

National Plan for Aviation Safety

Luxembourg

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1. Purpose

a. National Aviation Safety Program

The National Aviation Safety Program has been published in January 2020: [National Aviation Safety Program - Directorate of Civil Aviation // The Luxembourg Government \(gouvernement.lu\)](#). It describes the regulatory and structural setup of aviation in Luxembourg. It is designed to be complemented by a National Plan for Aviation Safety (NPAS). The purpose of the NPAS is to define, in consultation with aviation stakeholders, specific actions to be taken at national level to enhance aviation safety. While the National Aviation Safety Program describes a more or less fixed structure, the NPAS is designed to evolve and improve over time, not only by adapting to changing circumstances, but also by incorporating the input from aviation stakeholders.

b. Inputs

The actions of the NPAS are adapted to the specific situation and the specific risks faced by the aviation sector of Luxembourg. The main risks at national level have been derived from several sources:

- The Annual Safety Report by the Direction de l'Aviation civile (DAC): [Annual Safety Review - Direction de l'aviation civile // Le gouvernement luxembourgeois](#). The safety report for the year 2019 also includes a longer-term analysis over more than 5 years, based on more than 12000 occurrence reports.
- Shortcomings identified by DAC
- Shortcomings and actions identified by stakeholders.

The NPAS is aligned with the European Plan for Aviation Safety (EPAS: [European Plan for Aviation Safety 2021 - 2025 | EASA \(europa.eu\)](#)) where possible. The EPAS includes a number of Member State Tasks (MST), some of which are not applicable due to the specifics of the national aviation sector, for example: Loss of separation between civil and non-cooperative military aircraft.

But there is another factor that makes this NPAS different from the national plans of bigger States: as Luxembourg has only one international airport concentrating most of its aviation activities, it includes actions that would be considered local (airport) actions in these States and would not necessarily be included in the NPAS. This concentration also allows for a much more direct influence from stakeholders like the national ANSP, the airport operator, AOC holders and others on the NPAS. Their active contribution makes the NPAS relevant to their main risks and issues.

c. Structure

The next paragraph presents the main risks and opportunities for improvement, identified from different sources. The following three paragraphs then present the planned and ongoing safety actions, separated in three categories: Systemic actions, operational actions and safety oversight actions. Systemic actions (Paragraph 3) are related to the entire aviation system or an entire domain. They do not necessarily have a direct link with occurrences, incidents or accidents. For this first NPAS, this includes several actions regarding Safety management. Operational actions (Paragraph 4) are designed to mitigate specific, directly identified risks. Safety oversight actions (Paragraph 5) are Member State Tasks from the EPAS that are addressed specifically to DAC, as the national oversight authority. They do not include deliverables for other national stakeholders. Finally, paragraph 6 shows the differences between the NPAS and the EPAS by listing the EPAS Member State Tasks that are not applicable to Luxembourg and by explaining why they are not applicable.

2. Main Risks

This part briefly presents the main risks and opportunities for improvement. Some are based on the analysis of safety occurrences, but others are derived from a more proactive analysis taking into account foreseeable future evolutions. This proactive part is all the more important as the COVID-19 pandemic has impacted not only the routines but also the expectations of the aviation industry, and forces all actors into new roles, new tasks and new ways of performing their tasks.

Annual Safety Report

The first element to consider is the analysis of occurrence reports, published in the DAC Annual Safety Report of 2019. In particular, this report includes an analysis over 62 months (January 2015 to February 2020), both for all reported occurrences and specifically for those happening in Luxembourg. This long-term analysis is based on more than 12000 occurrence reports.

Top Ten Safety Issues (overall)
Risk of Mid-Air Collision
Fatigue
Cargo moving/shifting during flight
Engine failure or problems - multi-engine aircraft
Dangerous Goods handling (DGR)
Windshear
Runway incursion by aircraft
FOD (Foreign object / debris)
Technical - flight controls
Weight & Balance issues due to wrong loading
Additional Safety Issues - State of occurrence: Luxembourg
Airspace infringement
Risk of collision with drone
Jet blast / Prop hazard
Fuel leak on ground - technical issues (risk of fire)
Aircraft released with incomplete maintenance tasks
Aircraft deviation from ATC instruction

Impact of the COVID-19 pandemic and return to normal operations

The global COVID-19 outbreak of 2020 created the biggest crisis yet for the aviation sector. In addition to the health risk for aviation personnel, the significant reduction of operations generates multiple risks across different domains.

EASA has issued a COVID-19 Risk portfolio: [Review of Aviation Safety Issues Arising from the COVID-19 Pandemic | EASA \(europa.eu\)](#). It contains 49 candidate Safety Issues in 6 categories. The following 11 have been considered most critical at European Level and have been assessed by EASA in priority:

Safety Issue	EASA assessment	NPAS Lux.
Aviation personnel fatigue (SI 5002)	Mitigate	X
Rapid storage and de-storage of aircraft may lead to technical failures (SI 5011)	Mitigate	
Reduced focus on, or prioritisation of safety (SI 5009)	Mitigate	X
Reduced oversight by competent authorities due to lockdown (SI 5001)	Mitigate	
Restarting a complex system is challenging (SI 5005)	Mitigate	X
Skills and knowledge degradation due to lack of recent practice (SI 5003)	Mitigate	X
Decreased well-being of aviation professionals during shutdown (SI 5007)	Monitor	
Increased presence of wildlife on aerodromes (SI 5010)	Monitor	
Personnel may not feel safe and in control about returning to work (SI 5006)	Monitor	
Documentation and database updates may not have been applied (SI 5004)	Monitor	
Risk assessments based on previous normal operations are no longer valid (SI 5008)	Monitor	

In April 2021, an update introduced 11 additional Safety Issues.

DAC has adapted its oversight activities to the pandemic by conducting its inspections or audits partially online, limiting personnel interactions to the required minimum. As the related safety issue (SI 5001) is internal to DAC, while the National Plan for Aviation Safety is intended for the entire national aviation sector, it is not mentioned separately in this document. Instead it is included in the safety issue related to reduced focus on safety (SI 5009), as DAC's oversight of organisations' SMS systems aims to avoid that issue.

One other Safety issue has been included based on safety reports: Missing suppliers and difficulty liaising with suppliers. Note that this also covers partially the documentation and database update issue (SI 5004).

Runway refurbishment works at Luxembourg airport

The major runway refurbishment works in summer 2021 and 2022 at Luxembourg international airport (ELLX) could potentially increase risk in several areas: runway incursions, FOD, runway contamination... A thorough planning, risk mitigation and awareness of all actors is required.

Integration of helicopter traffic at Luxembourg airport

The traffic at Luxembourg airport is very diverse with a mix of Commercial Air Transport airplanes and VFR piston airplanes. In recent years, more and more helicopters have become part of the mix. The significant differences in the flight characteristics of these machines make it difficult for ATC to safely integrate all traffic. In the case of helicopters, the fact that they do not have to rely on the single runway may enable other options for their safe separation from other traffic at the ELLX platform.

Search and Rescue (SAR)

The national regulations and responsibilities in the domain of SAR have not entirely been set up and kept up to date. Meanwhile, new and better equipment and structures, that can significantly augment SAR capabilities, have become available but are not yet integrated in a coherent plan.

Cybersecurity

Cybersecurity risks in aviation cover a very wide scope: access control, ATM, While for some aspects mitigations are already in place, an overall review at national level is required and ongoing in order to ensure that all aspects are covered.

3. Systemic actions

a. State Safety Plan

The State Safety Program has been published in January 2020. As required by the “Règlement grand-ducal du 18 juillet 2014 relatif au programme national de sécurité aérienne”, it will be complemented by the National Plan for Aviation Safety.

Title	National Plan for Aviation Safety		
Description	Develop a national Safety Plan in collaboration with stakeholders		
Deliverables		Timeline	Owner
Draft State Safety Plan		Mai 2021	DAC
Consultation of stakeholders		Jun 2021	Stakeholders
Approved State Safety Plan		Dec 2021	DAC
References	EPAS MST.0001, MST.0028		

b. Promotion of SMS

In most aviation domains (flight operations, ATM, aerodrome), safety management systems (SMS) are a legal requirement and are well established by now. DAC is trying to enhance the focus of air operators on safety management by making it a regular topic at operator meetings. In addition, AOC audits now include face-to-face interviews with the accountable manager and nominated persons about their SMS. In the airworthiness domain, while the SMS requirements enacted in Regulation (UE) 2019/1383 are new for a number of organisations, in practice all CAMOs currently approved by DAC are linked to an AOC holder and their activities are already well integrated in the SMS of the AOC holder.

SMS promotion material is developed, among others, by the European Safety Promotion Network and the SM-ICG (Safety Management International Collaboration Group). Since 2020, DAC has joined SM-ICG as observer.

Title	Promotion of SMS		
Description	Promote safety management in all domains of aviation.		
Deliverables		Timeline	Owner
Join SM-ICG		2020	DAC
Internal SMS/SSP training (recurrent / initial)		Done (Sep. 2021)	DAC
References	EPAS MST.0002, EPAS SPT.0057		

c. Systemic issues linked to the COVID-19 pandemic

The unexpected magnitude of the pandemic has disrupted normal operations, including the underlying assumptions for risk assessments. The expected recovery to a higher capacity, usually called “return to normal operations” is also likely to lead to an overall system that is not the same “normal” as before the pandemic, but irreversibly different. Stakeholders need to be prepared for new and unexpected interactions in the aviation system, which emerge due to the COVID19 pandemic and due to side effects of measures taken to control its consequences.

The following publications provide some guidance:

[COVID-19-Roadmap-V2.pdf \(flightsafety.org\)](#)

[Safety Issue Report - Risk Assessment Not Valid V1.2.pdf \(europa.eu\)](#)

Title	Restarting a complex system is challenging		
Description	The global aviation system merges people, technology and operating environments into a single complex socio-technical system. Because this system is highly interconnected, changes can have knock-on effects that have not been anticipated. Normally, when a change to the system is made, it is risk assessed and trialled in detail. The shutdown and subsequent restart (in new circumstances) of approximately 80% of the aviation system will almost certainly have unpredictable consequences. Thus the aviation system resilience needs to be improved.		
Deliverables		Timeline	Owner
Review of the existing Risk Assessments to check their suitability for the return to, or continuation of (new) operations and identification of potential new hazards		2021-	All stakeholders
References	EASA Covid-19 portfolio: C-47/SI-5005, C-46/SI-5008		

Another systemic issue is the risk that the focus on aviation safety is lost or diminished, as other concerns grow: concerns for health, economic survival, job security, etc.

The following publication provides some guidance:

[TE - Concept Paper \(europa.eu\)](#)

Title	Reduced focus on safety or reduced prioritisation of safety		
Description	There are multiple factors that mean that organisations may not be providing safety and safety management with the same level of attention and resources as before the COVID-19 pandemic. These include distractions and stress at a personal level, and economic pressures and the practical pressures of returning to service at an organisational level. Also focussing too much on returning to service and economic survival may reduce the emphasis on human and organisational factors, to the detriment of safety. The reduced finances of many organisations means also that safety staff may have been made redundant or furloughed, yet at this point in time they have a significant amount of work to do in maintaining and updating their safety management system.		
Deliverables		Timeline	Owner
Ensuring an effective amount of safety staff/resources to ensure continued safe (risk assessed) operations		2021-	All stakeholders
Enhanced focus on the use of SMS processes like risk management and change management		2021-	All stakeholders
Continued oversight of SMS of organisations by DAC		2021-	DAC
References	EASA Covid-19 portfolio: C30/SI-5009, C-13/SI-5001		

The aviation system is interconnected worldwide, with all actors depending on many suppliers for physical parts or services. The suppliers are suffering their own consequences of the pandemic and may fail to deliver on time or to the expected standard.

Potential mitigating actions:

- Keep close and constant communication with suppliers.
- Ask each supplier (emphasis on critical ones) to communicate on their situation.
- Maintain the usual level of "Incoming Inspections". If a problem occurred, apply Stop and Fix.
- Closer attention to parts coming back from repair.
- Perform the logistics provider monitoring program for both "Incoming" and "Outgoing" operations.

Title	Missing suppliers and difficulty liaising with suppliers	
Description	Due to the pandemic, some suppliers have suspended their activities. Others are experiencing the impact of corona-related lockdown like difficult working conditions, short-time working, longer production and delivery times. This makes it difficult for organisations to keep the supply chain upright.	
Deliverables	Timeline	Owner
Anticipate potential issues by risk management and change management processes in the framework of SMS	2021-	All stakeholders
Increase the monitoring activities of suppliers and responsiveness when the services are not being delivered as expected.	2021-	All stakeholders
References	EASA Covid-19 portfolio: 55/SI-50NN	

d. UAS

The evolution of UAS calls for a well-planned integration in the airspace and the aviation system. In order to enable this integration, DAC has set up a new department specifically for UAS. Its objective is to establish the conditions of the safe operation of both recreational and professional use of drones.

Title	UAS – unmanned aerial systems	
Description	Safe integration of UAS in the aviation system in Luxembourg	
Deliverables	Timeline	Owner
Launch a media campaign for “Open” category UAS users	done	DAC
Complement EU regulations by national regulations	ongoing	DAC
Establish a Forum for professional drone users	done (Dec. 2021)	DAC
References	DAC Annual Safety Report 2019	

e. SAR

SAR (Search and Rescue) activities can be divided in 2 parts:

- Alerting system
- Search and rescue operations

Current situation

Overall, a working system is in place and integrated with the international COSPAS/SARSAT system. As the territory of Luxembourg is part of the Brussels FIR, the RCC (Rescue Coordination Center) responsible for SAR is the Brussels RCC. ANA Luxembourg is designated as Rescue Sub-Center (RSC) for the territory of Luxembourg but covers only the alerting part.

However, the existing arrangements are obsolete in several ways:

- They do not cover all scenarios
Search and Rescue operations itself are well-defined by specific action plans for two situations:
 - For emergencies at or near Luxembourg airport: AEP – Aerodrome emergency plan
 - For emergencies with a high number of casualties: PNV – Plan nombreuses victimes

For other emergencies, RCC Brussels would take the lead. However its airborne means for SAR consist of Belgian military helicopters based in Koksijde, located more than 250km from Luxembourg, so that their effective intervention in Luxembourg would be impractical as well as ill-defined by lack of bilateral agreements.

- They do not cover all ICAO requirements
- They do not make use of the best means that have become available in the meantime like:
 - o Locally based Police and EMS (Emergency Medical Services) helicopters
 - o Better communication means and channels

In a real emergency, these means would likely be used in an ad-hoc manner. Establishing a clear plan and responsibilities would therefore significantly increase their effectiveness at the most critical time.

Recommendations

DAC has performed a study of the current situation of SAR in Luxembourg which has been presented to the responsible ministries and entities in March 2020. It includes 22 recommendations focused on the following areas:

- Defining a national SAR concept
- Establishing a legal framework for SAR
- Assigning responsibilities and providing the necessary means
- Establishing international agreements with neighboring States, including clarification of the roles of RCC Brussels and RSC Luxembourg and international assistance
- Recruitment and training of staff
- Designation of a supervisory authority for SAR

Title	SAR – Search and Rescue arrangements		
Description	The national regulations and responsibilities in the domain of SAR have not been entirely set up and kept up to date. A complete review and re-arrangement of the legal framework, responsibilities, international agreements and response plans is necessary. The new arrangements will take into account the best means available now or in the near future like: - Locally based Police and EMS (Emergency Medical Services) helicopters - Better communication means and channels		
Deliverables		Timeline	Owner
A coherent set of adapted national regulations, clear responsibilities and response plans for SAR		2023	DAC, CGDIS
References	n/a		

f. Helicopter traffic integration study

After some runway incursions involving helicopters, a study with the purpose of identifying and assessing different options for a better integration of helicopters in the traffic at ELLX has been launched on the initiative of DAC. In June 2020, DAC, ANA and Lux-Airport created a working group to explore different options. The study is limited to VFR helicopter traffic, as IFR helicopter traffic is very rare.

Title	Helicopter traffic integration study for ELLX		
Description	The integration of helicopter traffic with airplane traffic at Luxembourg airport presents a challenge. A separation of helicopter traffic from the main runway would probably be beneficial for safety, but needs to be studied in detail.		
Deliverables		Timeline	Owner
A feasibility study for designated helicopter take-off and landing areas at Luxembourg airport		2022	DAC, ANA, Lux-Airport
References	ASR Top Ten Safety Issues – runway incursion by aircraft, (EPAS MST.0038)		

g. Airspace complexity and traffic congestion

In order to reduce the risk of mid-air collisions and airspace infringements, EASA is promoting good practices in airspace design that reduce 'airspace complexity' and 'traffic congestion'. (EPAS Safety Promotion Task SPT.0120).

Title	Airspace complexity and traffic congestion		
Description	Member States should consider 'airspace complexity' and 'traffic congestion' as safety-relevant factors in airspace changes affecting uncontrolled traffic, including the changes along international borders.		
Deliverables		Timeline	Owner
Consult with FABEC partners on potential airspace changes		2023	ANA
References	EPAS MST.0038, EPAS SPT.0120		

h. Cybersecurity

Cybersecurity in aviation is a relatively new and growing threat with a number of different aspects. For some aspects, the responsibilities are not defined yet at national level.

Title	National aviation cybersecurity arrangements		
Description	Close contacts with the <i>High Commission for National Protection</i> (HCPN) and the <i>Institut luxembourgeois de régulation</i> (ILR) are established. The discussion concerning the definition of responsibilities is ongoing. The exchange with ILR also concerns future amendments of the European legislation. The National aviation security programme is currently also being updated. A new chapter dealing with the cybersecurity will be introduced before the end of 2021. Finally, DAC is also implementing the new cybersecurity-related provisions of Regulation (EU) 2015/1998 of 5 November 2015 laying down detailed measures for the implementation of the common basic standards on aviation security. Due to the COVID-19 pandemic, the date of application of the area of cybersecurity requirements was postponed from 31 December 2020 to 31 December 2021.		
Deliverables		Timeline	Owner
Update National aviation security program		2022	DAC
A coherent set of adapted national regulations and clear responsibilities for cybersecurity in aviation		tbd	DAC, other national authorities
References	Implementing regulation (EU) 2019/1583		

4. Operational actions

a. Reduce the risk of mid-air collisions

The annual safety report of DAC for 2019 identified the risk of mid-air collisions as the highest risk. Because a mid-air collision would be a catastrophic outcome, multiple safety barriers exist to avoid it. The actions presented here aim at strengthening these safety barriers.

Title	Improvement and validation of the Surveillance chain at ELLX		
Description	Radar detection issues in Luxembourg airspace, linked to an upgrade of the surveillance chain, have been identified as a latent condition. Several occurrences of aircraft disappearing from radar screens, of ghost targets (aircraft shown where there is no aircraft) and of wrong correlations (aircraft shown, but with a wrong identity) were reported.		
	Corrective actions are in progress but the system needs to be validated both at current traffic level and at pre-pandemic traffic levels.		
Deliverables		Timeline	Owner
Validation of the surveillance chain in normal traffic situation		2023	ANA
References	ASR 2019		

Title	Implementation of SESAR solutions aiming to reduce the risk of mid-air collision en-route and in terminal manoeuvring areas		
Description	Member States should evaluate together with the ANSPs that are delegated to provide services in their airspace, the needs for implementing SESAR solutions related to enhanced Short Term Conflict Alerts (STCA)/enhanced safety nets) such as solutions #60 & #69. These SESAR solutions, designed to improve safety, should be implemented as far as it is feasible.		
Deliverables		Timeline	Owner
Analyse STCA tool in use to reduce nuisance alerts		2022	ANA
Evaluate implementation of SESAR solution #60: Improving conflict alerts for controllers - Enhanced short-term conflict alert (STCA) for terminal Manoeuvring areas (TMAs)		tbd	ANA
Evaluate implementation of SESAR solution #69: Better conflict detection tools - Enhanced short-term conflict alerts (STCA) with downlinked parameters		tbd	ANA
References	EPAS MST.0030, ASR 2019		

Title	Safety promotion for airspace infringement and collision avoidance		
Description	Several General Aviation organisations in and around Luxembourg have held regular safety seminars with active participation of DAC. DAC will continue its support of these seminars when they restart after a break due to the pandemic. The risk of mid-air collision and of airspace infringements will be on DAC’s agenda.		
Deliverables		Timeline	Owner
Promotion of airspace infringement and collision avoidance in GA safety seminars		2022-	DAC
References	ASR 2019		

b. Runway safety

Several sources combine to justify actions to prevent runway incursions:

- The incorrect presence of a maintenance van on the runway resulted in a serious incident in LVP operations in January 2010. The Final report by AET contains 12 Safety recommendations. While most are implemented, several actions that require a longer lead-time are still in progress.
- In 2020, some occurrences involving conflicts among vehicles on the runway at ELLX in low-visibility conditions indicate deficiencies in some of the safety barriers intended by the AET safety recommendations. One of the occurrence investigations also highlighted that, because the runway elevation is higher in the middle than at the ends, radio transmissions from one runway end are not received at the other end. ANA will conduct a study to determine if technical means to repeat the signal can be implemented.
- Runway incursions have been identified as a risk at Luxembourg Airport, both by the Local Runway Safety Team (LRST) and the Annual Safety Review of DAC. The LRST has collaboratively decided to implement a number of actions to lower the risk of runway incursions.
- The planned runway refurbishment will increase the risk of runway incursions by vehicle drivers unfamiliar with the airport. The airport will be closed during the night while work is carried out, but work on TWY I may take place during daytime while the airport is open.
- In parallel, the main focus of the EPAS Member State Task MST.0029 “Implementation of SESAR runway safety solutions” is on the situational awareness of air traffic controllers, pilots and vehicle drivers.

While the initial focus was mainly on the prevention of runway incursions, the planned actions will improve runway and taxiway safety in general.

Title	Enhance ground situational awareness		
Issue to be addressed	Runway incursions by aircraft, vehicle or persons		
Description	The incorrect presence of a maintenance van on the runway resulted in a serious incident in LVP in January 2010. The Final report by AET contains 12 Safety recommendations. While most are implemented, several actions that require a longer lead-time are still in progress.		
Deliverables		Timeline	Owner
Operational A-SMGCS Level 2 (AET SR LU-2012/003)		2022	ANA
Common frequency for aircraft and vehicles on the runway (AET SR LU-2012/004)		2023	ANA, LRST
Training and assessment of all vehicle drivers accessing the runway to include radiotelephony in English (AET SR LU-2012/005)		done	ANA
Study on radio signal transmission at ELLX from one runway end to the other (higher elevation in the middle of the runway)		2022	ANA
Training of all external drivers accessing maneuvering area for runway refurbishment works		2021-2022	Lux-Airport
Runway incursion prevention actions defined by the LRST: - Coordination of callsign assignment for vehicles - Switchable stopbars on all runway intersections		2022 2024	LRST ANA, Lux-Airport ANA, Lux-Airport
References	EPAS MST.029 AET Safety recommendations LU-2012-/003, LU-2012/004, LU-2012/005		

c. Operational issues linked to the COVID-19 pandemic

The drastic reduction of aviation activities means that aviation professionals are not performing their normal tasks, sometimes not performing them at all, or at a substantially reduced frequency.

Possible mitigating actions include:

- Use of FDM to monitor for deviations
- Use of Occurrence reports to monitor for trends
- Increased use of double-checking/counter-signing, traceability of information given

In addition, some of the most experienced and qualified staff have either left the industry or have been reassigned to different functions. The risk is for organisations to lose knowledge in the transition to the successor if it is not well planned and executed. The transition itself may also be affected by measures like social distancing, working from home office etc.

A different, but related risk in General Aviation is that pilots who need to complete a certain number of flights or flight hours to remain qualified, may be tempted to fly in marginal conditions if such a deadline approaches. DAC is willing to grant exemptions and prolongations for Pilot licences up to the limits set by EASA.

Title	Skills and knowledge degradation due to lack of recent practice		
Description	The drastic and prolonged reduction in traffic means that most aviation professionals are not performing their normal tasks, sometimes they are doing a substantially different job, and sometimes not working at all or at a substantially reduced frequency. Simulator and classroom-based training is also not taking place. Together, this creates a reduction in the skills and knowledge of aviation professionals, and with it associated safety risks.		
Deliverables		Timeline	Owner
Operators to take into consideration recent experience for crew rostering		2021-	Air Operators
ATC service providers to take into consideration recent experience for ATCO rostering		2021-	ANA
Organisations to consider the skill and knowledge degradation in their risk assessment		2021-	All stakeholders
References	EASA Covid 19 Risk portfolio C-1/SI-5003		

With redundancy and furlough reducing the available number of personnel, those left working may have to work additional hours. The preparation for and eventual return to (new) normal operations will require significant additional effort in comparison with actual normal operations. These may both contribute to rising levels of fatigue.

Title	Aviation personnel fatigue		
Description	As fewer personnel are available due to sickness / lockdown / conjuncture unemployment, others may have to work extra hours to cope with the workload. Fatigue will reduce the ability to concentrate, remember and make decisions and could potentially lead to people being more easily distracted and eventually lose situational awareness. Once the number of flights increases, the workload will increase and there will be a lot of pressure to make sure their aircraft are departing on time.		
Deliverables		Timeline	Owner
Fatigue reporting promotion		2022-	DAC Air Operators
Implementation of FRM principles		2022- 2025	Air Operators, ANA
Raise awareness of all operational personnel to fatigue management		2022- 2025	All stakeholders
References	EASA Covid 19 Risk portfolio C34/SI-5002, ASR 2019		

d. Dialogue with operators on FDM

Flight data monitoring (FDM) is an effective tool to enhance both flight safety and operational efficiency. Its effectiveness is steadily increasing over time as the trend towards more data and better analysis capabilities continues. DAC is planning to establish a working group at national level and to enhance its oversight of operators' FDM programmes.

Title	Member States should maintain a regular dialogue with their national aircraft operators on flight data monitoring programmes		
Description	Promoting FDM good practice DAC will establish a working group with national operators with the purpose to promote and exchange best practices in the domain of FDM.		
Deliverables		Timeline	Owner
Establish FDM working group at national level		2023	DAC, operators
Improve FDM oversight		2023	DAC-OPS
References	EPAS MST.0003		

e. Peer-to-Peer support programs

In order to prevent reoccurrence of an accident similar to the Germanwings accident of 2015, Regulation (EU) 2018/1042 requires all operators to establish a proactive and non-punitive support program for flight crew. This new requirement poses some challenges, especially for small operators. In 2021, a working group with the participation of all national AOC holders has been established: the Support Program Coordinator Forum (SPCF). It is led by an operator representative, with DAC participating as observer.

Title	Establish effective peer-to-peer support programs		
Description	Establish a Support Program Coordinator Forum (SPCF) to work together to achieve the following objectives: - To provide a platform for an open discussion and exchange of experience in the PSP domain; - To assist the operators with guidance on work priorities in the PSP domain; - To facilitate the sharing of Peer support expertise between DACL and industry/operators in line with the applicable European regulations; - To exchange best practices with regards to PSP implementation; - To develop guidance and promotion material;		
Deliverables		Timeline	Owner
Establish a national working group: Support Program Coordinator Forum (SPCF)		2021	Operators, DAC
Develop promotional material		2022-	SPCF
References			

f. Jet blast

Jet blast from taxiing aircraft can directly or indirectly put personnel in danger. While not frequent, several such incidents were noted since 2018 on the cargo apron at Luxembourg, including one high-risk incident. DAC has verified that the layout of the apron and parking positions is in line with regulations and common practice at other airports. Flight crew are made aware of the risk by the apron regulations published in the AIP. Nevertheless, the ongoing incidents demonstrate that further risk mitigation measures seem indicated.

Title	Jet blast study by Lux-Airport		
Description	Personnel at Luxembourg airport is at risk from the jet blast of taxiing aircraft. Several parking positions are affected, mainly on the cargo apron P7, but also on P1. A jet blast study has been initiated by Lux-Airport to obtain better data.		
Deliverables		Timeline	Owner
Study into the risks and potential solutions for jet blast at ELLX		2023	Lux-Airport
References	DAC Annual Safety Report 2018, 2019		

g. FOD

The planned runway refurbishment at Luxembourg airport during summer 2021 and 2022 also increases the risk of FOD on the runway and on taxiways used for vehicle access.

Title	FOD prevention		
Description	A complete refurbishment of the runway at ELLX is planned for summer 2021 and 2022. The work on the runway will be carried out at night only, while flight operations take place during the day. Work on TWY I may take place during the day. An increased risk of FOD on the runway and on taxiways used for vehicle access is expected.		
Deliverables		Timeline	Owner
FOD prevention plan		2022	Lux-Airport
Training of all external drivers accessing maneuvering area for runway refurbishment works		2021-2022	Lux-Airport
Implement a FOD detection system		2021-2022	ANA
References	DAC Annual Safety Report 2019		

h. General Aviation: Meteorological info in the PPL/LAPL syllabus

This item addresses weather-related risks such as entering IMC, icing conditions, carburetor icing, and poor weather conditions. Weather is an important contributing factor to GA accidents, often related to pilots underestimating the risks of changing weather conditions prior to take-off and during the flight, as weather deteriorates.

Title	PPL/LAPL learning objectives in the Meteorological Information part of the PPL/LAPL syllabus		
Description	Member States should develop proportionate learning objectives in the ‘Meteorological Information’ part of the PPL/LAPL syllabus. Such learning objectives to be of a basic, non-academic nature and address key learning objectives in relation to: — practical interpretation of ground based weather radar, strengths and weaknesses; — practical interpretation of meteorological satellite imagery, strengths and weaknesses; — forecasts from numerical weather prediction models, strengths and weaknesses.		
Deliverables		Timeline	Owner
Learning objectives, with related question bank		2022	ATOs
References	EPAS MST.0036, SPT.0087		

i. General Aviation: Improvement in the dissemination of safety messages

Several general aviation associations already organize safety workshops or similar events. DAC, as well as ANA, are available to support such events.

Title	Improvement in the dissemination of safety messages		
Description	Member States should improve the dissemination of safety promotion and training material by their competent authorities, associations, flying clubs, insurance companies targeting flight instructors and/or pilots through means such as safety workshops and safety days/evenings.		
Deliverables		Timeline	Owner
Safety workshops and safety days/evenings		continuous	GA organisations
Participation of DAC in associations' safety events		continuous	DAC
References	EPAS MST.0025		

j. Promotion of safety culture in General Aviation

Safety culture, including occurrence reporting, is less established among general aviation pilots than among professional pilots. After some trouble related to software transition, an entirely new web portal for occurrence reporting is available: www.aviationreporting.eu. It provides information about safety culture and just culture as well as an easy way to report safety occurrences to DAC.

As mentioned above, DAC usually participated in safety workshops by presenting the Annual safety report, which results from the analysis of occurrence reports. DAC will continue its commitment to these seminars when they recover after the pandemic.

Title	Promotion of safety culture in General Aviation		
Description	Member State CAs should include provisions to facilitate and promote safety culture (including just culture) in GA as part of their State safety management activities in order to foster positive safety behaviours and encourage occurrence reporting.		
Deliverables		Timeline	Owner
Presentation of safety analysis in GA safety seminars		2022-	DAC
Provide an easy way for GA pilots to report occurrences via ECCAIRS 2 Central Hub Home (aviationreporting.eu)		continuous	DAC
Provide feedback to individuals addressing an occurrence report directly to DAC		continuous	DAC
References	EPAS MST.0027		

5. Safety oversight actions

Several Member State Tasks (MSTs) of the EPAS are not addressed to the aviation organisations in the State, but have a narrower focus: the competent authority. This part of the NPAS describes the MSTs that are addressed specifically to DAC and are designed to enhance its safety oversight capabilities. Some deliverables may have an indirect impact on the organisations under DAC's oversight, but the main actions are internal actions for DAC.

a. Assessment of SMS

EASA has developed a management system assessment tool for use by national authorities within their oversight role. This tool has been evaluated by the different oversight departments of DAC. OPS and LIC departments have partially integrated it in their specific audit questionnaires. In 2021, NSA department has adopted it for trial in parallel with the EoSM validation. NAV department will evaluate it for application in its domain.

Title	Assessment of SMS		
Description	Consistent risk- and performance-based oversight Without prejudice to any obligations stemming from the SES ATM Performance Scheme, Member States should make use of the EASA management system assessment tool to support risk- and performance-based oversight. Member States should provide feedback to EASA on how the tool is used for the purpose of standardisation and continual improvement of the assessment tool. Member States should regularly inform EASA about the status of compliance with SMS requirements and SMS performance of their industry. Note that the EASA Management System assessment tool is under revision to include Continuing Airworthiness Management Organisations (CAMOs) and later on Part-21 and Part-145 organisations.		
Deliverables		Timeline	Owner
Trial application in ATM domain		done	DAC-NSA
Evaluate the EASA management system assessment tool for the airworthiness domain		2022	DAC-NAV
The EASA tool is not used by the DAC OPS and LIC departments as such but the SMS checklist is containing a lot of elements from it.		done	DAC-OPS DAC-LIC
References	EPAS MST.0026		

b. Human factors competency of DAC Staff

A new Member State Task of the EPAS aims to achieve Human Factor competency of regulatory staff. It goes hand in hand with Safety Promotion Task SPT.0115 of the EPAS, according to which EASA should develop a competency framework for regulatory staff by 2022.

As most DAC oversight staff participated in a Human Factors Course organized in-house in November 2015, basic Human Factor skills are present. An alignment with EASA recommendations will be planned as next step, but depends on the advancement of SPT.0115 which is only due by 2022 (development by EASA of guidance and tools to organise the implementation of the competency framework, and plan and conduct the training for the respective regulatory staff).

Title	Foster a common understanding and oversight of Human Factors		
Description	The task includes some preparatory activities which will be performed by EASA with the support of the Human Factor Collaborative Analysis Group (HF CAG) in terms of: — development of guidance and tools for the competency assessment of regulatory staff before and after training; — guidance for the appropriate level of Human Factors competency for Human Factors trainers; — development of promotion material to be provided as guidance to Member States and encourage implementation. These guidance and tools will be provided to the MS competent authorities to organise the implementation of the competency framework, and plan and conduct the training for the respective regulatory staff.		
Deliverables		Timeline	Owner
Guidance for competency assessment of regulatory staff		2023	DAC
Guidance for competency for trainers		2023	DAC
References	EPAS MST.0037, SPT.0115		

c. Oversight capabilities

DAC has established a management system that has been certified according ISO 9001:2015 in November 2019. The management system ensures DAC's compliance to all applicable authority requirements. Due to the small size and the proximity of the aviation sector in Luxembourg, DAC can maintain a close oversight of organisations. Specific actions to improve cooperative oversight involve a better understanding of operators' governance structure: cf. point e) below – MST.0019.

The actions in place to promote SMS at organisations, as described in Article 3.b, are mostly interactive. They are delivering feedback to DAC on the existing management systems of organisations in all sectors.

Title	Oversight capabilities/focus areas		
Description	(a) Availability of adequate personnel in CAs Member States shall ensure that adequate personnel is available to discharge their safety oversight responsibilities. (b) Cooperative oversight in all sectors Member States shall ensure that the applicable authority requirements are adhered to in all sectors. The objective is to ensure that each organisation's activities are duly assessed, known to the relevant authorities and that those activities are adequately overseen, either with or without an agreed transfer of oversight tasks. <i>NB: EASA will continue to support CAs in the practical implementation of cooperative oversight, e.g. benefitting from the outcome of the trial projects conducted between the United Kingdom, Norway, France, Czech Republic, as well as with exchanges of best practices and guidance.</i> (c) Organisations management system in all sectors Member States shall foster the ability of CAs to assess and oversee the organisations' management system in all sectors. This shall focus in particular on safety culture, the governance structure of the organisation, the interaction between the risk identification/assessment process and the organisation's monitoring process, the use of inspection findings and safety information such as occurrences, incidents, and accidents and, where applicable, flight data monitoring. This should lead CAs to adapt and improve their oversight system.		
Deliverables		Timeline	Owner
a) Manpower reviews are performed in order to check the adequacy and the availability of the personnel		annual	DAC
b) c) Better understanding of operators' governance structure: see item 2.e below, EPAS MST.0019			
c) Interviews of accountable manager and nominated postholders re. SMS are included in AOC audits		done	DAC
References	EPAS MST.0032		

d. Oversight of flight time specification schemes

Oversight of flight time specification schemes is in place.

Title	Oversight capabilities/focus area: flight time specification schemes		
Description	Member States shall ensure that the CAs possess the required competence to approve and oversee the operators' flight time specification schemes; in particular, those including fatigue risk management. CAs should focus on the verification of effective implementation of processes established to meet operators' responsibilities requirements and to ensure an adequate management of fatigue risks. CAs should consider the latter when performing audits of the operator's management system.		
Deliverables		Timeline	Owner
Dedicated FRM inspection has been created in 2019		done	DAC-OPS
Dedicated FTL inspection is in place.		done	DAC-OPS
FTL is part of the risk profile of the operator which is used for the risk based oversight programme		done	DAC-OPS
References	EPAS MST.0034		

e. Better understanding of operators' governance structure

DAC's checklists used for AOC audits include the aspect of group operations. Also, some inspections are carried out to verify activities subcontracted to the group (e.g. dispatch). The airworthiness domain is awaiting the development of the recently initiated EASA rulemaking task about business group CAMOs (RMT.0734). EASA will support this MST by providing guidance on how to effectively oversee group operations based on an overall concept for the oversight of such operations.

Title	Better understanding of operators' governance structure		
Description	Member States' CAs should foster a thorough understanding of operators' governance structure. This should in particular apply in the area of group operations. Aspects to be considered include: — extensive use of outsourcing, — the influence of financial stakeholders, and — controlling management personnel, where such personnel are located outside the scope of approval. Note: The Agency will support this MST by providing guidance on how to effectively oversee group operations based on an overall concept for the oversight of such operations. This will consider work ongoing at ICAO level (cross-border operations) and include continuing airworthiness management aspects. The timeline is amended accordingly.		
Deliverables	Timeline	Owner	
Guidance material	2021 Q4 2022 Q1	EASA	
Risk profile of operators to include the operators' governance structure	2022	DAC-OPS	
Monitor development of RMT.0734 (Business Group CAMO)	2022	DAC-NAV	
References	EPAS MST.0019		

f. Share ELP best practices

As stated in this MST, EASA will collect such feedback at the opportunity of the various Standardisation activities. It is understood that, beyond normal interaction at TeB or similar level, no specific information collection has been set up by EASA. DAC will support EASA during any standardisation visits as well as by its usual participation in related TeB meetings and activities.

Title	Language proficiency requirements — share best practices, to identify areas for improvement for the uniform and harmonised language proficiency requirements implementation		
Description	Member States should provide feedback to EASA on how the LPRI takes place, including that ATOs deliver training in English, for the purpose of harmonisation and uniform implementation. Note: EASA will collect such feedback at the opportunity of the various Standardisation activities.		
Deliverables		Timeline	Owner
Feedback on the implementation status		continuous	DAC
References	EPAS MST.0033, SPT.0105		

6. Differences to EPAS

The EPAS is based on a safety assessment of aviation in all Europe. As Luxembourg is representing only a small fraction of this vast domain, it is expected that not all identified risks are applicable to Luxembourg. All Member State Tasks of the EPAS have been evaluated, and for several of them the conclusion is that they do not apply to our specific national situation. This part of the NPAS explains why these Member State Tasks of the EPAS are considered not applicable for the aviation sector in Luxembourg.

a. Fraud cases in Part-147 organisations

Title	Prevention, detection and mitigation of fraud cases in Part-147 organisations		
Description	EVT.0002, the report on the EU maintenance licensing and training system, denounced cases of fraud or cheating during the examinations. The action includes discussions with the CAs/industry on how to prevent, detect, mitigate and eliminate fraud cases.		
Deliverables		Timeline	Owner
n/a			
References	EPAS MST.0035		

There is only one Part-147 organisation in Luxembourg. It provides only type-rating training, mostly for its own staff, and holds examinations mostly in Luxembourg. Based on many years' oversight, no problems of this nature were ever encountered. The risk is considered low enough, so that no additional actions on top of the normal oversight by DAC are required.

b. Helicopter Safety Events

Title	Helicopter safety events		
Description	Member States' CAs, in partnership with industry representatives, should organise helicopter safety events annually or every two years. The EHEST, IHST, CA, Heli Offshore or other sources of safety promotion materials could be freely used and promoted.		
Deliverables		Timeline	Owner
n/a			
References	EPAS MST.0015		

It is assumed that the task to organise annual helicopter safety events is intended for States that have a large helicopter industry. For Luxembourg, with only one small helicopter AOC and one small ATO, safety events are not considered an adapted means of communication. Direct communication, facilitated by short distances, is more effective.

The difficulty for a small authority does not lie in keeping contact with operators, but rather in keeping contact with all the developments in the larger industry. In the rotorcraft domain, DAC is achieving this by participating in the helicopter expert group (subgroup of the TeB Air Ops) since 2020.

c. Loss of separation between civil and military aircraft

Title	Loss of separation between civil and military aircraft		
Issue to be addressed	Several EU Member States have reported an increase in losses of separation involving civil and military aircraft and more particularly an increase in non-cooperative military traffic over the high seas. Taking into account this situation, and the possible hazard to civil aviation safety, the EC mandated EASA to perform a technical analysis of the reported occurrences.		
Description	The technical analysis issued a number of recommendations for the Member States: — endorse and fully apply ICAO Circular 330; — closely coordinate to develop, harmonise and publish operational requirements and instructions for State aircraft to ensure that 'due regard' for civil aircraft is always maintained; — support the development and harmonisation of civil/military coordination procedures for ATM at EU level; — report relevant occurrences to EASA; and — facilitate/make primary surveillance radar data available in military units to civil ATC units. The objective of this action is to ensure that Member States follow up on the recommendations and provide feedback on the implementation. EASA will have a supporting role and provide feedback on the occurrences reported. More generally, Member States are invited to consider civil-military coordination aspects where relevant for state safety management activities, with a view to identifying where civil-military coordination and cooperation will need to be enhanced to meet SSP objectives.		
Deliverables		Timeline	Owner
n/a			
References	EPAS MST.0024		

This MST was triggered by encounters of civil aircraft with "non-cooperative" military aircraft (aircraft operating without transponder) over the high seas. No such events have occurred in Luxembourg.

d. SESAR solutions aiming to facilitate safe instrument flight rules operations

Title	Implementation of SESAR solutions aiming to facilitate safe instrument flight rules operations		
Description	Member States together with their ANSPs and their flight procedure designers (if different from ANSPs) should evaluate the possibility to establish a network of low-level IFR routes in their airspace to facilitate safe helicopter operations. These SESAR solutions, such as solution #113 that are designed to improve safety, should be implemented as far as it is feasible. See SESAR Solutions Catalogue2019 Third Edition: https://www.sesarju.eu/sites/default/files/documents/reports/SESAR_Solutions_Catalogue_2019_web.pdf Ref.: ATM Master Plan (Level 3 Ed 2019) action NAV12 (ATS IFR Routes for Rotorcraft Operations)		
Deliverables	Timeline	Owner	
n/a			
References	EPAS MST.0031		

This MST aims specifically at improving the safety of IFR helicopter traffic during the en-route segment of their flights. However, there is very little IFR helicopter traffic in Luxembourg. Most helicopter traffic is VFR, and a NPAS action to improve the safety of these operations near Luxembourg airport is included under article 3.f. A specific study for better integration of helicopter traffic has been launched.