuing airworthiness, aircraft operations, aircrew licencing, ATM/ANS and rules of the air).
- In parallel, work on the second NPA under RMT.0230 to cover operations of unmanned VTOL-capable aircraft and UAS operating international IFR has commenced.
- Establishment of a new Task Force of EASA Member States, coordinated by EASA, on harmonised approaches for the certification of U-space Service Providers (USSP).

61 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0664>

62 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0665>

63 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0666>

64 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021R0666&qid=1654607972196>



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3.4.3.3 Ensure the safe integration of other air mobility and operational concepts

After gyroplanes (new subtask in RMT.0731 'New air mobility' introduced for the EPAS 2021-2025), airship and flying car developments are being closely monitored and are subject to a BIS; in particular, to determine when to start the corresponding rulemaking work.

Airships: there are a number of airship projects in Europe. These lighter-than-air aircraft are likely to be used in commercial operations in the medium term; for instance, with more than 60 tons payload for cargo transport. The existing flight crew licensing, air operations and continuing airworthiness regulations will need to be adapted to incorporate this type of operation.

Flying cars: there are currently a number of 'flying car' projects under certification by EASA. These flying cars are dual-transport mode aircraft capable of being operated both as a flying machine and as a terrestrial vehicle. The aviation safety regulations (e.g. air operations regulation, continuing airworthiness regulation) will need to be adapted to incorporate this type of aircraft.

Key action:

- **RMT.0731** 'New air mobility' to develop rules or amend existing ones, where necessary, to address new technologies and operational air transport concepts. This includes specific subtasks to develop flight crew licensing and operational rules for gyroplanes and tilt rotors.

3.4.3.4 EASA Counter Drone (C-UAS) Action Plan

The EASA internal task force (TF) — established following the events in Gatwick during the winter 2018/2019 — was mandated to analyse the facts related to the incidents and to develop an action plan ensuring that aerodrome operators, air traffic service (ATS) providers and aircraft operators are better prepared to prevent such events from happening, and, if they nevertheless should happen, respond appropriately to non-cooperative (unauthorised) drones.

The action plan is articulated around five objectives:

- educate the public to prevent and reduce misuse of drones around aerodromes;
- prepare aerodromes to mitigate risks from unauthorised drone use;
- support the assessment of the safety risk of drones to manned aircraft;
- ensure that C-UAS measures are swiftly considered and implemented from a global safety perspective; and
- support adequate occurrence reporting.

The output from the action plan complements EASA's rulemaking activities on U-space and the EASA implementation plan for Commission Delegated Regulation (EU) 2019/947 and Commission Implementing Regulation (EU) 2019/945.

Other actions of non-regulatory nature on drones

- **SPT.0091** 'European safety promotion on civil drones' for coordinated safety promotion to create understanding and awareness of the rules and to support safe UAS operations in the long term.
- **RES.0015** 'Vulnerability of manned aircraft to drone strikes'.
- Webinars with Member States on different topics related to Regulations (EU) 2019/945 and (EU) 2019/947, in order to promote common understanding and harmonised implementation.



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3.4.4 Virtual certification: modelling and simulation (M&S)

The aviation industry undergoes a digital transformation process which has a strong impact on how new technologies and innovations are developed and used, including the research and development, design, testing, certification, production/manufacturing, training, maintenance and oversight processes. M&S has the potential to accelerate the introduction of new technologies and innovative types of operation and is thereby contributing to the strategic objectives of the European Green Deal.

Furthermore, it offers potential for cost efficiency gains for all involved parties. M&S tools can be automated and may benefit e.g. from ML solutions, in order to optimise a particular design by performing extensive simulations. What is more, M&S has the capacity to further improve product safety as it provides the ability to interrogate many different design and operating conditions beyond the practical limitations of physical testing. Therefore, it is now included as a distinct strategic priority.

The Agency will monitor the related work in the Clean Aviation projects under Call 1, in particular through contributions to TRA-02 on 'Novel Certification Methods and Means of Compliance for Disruptive Technologies'. This will facilitate the identification of new processes and methods necessary to prepare the future regulatory and certification framework adapted to disruptive new technologies and architectures. As part of this effort and considering that M&S will be one of the enablers for such an evolution, the industry will need guidance and requirements from the regulator on how M&S techniques can be applied and accepted in certification processes in particular as regards the credibility of such techniques, including the verification and validation processes.

As part of this CLEAN-AVIATION-2022-01-TRA-02 monitoring, the Agency intends to establish an M&S roadmap which will describe the overall regulatory approach to M&S including an action plan for rulemaking and standards development, contributions to relevant R&I projects, the advancement of innovative compliance methods, the cooperation with other regulators, as well as competency management aspects. This roadmap will be closely coordinated with the AI Roadmap. Once agreed, related actions in terms of rulemaking, research, safety promotion, etc. will feed into future EPAS Volume II editions.

3.4.5 ATCO — system-based licensing system

This new strategic priority has been established in light of the evolution of the European ATM landscape to converge air traffic control (ATC) training and ATCOs performance.

For the last decades, European approved ATCO training organisations and air navigation service providers (ANSPs) have trained ATCOs so that they are able to perform safely and efficiently in their particular environment, with their unique airspace configurations, operational procedures and environmental conditions. This approach has led to vastly different training programmes being implemented across Europe.

This situation is unsustainable, and action is necessary to enable the evolution of the European ATM landscape towards dynamic cross-flight information region (FIR) operations, standardised operational procedures and technological convergence. The new environment requires also additional convergence in terms of ATC training and ATCOs performance.

Compared to today's architecture based primarily on ATC sectors (defined airspace volumes), **system-based ATCO licensing** would be different in matching the operational characteristics focusing primarily on the systems' capabilities and user requirements. Those system requirements need to be associated with the necessary qualification requirements and supported with appropriate training. Crucially, this would allow ATCOs to manage any part of the airspace, not limited to certain sectors. All other elements of the licensing scheme, being administrative, medical and organisational requirements could remain untouched or slightly adapted.

To implement this strategic priority, EASA will initiate the required regulatory adaptations to transition the licensing scheme, including its training aspects, towards a system-based approach with phased implementation.



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EASA intends to **set the required performance standards using the principles of competency-based training and assessment (CBTA)**, which is also the ICAO preferred route to all aviation personnel licensing. Standards for licensing through CBTA will be associated with the ICAO ATC Competency Framework⁶⁵.

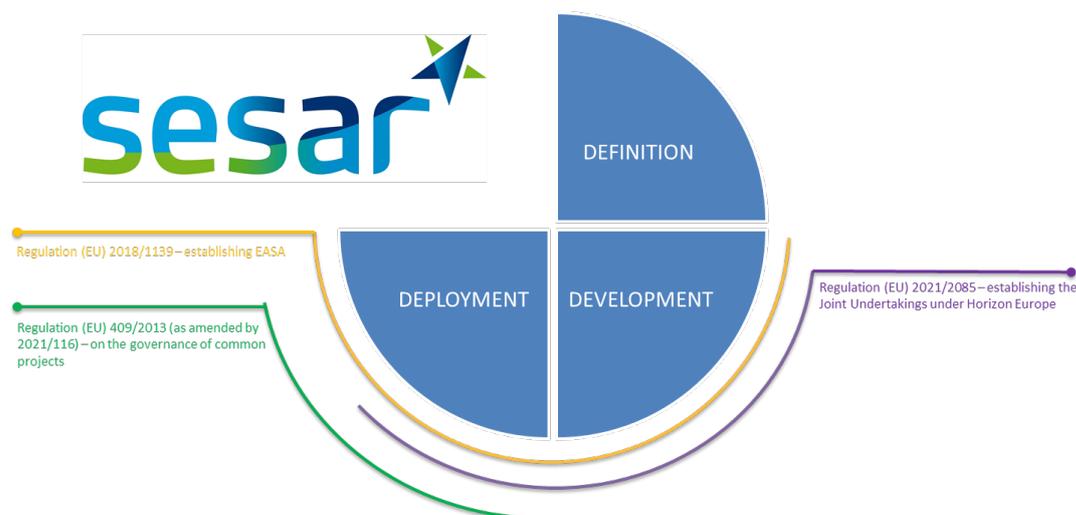
Key action:

- **RMT.0738** Next generation of air traffic controller licensing rules (IRs and AMC and GM).

3.4.6 SESAR research and development for new ATM/ANS functionalities

Considering the Agency's key objective to set the highest safety standards for European civil aviation in a cost-effective manner, its contribution to the implementation of the ATM Master Plan is a fundamental enabler for increased performance of the European civil aviation systems.

In this regard, and to ensure consistent and coordinated actions with respect to the SESAR programme aiming at improving the overall performance of the European ATM system and supporting the digital transformation of the Single European Sky, the EU regulatory framework has evolved in the last few years extending EASA's role in relation to the different phases of the SESAR programme, with particular emphasis on the development and deployment phases.



► Figure 7: SESAR programme phases

EASA will contribute to the implementation of SESAR functionalities through an array of actions, including the provision of technical advice to the EC on the readiness for deployment and increased collaboration with the SESAR 3 Joint Undertaking (S3JU)⁶⁶ and other key actors in the SESAR Programme, in particular the SESAR Deployment Manager, EUROCAE and other standards development organisations. In addition, EASA may be invited to advise on individual projects and demonstration activities. The overall objective is to support a seamless development and deployment of SESAR R&D Solutions.

65 ICAO Doc 9868 PANS-Training

66 S3JU is a three-way partnership between the EU, EUROCONTROL and ATM research and industry stakeholders <https://www.sesarju.eu/news/new-sesar-3-joint-undertaking-promises-be-bigger-bolder-better>



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As a result of these processes, different regulatory and non-regulatory actions will be derived. Using the ATC domain as an example, EASA will assess the relevant solutions (e.g. dynamic cross-border sectorisation, virtual centre concept, capacity-on-demand services), at different stages throughout their development process, advise the S3JU on their content in the framework of the bilateral cooperation, and take the necessary actions to facilitate their implementation, including when relevant the amendment of the applicable regulations (e.g. Commission Regulation (EU) 2015/340 via RMT.0668) and the availability of industry standards, through the European standards coordination processes (European ATM Standards Coordination Group (EASCG)).

Key action:

- **RMT.0682** Implementation of the regulatory needs in support of the SESAR deployment

3.4.7 Ensure the safe integration of extended minimum-crew operations (eMCO)

The continued technological developments and innovation drive industry to explore the technical feasibility and economic benefit deriving from the reduction of air crews, and challenge the safety regulators in their quest to ensure that the highest possible level of safety in air operations continues to be maintained.

Part-ORO (Annex III to Regulation (EU) No 965/2012, on air operations) contains conditions and limitations addressing crew composition, flight time limitation (FTL) regimes and crew training, based on long-established safety principles with the appropriate proportionality depending on the type of operation.

However, in the near future, technological developments may allow the possibility for large passenger aeroplanes conducting CAT to be safely operated by a single pilot during the cruise phase of the flight provided that effective mitigations (e.g. advanced cockpit with workload alleviation means and other measures to address decision making, pilot training, Crew Resource Management (CRM), capability to cope with incapacitation, effective fatigue management, preventing security threats, dealing with HF, mental and psychological factors, ground assistance, etc.) are in place, in order to ensure an equivalent or higher level of safety in each of the relevant areas affected.

EASA is working with selected interested stakeholders in developing the concept of operations and associated safety case. Current activities include the definition of the certification criteria for the additional design features to support these new concepts, at specific aircraft level, as well as engagements with other interested stakeholders, including non-EU regulators and ICAO. Also, EASA has launched a research project (RES.0028) designed to support the development of the safety cases. EASA is, in parallel, evaluating the impacts on a variety of aspects, including to the existing regulatory framework, with the support of selected Stakeholders. EASA will consult all relevant stakeholders via the established channels in preparation of the rulemaking task included with EPAS Volume II.

Moreover, EASA will continue working with ICAO and partner authorities to support global implementation of Extended Minimum-Crew Operations.

Key actions:

- **RES.0028** 'Extended minimum crew operations - single pilot operations risk assessment framework' to support the eMCO safety case.
- **RMT.0739** 'Introduction of extended minimum-crew operations (eMCO)' to adapt the regulatory framework provided the expected level of safety is granted.



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3.4.8 Ensure the safe integration of new business models in air operations

This new strategic priority will address new business models emerging in the airline industry, e.g. in response to market pressures or as a result of industry consolidation. Considering the current operational context and economic outlook, an increase in such new business models may be expected.

As an example, airline group operations are on the rise.

To implement this priority, it may be necessary to adapt the rules to address continuing airworthiness aspects, crew interoperability, aircraft inter-change and to facilitate management system integration. Impact Assessment should consider possible socio-economic factors, which in turn might have an impact on the safety performance of the operators.

Structure for level 3:

3.4.8.1	Ensure safe and transparent conditions for airline group operations
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3.4.8.1 Ensure safe and transparent conditions for airline group operations

Current regulations are primarily 'State-centric' in that they assume that a single operator will be overseen by one competent authority mainly, whereas there are more and more cases involving several competent authorities.

The existing EPAS action MST.0019 'Better understanding of operators' governance structure' is intended to support competent authorities in the oversight of group operations. Additional guidance for oversight and management system integration/harmonisation will be provided with the AMC and GM. The need for further actions will be determined through the BIS on crew-interoperability.

This priority item is closely linked with priority item 3.1.5 'Capable and streamlined oversight', which includes to support NCAs' cooperative oversight: Group operations, implementation of 'One CAMO' for airline groups' and item 3.1.6.2 'Remove obstacles for a well-functioning single market'.

3.4.9 New propulsion technologies

This strategic priority aims at adapting existing regulations to support the safe integration of aircraft with electric and hybrid propulsion into the aviation system, as well as to conduct research on the environmental benefits and the certifiability of proposed designs for aircraft propulsion systems with integrated hybrid/electric engines and power generation architectures.

As concerns hydrogen-powered technologies, the Agency has started with creating a roadmap to build up competency in this domain, to be able to support industry requests while remaining confident in the level of safety achieved. The Agency is moving towards adapting regulations, starting by ensuring that regulations are neutral with regard to new propulsion technologies, such that there are no barriers to aircraft with hydrogen propulsion. Where possible this will be done at the same time as they are adapted to enable electric and hybrid propulsion. In doing so the Agency will ensure, as far as possible, that by the time those technologies can be certified any required adaptations in the operational, fire and rescue service, licensing and maintenance rules are effective.

Structure for level 3:

3.4.9.1	Enable the safe integration of electric and hybrid propulsion technologies
3.4.9.2	Enable the safe integration of hydrogen-powered technologies



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3.4.9.1 Enable the safe integration of electric and hybrid propulsion technologies

Innovation in any industry is a key factor influencing its competitiveness, growth and employment potential. With this strategic priority in mind and looking at the increasing number of new aircraft and engine manufacturers developing aircraft concepts using electric and hybrid propulsion technologies (and increasingly electric systems), it becomes apparent that there are very strong prospects as well as demand, from industry and governments, to have hybrid propulsion and fully electric aircraft. The market potential is therefore considered significant with related effects on wealth and job creation. Green Aviation has become a high-priority goal to be achieved during the next decades. The use of electric and hybrid propulsion systems has the potential of significantly reducing the aviation environmental footprint in terms of both gaseous emissions and noise. However, to ensure that this objective is met, the full life cycle of the product needs to be taken into account as well as the energy mix used to encompass the environmental impact from raw material extraction, production, operation as well as recycling of the parts after removal from service.

To encourage the safe integration of new technological advancements in the wider electrical aviation sector overall, flexibility in the approach on all types of concepts, variations and design types will be enhanced.

To allow for the projects to thrive, a number of complex issues need to be tackled from a regulatory perspective.

In terms of rulemaking for aircraft and propulsion systems design requirements, EPAS actions will be included once enough experience will have been gained on the use of certification Special Conditions (SCs). The use of performance-based and non-prescriptive specifications is already laid down in the SCs for VTOL-capable aircraft and electric and hybrid propulsion technologies and may be embedded also in the future CSs, as already used for e.g. CS-23.

EASA has also developed a dedicated set of SCs, which will be applied together with existing certification specifications (CS-E, CS-23, CS-27, etc.) for the certification of aircraft with electric and hybrid propulsion, and on a case-by-case basis for each application.

Moreover, in order to enable standardised type certification of electric and hybrid propulsion systems (EHPS), either in the case of having a separate engine type certificate (TC) for the EHPS, or in the case where the EHPS would be integrated into the aircraft TC, a set of technical specifications have been established in a dedicated SC for EHPS. The proposed SC E-19 was published for public consultation on 27 January 2020 and the consultation ran until 19 June 2020. EASA received 501 comments and provided a final version with a comment-response document (CRD) in April 2021⁶⁷. SC E-19 requires the aircraft installation to be known for the certification of the EHPS. As the definition of EHPS installation interfaces would depend on the specific aircraft application, the possibility to further define EHPS requirements to ensure a two-step approach (step 1: requirements for engine TC not related to a specific platform; step 2: requirements for engine TC relevant to a specific platform integration) will continue to be studied in 2023 with the objective of first confirming the industry need for this two-step approach.

The first small aircraft type model with fully electric propulsion system was EASA type-certificated on 15 June 2020.

Likewise, in electric and hybrid aviation EASA aims to continue building up knowledge on emerging technologies (such as H2 technologies, fuel cells, evolving technologies for batteries), to establish technical advice contracts (TACs) or IPCs to identify certification challenges in innovative products, and to continue liaising with relevant industry and standardisation working groups. EASA is also engaged through providing technical training to its staff.

In terms of rulemaking actions for other aviation domains, RMT.0731 will lead to different streams of activities, one of them addressing the regulatory gaps identified in the existing regulations with regard to electric and hybrid propulsion.

67 <https://www.easa.europa.eu/document-library/product-certification-consultations/final-special-condition-sc-e-19-electric>



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Key actions:

Adapting existing regulations to support the introduction of aircraft with electric and hybrid propulsion systems will be done through a number of actions, as follows:

- **RMT.0731** 'New air mobility' for continuing airworthiness requirements for all types of aircraft.
- **RMT.0230** 'Introduction of a regulatory framework for the operation of drones',, also addressing manned VTOL-capable aircraft electric propulsion aspects related to the ADR, ATM, FCL and OPS domains.
- **RMT.0678** (FCL) and **RMT.0573** (OPS), addressing a first set of FCL and OPS electric propulsion-related requirements for other aircraft types that are not covered by RMT.0230.
- **RES.0048** to assess the feasibility, the environmental benefits and the certifiability of proposed designs for aircraft propulsion systems with integrated hybrid/electric engines and power generation architectures as well as sub-systems' enablers.

The environmental protection requirements regarding emissions and noise of aircraft with electric and hybrid propulsion will be assessed with the existing RMT.0727 (Alignment of Part 21 with Regulation (EU) 2018/1139, including simple and proportionate rules for General Aviation), RMT.0230 (Drones) and RMT.0514 (Implementation of the CAEP amendments: Climate change, emissions and noise).

Potentially more streams to cover other future projects could be added in RMT.0731, including the development of CSs based on experience gained in certification projects applying SCs such as for VTOL-capable aircraft or electric and hybrid propulsion technologies. Considering the particularities of EHPS and the use of high-voltage systems, qualification standards for aviation maintenance personnel as well as safety standards for maintenance organisations might also need to be assessed.

3.4.9.2 Enable the safe integration of hydrogen-powered technologies

In order to meet the environmental targets for climate neutrality by 2050, there is an increased focus by the industry on the potential of using hydrogen as an energy carrier in aviation that could then either be used by fuel cells to produce electricity or burnt in a combustor in a similar way to kerosene today. The properties of hydrogen raise a number of challenges from storage and distribution right through to conversion into the final energy used to propel the aircraft. Some industry actors have declared their intention to have a CS-23 aircraft certified as early as 2024 while Airbus have publicly stated for their ZeroE initiative that their objective is to have a transport aircraft certified by 2035.



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3.4.10 Prepare for safe higher airspace operations

In view of the industrial developments in Europe as well as the operational demonstrations in third countries, the strategic nature of the higher airspace⁶⁸ operations has been upheld for this EPAS reference period.

Several suborbital operations were performed in the US already in 2021 and 2022 and their operators are considering future flights in Europe, facilitated by the development of spaceports in some EU Member States. In addition, the Joint Communication on Space Traffic Management (STM)⁶⁹ highlights the close interaction between space and air traffic, during the launch and re-entry phases of space flights, and calls for a coordinated approach.

Operations in the higher airspace will be either manned or unmanned and may pose safety risks when transiting through the current air operations in the airspace below FL 660 or when cruising above that altitude. They may also entail a negative environmental impact, notably in terms of noise or emissions. To provide the necessary protection, EU regulations need to be adapted or new ones adopted, among others, in the field of airworthiness, operations, personnel, ATM/ANS, aerodromes/spaceports and environment, taking due account of the respective competences of the EU and Member States.

A European framework on higher airspace operations (HAO) should aim at avoiding risks of fragmentation and contribute to a level playing field, while supporting the development of a favourable ecosystem around these innovations. Mandated by DG MOVE, EASA has, upon a decision of the MAB, established the HAO Task Force⁷⁰ to undertake exploratory and non-binding work for the definition of the regulatory framework and assess the actions needed in all areas of its competence, taking due account of the interface with 'lower' airspace users and with space users. In parallel, the Agency will develop an 'EASA HAO Roadmap', following the BIS, building on the work of the ECHO project⁷¹ and of the Task Force deliverables. It will also include stakeholders' consultations, methodology and resources considerations. Depending on the outcome of this roadmap and also in view of the HAO-related resolutions of the 41st ICAO Assembly, in 2023 EASA may consider the launch of a specific rulemaking task.

In addition to the development of the regulatory framework, EASA is following up related EU research projects and is prepared to provide advice and support to European industry as necessary through appropriate IPCs or TACs.

68 Higher airspace refers to airspace above FL 660.

69 [Joint Communication from the European Commission and the High Representative of the Union for Foreign Affairs and Security Policy to the European Parliament and the Council on an EU approach for Space Traffic Management of 15.02.22 \(JOIN \(2022\) 4 final\)](#)

70 The HAO Task Force was established by the EASA Member States' Advisory Body to do preparatory work and define principles for the potential future European regulatory framework for HAO. It is composed of interested Member States (DE, FI, FR, IT, NO, SE), EDA and Eurocontrol (as members) and EASA (as secretariat).

71 [ECHO: European concept for higher airspace operation](#). This SESAR 2020 project aims to enable safe, efficient and scalable operations above the flight levels where conventional air traffic operates.



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3.5 Environment

Environmental protection and the sustainability of the aviation sector has been growing in importance over the years and is a key priority for citizens, policymakers and the industry.

EASA has an explicit mandate to protect the environment, climate and human health. In 2020, as a follow-up to the initial 2017 Environmental Strategy, the Agency stepped up its actions towards a cleaner, quieter and more sustainable aviation system by broadening the scope and ambitions of the strategy through the launch of the Sustainable Aviation Programme, with an initial period of 4 years, with the following main objectives:

- A. Facilitate the decarbonisation of the aviation system through Agency initiatives
- B. Act towards sustainable aviation through environmental certification and standards
- C. Act towards sustainable aviation through effective transversal actions
- D. Act towards sustainable aviation through flight standards and ATM-related actions for increased operational efficiency

Structure for level 3:

3.5.1	Facilitate the decarbonisation of the aviation system through Agency initiatives
3.5.2	Act towards sustainable aviation through environmental certification and standards
3.5.3	Act towards sustainable aviation through effective transversal actions at European level (Article 87 implementation)
3.5.4	Act towards sustainable aviation through flight standards and ATM-related actions for increased operational efficiency

3.5.1 Facilitate the decarbonisation of the aviation system through Agency initiatives

As part of its environmental strategy, which is implemented via the Sustainable Aviation Programme, the Agency facilitates decarbonisation of the aviation system and a range of other activities to address greenhouse gas reductions.

	Reduction of aircraft emissions through facilitating and monitoring the use of sustainable aviation fuels (SAF) within Europe and support to the ReFuelEU initiative. The Agency will cooperate with stakeholders in order to facilitate the uptake of SAF, in particular focusing on removing technical barriers for new fuel suppliers through the concept of an EU Clearing House for SAF. As such, a stronger role for the EU in the SAF approval processes is envisaged.
	Promotion of low-emission solutions through facilitating the introduction of electric, hybrid and hydrogen-powered aviation such as the certified first fully electric GA aircraft type, the contribution to Horizon Europe's R&I programme (e.g. Clean Aviation), as well as related innovation partnerships with stakeholders.
	Reduction of aviation's environmental footprint through the development of an Environment Label ('EcoLabel' – a voluntary initiative) for aviation, by providing harmonised, reliable and easily understandable information for more sustainable choices , coordinated within EASA Member States. It should allow rewarding those air transport operators making efforts to reduce their environmental footprint and help increase the effectiveness of other measures like the ReFuelEU initiative, zero pollution, the Environmental Noise Directive, etc.
	Aiming to reduce the climate impact from aviation , the Agency is engaging through involvement in environment-related research activities such as the further investigation into the issue of the climate impact of non-CO ₂ emissions from the aviation sector, as well as the necessary research facilitating new sustainable aviation fuels.



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3.5.2 Act towards sustainable aviation through environmental certification and standards

In the area of aircraft and engine technology, the Agency's product certification activities ensure that products are as quiet and clean as possible, thereby reducing negative impacts on the health of citizens. At the same time, the Agency innovates to develop **the most cost-effective environmental certification process in the world**, thereby contributing to the competitiveness of the European industry.

EASA for the first time certified an aircraft for CO₂ emissions, applying a new process and methodology, in 2021. These new environmental certification tasks will continue to grow in the following years.

Supersonic aircraft

It is likely that supersonic transport (SST) aircraft will be operated in Europe in the medium term.

Specific landing and take-off noise regulations will need to be adapted for SST aircraft, safeguarding thus the high level of environmental protection in Europe. In order to ensure a level playing field with subsonic aircraft, these supersonic landing and take-off noise regulations will be guided by the international noise certification standard for subsonic aeroplanes.

It is expected that SST aircraft will be restricted to fly at supersonic speeds over high seas in order to avoid unacceptable situations to the public —sonic booms to begin with. There is a long-term ambition to work on the definition of a sonic boom noise certification standard for 'low-boom' SST aircraft that will safeguard that no such unacceptable situations will be present. This is one precondition to facilitate supersonic flights over land. As regards emissions certification standards, SST aircraft and engine emissions regulations need to be developed and updated respectively, to ensure environmental compatibility of supersonic aircraft.

Novel technologies

Fostering green technologies will be key to help decarbonise the aviation system and reach the Green Deal objectives. An effective mechanism for research, such as the Clean Aviation programme, will investigate the impact of introducing novel technologies such as hydrogen, electric/hybrid engine architectures on environment. As regards UAS (drones), air taxis and VTOL-capable aircraft, technologies are rapidly evolving into operational solutions requiring new environmental protection standards. An early involvement of EASA in the development of novel technologies will allow an efficient certification process that addresses the appropriate environmental protection requirements. In addition, it will facilitate the timely entry into market when the novel technologies mature and allow the Agency to address environmental protection requirements, especially in case no ICAO standards exist yet.

Key actions:

- The Agency has a mandate to collect and **verify aircraft noise and performance information** for noise modelling around airports, as per Regulation (EU) No 598/2014⁷² Article 7.
- A number of **novel technologies** are rapidly approaching market maturity. In order to respond proactively to these technologies and allow for smooth certification based on robust environmental assessments, a dedicated activity has been launched to assess their environmental characteristics and sustainability. This will include the electric propulsion project as well as the sustainability assessment of alternative fuels. The success of this activity will be ensured by engaging traditional stakeholders as well as aviation environment non-governmental organisations (NGOs).
- The Agency will develop environmental protection requirements for SST aircraft (RMT.0733).

72 <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1570907778872&uri=CELEX:32014R0598>



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Smart standards

The Basic Regulation makes direct reference in Article 9 to the relevant Volumes of ICAO Annex 16. The Agency's effective involvement upstream in the ICAO-CAEP process, ensures availability of environmental standards based on EU Better Regulation principles.

Key actions:

- An important priority from the European perspective is the CAEP work on dual stringency analysis, by integrating Aeroplane CO₂ Emissions and LTO Noise Standard Setting.
- Another priority from the European perspective is the CAEP work on **supersonic** transport to safeguard that **the current high level of aviation environmental protection in Europe does not deteriorate** and a level playing field between subsonic and supersonic jets is ensured. Furthermore, the environmental certification requirements for supersonic transport must on the one hand not undermine the historic environmental improvements that have been achieved by subsonic aircraft, and on the other hand help to avoid potential operating restrictions that affect the wider sector.
- EASA expertise in ICAO standard setting will continue to be made available to the EC for ICAO's Carbon Offsetting and Reduction Scheme for International Aviation (**CORSIA**).
- As the Basic Regulation permits Europe to create environmental standards in those areas where no ICAO standards are available, efficient rulemaking will focus on areas where Europe would like to take the lead (e.g. hybrid; electric and hydrogen-powered aircraft).
- Smart standards are also synonymous with '**data-informed**' standards. In this regard, EASA continuously improves the quality of its impact assessment capabilities by organising the collection and analysis of flight data at European level (Data4Safety) and developing state-of-the-art tools to monitor and forecast aviation's noise and emissions as well as the costs of candidate policies to mitigate those (Horizon Europe).

The Agency bundles its efforts on digitalisation of its environmental activities under the EASA Environmental Portal with a first application as regards the collection of **aircraft noise and performance information**. The Portal aims at achieving efficiency gains both for the Agency as well as for NCAs (e.g. in issuing noise certificates), manufacturers, operators and aerodromes (e.g. in collection of noise certificates)⁷³. The Agency will further develop the Environmental Portal, considering future expanded data streams in support of the environmental sustainability activities.

73 Current Module 1: Noise data and certificates. Potential future modules could be added as appropriate.



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3.5.3 Act towards sustainable aviation through effective transversal actions at European level (Article 87 implementation)

The Basic Regulation contains a broadened mandate for the Agency on environmental protection with an objective to 'prevent significant harmful effects on climate, environment and human health' (Article 87(1)). As this is a new requirement stemming from the EASA Basic Regulation, associated processes are being developed.

The EC, EASA, other EU institutions as well as Member States are called to cooperate on environmental matters (Article 87(2)) including on the EU Emissions Trading System (ETS) and on Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)⁷⁴. This cooperation is implemented through bilateral agreements of the Agency (e.g. the MoU with the European Chemicals Agency (ECHA) on REACH) and pan-European structures, like the ECAC European Aviation Environmental Group (EAEG).

Key actions:

- The Agency assists the EC with the definition and coordination of policies and actions (Article 87(3)). Current actions are, for example, related to CORSIA, green investment taxonomy and the study on non-CO₂ effects of aviation on climate.
- The Agency is mandated to perform and publish an environmental review which shall give an objective account of the state of environmental protection relating to civil aviation in the Union. Said review shall also contain recommendations on how to improve the level of environmental protection in the area of civil aviation in the Union (Article 87(4)). As the EAER developed with the European Environment Agency (EEA) and EUROCONTROL and published in January 2019 contains already the 'objective account' with the best available data, the Agency published the recommendations in 2022, with the 3rd edition of the report ⁷⁵.
- Based on the outcome of the 2019 work on **circular economy** indicators and **life cycle assessments** of novel technologies, the Agency will support the use of life cycle assessments for traditional airline activities as well as new UAM concepts through investigations in the frame of the Environmental Label Programme.
- Based on its technical expertise and independence, the Agency is ideally placed to provide expertise and strategic steer to **international cooperation and research activities** (Horizon Europe, Clean Aviation, Sesar3). As part of this, EASA can act as a contract manager or as a technical partner to the EC to support the implementation and monitoring of environment-related research projects. Similarly, EASA will support ECHA by providing aviation technical expertise into the REACH process.

⁷⁴ Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC.

⁷⁵ 2022 EAER Report: [High Resolution](#)



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3.5.4 Act towards sustainable aviation through flight standards and ATM-related actions for increased operational efficiency

The Agency will perform further analysis to more clearly identify room for related regulatory or non-regulatory actions, focusing on areas including:

- monitoring ATM environmental performance and reviewing/identifying adequate environmental performance indicators to support regulatory and ATM environmental performance improvement initiatives at EU level;
- supporting more sustainability in flight crew training operations;
- identifying actions to improve sustainable aerodrome operations including a review of the impact of operations of novel aircraft concepts;
- identifying and removing regulatory barriers;
- supporting elements for hybrid and electric and hydrogen operation; and
- optimising operational procedures, such as abundant fuel carrying.

4. Performance



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4.1 Safety performance

This section presents the principles and an outline for the EPAS safety performance metrics reflecting the EPAS strategic priorities in the area of safety and the high-level safety objective set out in the Basic Regulation to ‘establish and maintain a high uniform level of civil aviation safety in the Union’. It does not provide the values for those safety performance metrics. With the 2019-2023 edition the EPAS introduced an ‘aspirational goal’ to ‘achieve constant safety improvement with a growing aviation industry’ as an alternative to the GASP aspirational goal of ‘zero fatalities in commercial operations by 2030 and beyond’. With the 2022-2026 edition, the aspirational goal was adapted; it remains unchanged in this EPAS edition:

‘maintain collectively the pre-pandemic high aviation safety level throughout the recovery phase and improve safety post-recovery’

This goal is deemed ‘aspirational’ as it represents an ambition of achieving an ever-safer aviation system. It is intended to address all operational domains. It is complemented by a specific safety objective defined in the Rotorcraft Safety Roadmap (refer to **Section 3.3.2**) to:

‘improve overall rotorcraft safety by 50 % within the next 10 years (starting January 2019)’

A key performance indicator (KPI) for this specific safety objective is the number of rotorcraft accidents in Europe that result in at least a fatality or a serious injury. This KPI is monitored and published annually as part of the ASR.

The EPAS SPIs serve to monitor the impact of EPAS actions on safety performance. Safety performance monitoring also supports the identification of new safety issues feeding the European SRM process. In accordance with Article 6 of the Basic Regulation, EPAS shall specify the level of safety performance in the Union, which the Member States, the EC and EASA shall jointly aim to achieve. Considering the aspirational safety goal, the baseline level of safety performance is that shown in the SPIs contained in the ASR 2020 that reflects the pre-pandemic safety performance in the Union, both for the aviation system as a whole (cf. Chapter 1 ‘EASA Member States Cross Domain Safety Overview’) and for the various domains (cf. Chapters 2 to 7).

EPAS safety goals

As of 1 January 2023, the European Union (EU) Member States’ national competent authorities (NCAs) will be required to implement the European Risk Classification Scheme (ERCS). An implementing and a delegated regulation, implementing and supplementing Regulation (EU) No 376/2014 on the reporting, analysis, and follow-up of occurrences in civil aviation, were adopted in 2021 and 2020 respectively. Both new Regulations, namely Implementing Regulation (EU) 2021/2082 laying down the arrangements for the implementation of Regulation (EU) No 376/2014 of the European Parliament and of the Council as regards the common European risk classification scheme⁷⁶ and Delegated Regulation (EU) 2020/2034 supplementing Regulation (EU) No 376/2014 of the European Parliament and of the Council as regards the common European risk classification scheme⁷⁷, lay down the arrangements and the methodology for the risk classification of all occurrences reported in the EU in a harmonised manner.

With this common risk classification scheme, each single occurrence reported to the European Central Repository (ECR) after 1 January 2023 will be assigned an ERCS safety risk score, including a key risk area (KRA). The coding of these attributes in the ECR will offer new possibilities for EASA and for national competent authorities (NCAs) to define safety metrics and performance targets, as well as enable for the first time the comparison of the levels

⁷⁶ OJ L 426, 29.11.2021, p. 32.

⁷⁷ OJ L 416, 11.12.2020, p. 1.

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of risk with a cross-domain perspective. A unique risk classification scheme will hence be applied whatever the product, the type of operation, the reporting organisation, or the class of occurrence.

Indeed, with this occurrence risk classification, the actual occurrence is extrapolated into the worst likely accident outcome that would have resulted if that occurrence had escalated into an accident ('severity'). The actual occurrence is then classified by identifying the stopping and remaining barriers that prevented that occurrence from resulting in that accident outcome ('likelihood'). The ERCS is meant to respond to the question 'What was the risk at the time when the occurrence happened?'

The KRA is the 'most likely type of accident' that the occurrence under assessment could have escalated to. The 'worst likely accident outcome' is identified by combining that KRA (or 'most likely type of accident') with the potential-loss-of-life category. The potential-loss-of-life category is determined based on the aircraft size and its proximity to populated or high-risk areas.

At EU level, EASA will use the ERCS to set safety goals at KRA level. These safety goals will be defined with reference to the median of the numerical equivalent ERCS scores per KRA considering criteria such as, for example, the aviation activity level, the systemic conjuncture, the domain (operational, organisational, conjunctural, etc.), and the quality level of the ERCS implementation.

To set such EPAS safety goals to be achieved per KRA, a minimum of 3 years of ERCS implementation in the EU will be needed to establish a representative baseline to project the objectives from. The safety goals per KRA should be achieved over a realistic but ambitious timeframe thanks to the definition and implementation of EASA's EPAS and EU Member States' SPAS actions that will mitigate the risk level of those safety issues that contribute to the KRAs. The first set of the EPAS safety goals would thus be available for the reference period 2026–2028.

EPAS SPIs

SPIs shall monitor both safety **outcomes** (such as accidents, incidents and injuries) and the enablers, in terms of **systems and processes**⁷⁸ required to maintain effective safety management at authority and organisation levels.

Outcome-based indicators

Monitoring safety outcomes addresses GASP Goal 1 and the EPAS strategic priority 'operational safety'. Outcome-based indicators consider as main inputs:

- the number of fatal accidents;
- the number of fatalities; and
- the number of non-fatal accidents and serious incidents.

This is aligned with the high-level ICAO safety metrics, thereby facilitating comparison of European performance with that of other regions or with global averages. The numbers of fatal accidents and fatalities provide the highest level of safety outcome monitoring, while the non-fatal accidents and serious incidents combined provide monitoring of higher-risk events. These can subsequently be reviewed to identify KRAs that inform EASA's safety priorities.

Indicators related to KRAs are identified through the European SRM process and described in the ASR. EASA, in cooperation with the European NoAs, has developed a safety performance framework that identifies different tiers of SPIs.

⁷⁸ The efficiency of systems and processes established and implemented by EASA will continue to be monitored through the EASA SPD related indicators.

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- **Tier 1** transversally monitors all the domains and the performance in each domain. Tier 1 considers the number of fatal accidents and fatalities in the previous year compared with the average of the preceding decade.
- **Tier 2** covers the KRAs at domain level. Tier 2 provides the number (and where available, the rate) of fatal accidents and the ERCS risk level for each domain in the ASR, divided into the KRAs.

These outcome-based indicators will continue to be monitored through the European SRM process. Likewise, reporting on those will continue to be done through the ASR.

Monitoring systems and processes

SPIs related to systems and processes are defined and monitored in three areas:

1. Member States' oversight capabilities

This is related to GASP Goal 2 and the EPAS strategic priority 'standardisation'.

Continuous Monitoring takes into account the EASA standardisation rating as an alternative to the ICAO USOAP Effective Implementation (EI) indicator. The standardisation rating is used for the prioritisation of standardisation inspections. It aims at emulating a risk picture subject to expert's review on the NCA's ability to discharge its safety oversight capabilities. The standardisation rating considers elements related to size, nature and complexity of the State authorities and functions, the number and type of open standardisation findings, as well as the State's reactivity in relation to findings closure, once the final report has been sent.

The performance metrics for the standardisation rating are provided per domain and include the minimum rating, the average rating and the tendency for both values compared to the previous year. The standardisation rating metrics are included in the Standardisation Annual Report.

2. Member States' progress with SSP implementation

This is related to GASP Goal 3 and the EPAS strategic priority 'systemic safety & resilience'. The objective is for States to achieve effective SSP implementation, as appropriate to their aviation system complexity, by 2025. While the global target associated with GASP Goal 3 was extended to 2028 the EPAS maintains the initial target for Member States to achieve effective SSP implementation, as appropriate to their aviation system complexity, by 2025. Since 2022, SSP implementation is also monitored by EASA as part of the assessments of the implementation of Basic Regulation Articles 7 (SSP) and 8 (SPAS) during EASA standardisation inspections (extension of the SYS standardisation domain). Related indicators for EPAS are the SYS SSP assessment levels that should reach a minimum level of present and effective by 2025. Main findings and results of the EASA SSP assessments will be discussed in the regular SM TeB meetings. Effective implementation of SMS (EASA management systems) in aviation organisations

This partially addresses GASP Goal 5; it also addresses the EPAS strategic priority 'systemic safety & resilience' and the requirements in the Basic Regulation.

Monitoring the implementation of SMS in industry should focus on compliance with relevant requirements and effectiveness of SMS key processes. To develop a common set of indicators and targets on effective implementation of SMS, an agreed methodology for assessing SMS as well as a common method to score and aggregate related assessment results would need to be developed and implemented. Such an assessment and scoring methodology is currently only available in the ATM/ANS domain, as part of the SES ATM Performance Scheme. Moreover, while the EASA Management System assessment tool is promoted through EPAS action MST.0026, EASA has not yet received sufficient feedback on the use of the tool.

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For the above reasons, no detailed EPAS indicators and targets are monitored on SMS effectiveness (for domains other than ATM/ANS – see below). However, it is proposed to monitor the following:

- (a) the extent to which the EASA Management System assessment tool (or similar) is being used by Member States, to get their feedback; and
- (b) the status of compliance with the EASA Management System (SMS) requirements.

EASA's monitoring is based on the collection of information on the tools used to assess the management system and oversight data provided by NCAs covering a set of organisation management system requirements. No data/information on individual organisations is requested. EASA converts numbers into rates based on the data Member States provide regularly through the SIS on the number of organisations under their oversight.

The information and data collected in this domain are compiled annually and presented to the SM TeB in view of determining further actions to support the effective implementation of management systems in organisations.

Alignment with the ATM Performance Scheme

Significant effort has been invested by the Agency, Member States and industry to ensure that the Safety Key Performance Area of the SES Performance Scheme aligns with the principles and technical direction of EASA's performance monitoring framework. The performance indicators for Reference Period 3 of the Performance Scheme were designed by an Agency-led working group in 2019 and then associated AMC and GM were published in 2020. These indicators measure the effectiveness of safety management at organisation level and then monitor safety outcomes via untargeted tier 2 performance indicators, using the ECR as the data source.

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4.2 Environmental performance

The efficiency of actions included in the EPAS in relation to environmental protection will continue to be monitored as part of the EAER⁷⁹.

The report is led by EASA with support from the EC, the EEA and EUROCONTROL. EAER provides a valuable source of objective and accurate information on the environmental performance of the aviation sector and sets the scene for Europe's ambition to make the sector more sustainable. It includes performance indicators that provide an overview of the sector's environmental performance over time. This includes technology/design, sustainable aviation fuels, air traffic management/operations, airports, market-based measures and the latest scientific understanding on environmental impacts from aviation.

EASA published the 2nd edition of the report in January 2019 and, in line with EASA's expanded environmental protection remit, is responsible to update the EAER every 3 years. EASA published the 3rd edition of the report⁸⁰ which considers account the environmental performance data of the aviation sector covering the years 2019-2021. The 3rd edition also contains recommendations aiming to improve the environmental performance of the civil aviation sector in the Union.

79 <https://www.easa.europa.eu/eaer/downloads>

80 2022 EAER Report: [High Resolution](#)



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