REPUBLIC OF MAURITIUS

DEPARTMENT OF CIVIL AVIATION

Sir Seewoosagur Ramgoolam International Airport, Plaine Magnien

Annual Safety Report for the Period July 2019 to June 2020 and 2020 to 2021

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Abbreviations

ADREP	Accident/Incident Data Reporting
AFI	Africa, Indian Ocean area
AOC	Air Operator Certificate
ATC	Air Traffic Control
CAT	Commercial Air Transport
CFIT	Controlled Flight into or Toward Terrain
DCA	Department of Civil Aviation
EASA	European Aviation Safety Agency
FOD	Foreign Object Debris / Foreign Object Damage
FLH	Flight Hours
GA	General Aviation
GH	Ground Handling
GHSP	Ground Handling Service Provider
ICAO	International Civil Aviation Organisation
LOC-I	Loss of Control In-flight
MAC	Mid-Air Collision
MOR	Mandatory Occurrence Report
MVTS	Movements (Take-off and Landing)
RA	Resolution Advisory
RASG	Regional Aviation Safety Group
RE	Runway Excursion
RI	Runway Incursion
RNO	Return to Normal Operations
SMS	Safety Management System
SPI	Safety Performance Indicator
SPT	Safety Performance Target
SSP	State Safety Program
TA	Traffic Advisory
TCAS	Traffic Collision Avoidance System

Foreword

As a signatory of the Convention on International Civil Aviation (Chicago Convention), the Republic of Mauritius has an obligation to implement the provisions made in the Chicago Convention and its Annexes, including related documents for the safe, secure, regular and efficient air transport within its area of jurisdiction.

Article 37 of the Convention states that each Contracting State undertakes to collaborate in securing the highest practicable degree of uniformity in regulations, standards, procedures, and organisation in relation to aircraft, personnel, airways and auxiliary services in all matters in which such uniformity will facilitate and improve air navigation.

Annexes 1, 6, 8, 11, 13, 14 and 19 to the Convention on International Civil Aviation Organisation (ICAO) require Contracting States to establish a State Safety Programme (SSP), in order to achieve an Acceptable Level of Safety Performance (ALoSP) in civil aviation. A SSP is defined as an integrated set of requirements and activities in a State aimed at improving safety. The Regulations describe the basic safety concepts as the foundation which needs to be understood for both a Safety Management System (SMS) and a SSP, as well as how these safety concepts are embodied into the ICAO Standards and Recommended Practices (SARP's).

The SSP plays an important role in identifying, monitoring and maintaining the effectiveness of the various elements in our safety systems. The concept of establishing an ALoSP complements the current approach to safety management based on regulatory compliance with a performance based approach.

As the regulatory authority in civil aviation, the Department of Civil Aviation is responsible to develop a SSP and implement it in coordination with other stakeholders responsible for civil aviation safety. A SSP has been issued in 2013, under Regulation 135 of the Civil Aviation Regulations 2007.

This State Safety Annual Report for the period July 2019 to June 2020 and July 2020 to June 2021 has been issued under Section 4 "State's Safety Promotion" of the SSP of the Department of Civil Aviation (DCA).

This State Safety Annual Report for the period July 2019 to June 2020 and July 2020 to June 2021 identifies and describes current arrangements and outlines the steps all the aviation stakeholders need to adhere to and adopt in order to respond to present and upcoming safety challenges.

I POKHUN
Director of Civil Aviation

Executive Summary

The Mauritius Civil Aviation Safety Report provides an overview of the Mauritian Civil Aviation safety data of years 2019-2020 and 2020-2021 and does not include yet comparisons to similar data period being the first published annual safety report.

The content and analysis of this report is based on data extracted from the Department of Civil Aviation occurrence reporting system, as required by regulation 128 of the Civil Aviation Regulations 2007.

Year 2020 -2021 has been very difficult for aviation. Air travel has been heavily impacted due to the COVID-19 pandemic leading to a significant decline of air travel and closure of airports worldwide. This new operational scenario brought with it a fair share of new challenges and required the operators and authorities to revisit their safety risk assessments to reflect their change in operations and the environment. Even though flying for scheduled airlines was heavily reduced, the business aviation segment and general aviation remained relatively busy. During the period July 2019 up to June 2021, the DCA evaluated **279** reports of which **161** were analyzed and taken into account in this report.

Since each event might have multiple reports submitted as follow-ups and/or closures and/or submission from multiple reporters, for clarity of analysis, this document will distinguish between an 'MOR event' or else 'number of reports' as appropriate.

The data is being presented as an additional tool for aviation users to have a snapshot of the safety levels of the Mauritian Civil Aviation environment and present the main safety issues as identified by the DCA and information provided at international levels.

The Mauritius Civil Aviation Safety Report is compiled by the Flight Operations, Airworthiness, Air Traffic Management (ATM) and Aerodrome sections with the Department. The data analysis will help assist in the identification of Safety Performance Indicators (SPIs) and Safety Performance Targets (SPTs) for the Mauritius State Plan for Aviation Safety.

During the period 2019-2021, Mauritius has not experienced any fatalities or aviation accidents reported as such. **Therefore, comparisons with global statistics, published annually by ICAO, have no bearing on those of this report, which deal only with analyses of incidents reported. However, Mauritius, with a record of 0 accidents during the period analysed, can be considered as an area of air operations where safety performance indicators (SPIs) are well below the regional and global rates which are respectively, 6.07 and 2.14 accidents per million departures.**

For reference and in addition to this report, it is useful to recall some world statistics concerning aircraft accidents published by ICAO and considering the place of Mauritius in the Indian Ocean area (AFI) zone.

Worldwide Accident Statistics and Analysis – Commercial Air Transport

Overall Safety Performance Indicator – Global Accident Rate

ICAO's global accident rate provides an overall indicator of safety performance for air transport operation. The accident rate is based on scheduled commercial operations involving fixed-wing aircraft with a maximum take-off weight (MTOW) above 5 700 kg. Aircraft accidents are reviewed and validated by the ICAO Occurrence Validation Study Group (OVSG) using definitions provided in Annex 13.

Data on departures is collated by ICAO's Air Transport Bureau and comprises scheduled commercial operations that involve the transportation of passengers, cargo and mail for remuneration. Estimates are made where data has not been provided by States, and as new data is provided to ICAO, it will be incorporated into the database. It is worth noting that this may cause small changes to the calculated rates from year to year.

According to ICAO Safety Report (2021 Edition), the accident rate in 2020 was 2.14 accidents per million departures, representing a decrease of 27 per cent compared to the previous year. Chart 1 below shows the global accident rate trend (per million departures) for 2019 and 2020.

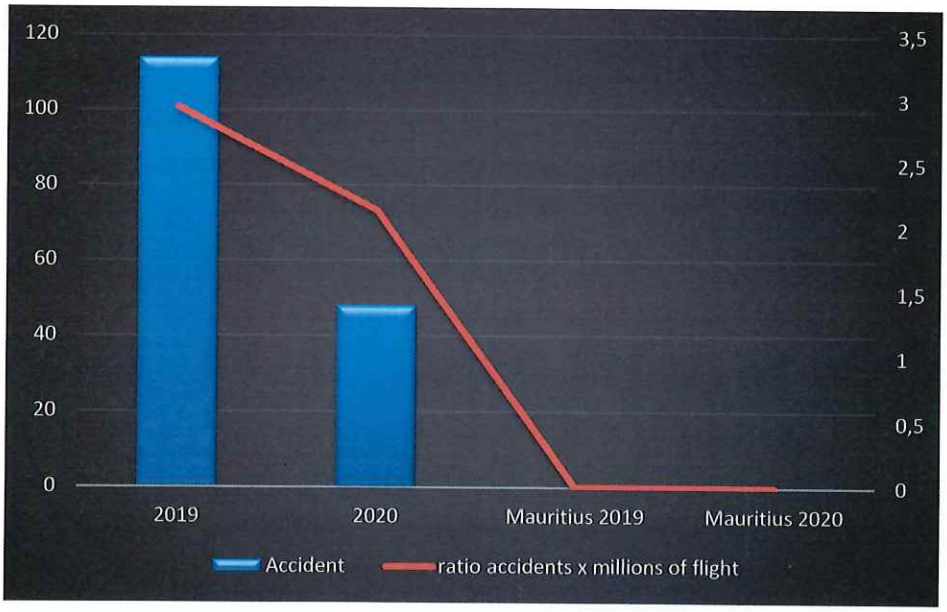


***Exhibit 1** – Accident records: 2019 - 2020 commercial operations*

Regional Accident Statistics

To further analyze the state of aviation safety, the accident data for commercial air transport operations are categorized according to Regional Aviation Safety Group (RASG), by State of Occurrence.

Exhibit 2 is extracted from the ICAO Safety Report (2021 Edition) and provides details on the state of aviation safety in different RASG regions for 2020 in the context of global outcomes.

RASG Region	Estimated departures	Number of accidents	Accident rate (per million departures)	Fatal accidents	Fatalities
Africa-Indian Ocean (AFI)	659 502	4	6.07	nil	nil
Asia Pacific (APAC)	8 590 721	10	1.16	2	119
Europe (EUR)	4 504 203	10	2.22	1	3
Middle East (MID)	694 941	4	5.76	1	176
Pan America (PA)	8 021 215	20	2.49	nil	nil
WORLD	22 470 582	48	2.14	4	298

Exhibit 2 . Departures, accidents and fatalities by RASG region

It is worth noting that these statistics are based on Accident/Incident Data Reporting (ADREP) data reported by the State of Occurrence in 2020. Partly due to the small number of departures, some regions experience a large fluctuation in the accident rate from year to year. For this reason, these numbers should be considered in relation to the total number of accidents to gain an overall perspective.

From Exhibit 2, we observe that even if the AFI region to which Mauritius belongs has not suffered any fatal accident, the ratio of accidents to the number of commercial flights remains the highest in the world. However, Mauritius has no influence on this outcome, since for the last two years, there has been no accident involving a 3B registered aircraft or helicopter.

Mauritius Occurrence Analysis

Based on the above, only the different types and categories of incidents/occurrences related to the ALoSP stated in Appendix II have been taken into consideration.

Additionally, we have included specific categories that are not part of the SSP of the DCA so as to follow-up on the evolution of the safety performance of operational activities in Mauritius and other States where 3B registered aircraft operate.

Occurrence Reports

Occurrence reporting is one of the active systems that contributes towards identifying safety-related issues and helps develop pro-active approaches and strategies to mitigate undesired outcomes while enhancing overall aviation safety.

Along the years, Department of Civil Aviation of Mauritius has seen a steady increase in the amount of occurrence reports it received and analysed. The increase can be attributed to two main factors:

- the work done by the Department of Civil Aviation of Mauritius to inspire a safety reporting culture among aviation users, and;
- the growth of aviation activity in Mauritius and new organisations under the oversight of the DCA.

All reports submitted to the Department of Civil Aviation of Mauritius are stored and managed with strict confidentiality.

Exhibit 3 compares the total number of events recorded by the DCA during the period 2019-2020 with those of the period 2020-2021. These events have been classified into five different groups of activity:

	07/2019 - 06/2020	**07/2020 - 06/2021**
• Aircraft Operations	87 events recorded	33 events recorded
• Helicopters Operations	9 events recorded	2 events recorded
• General Aviation	1 events recorded	0 events recorded
• Aerodromes	2 events recorded	9 events recorded
• ATM	7 events recorded	11 events recorded

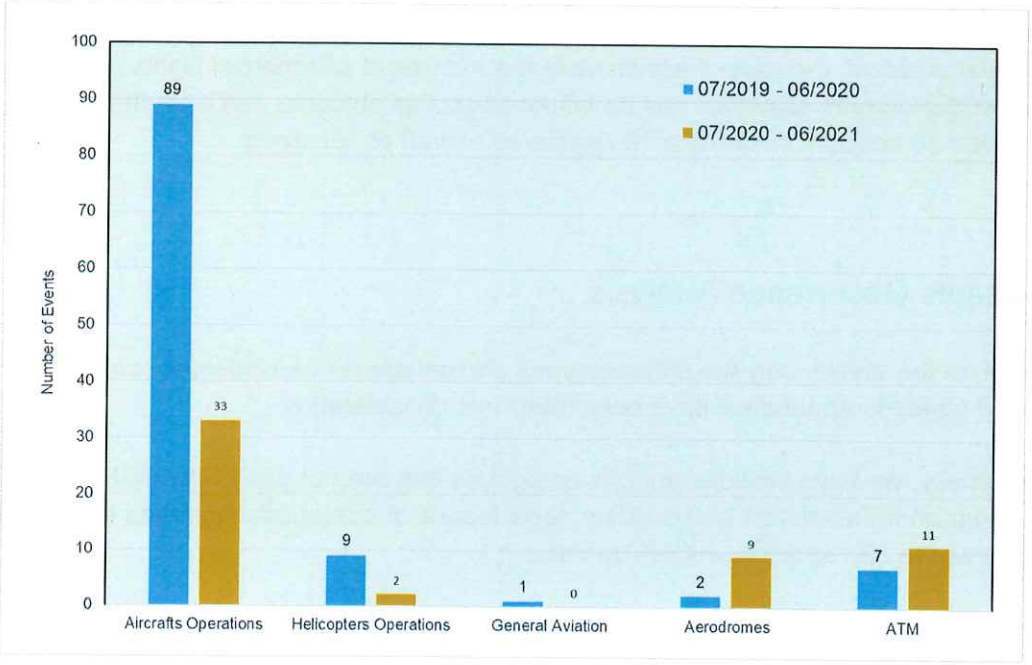


Exhibit 3 *– Number of Events for the periods July 2019 to June 2020 and July 2020 to June 2021*

The figures for the period 07/2020 to 06/2021, which are much lower than those of previous years, are of little significance as they were collected during the COVID-19 period and cannot be compared with those of previous years. Exhibit 3 shows an increase in events during Q1 2021 following the opening of certain routes and airports and the will for 'Return to normal Operations' (RNO) by the airline industry.

Exhibit 4 shows the total flying hours (commercial) operated by Air Operator Certificate (AOC) holders and total number of movements at SSR International Airport, under DCA oversight. The exhibit shows the result of a normal activity during the period July 2019 up to 2020 and the reduce activity of the period July 2020 up to 2021, due to COVID-19.

	2019-2020	***2020-2021***
Categories	***Nb. of flight hours***	
AOC Holders/ Air Operators	*39245*	*10778*
Categories	***Nb. of movements***	
ATM/Aerodromes	*18049*	*3711*

Exhibit 4 *- Flying hours of AOC holders and total number of movements at SSR International Airport per year (2019-2021)*

Significant results are obtained by comparing the events to the total number of flight hours in the period or, for aerodromes and ATMs, the number of movements, in order to obtain a ratio of events vs activity.

Exhibit 5 shows the occurrence categories submitted to the Department of Civil Aviation of Mauritius between 07/2019 and 06/2021. This visual provides a snapshot of the ADREP categories reported and provides the basis for further analysis within that specific category as addressed in this document.

ACTIVITY	***N. of events***		***Nb. of flight hours***		***Nb. of movements***		***EVENT AVERAGE***	
	2019-2020	***2020-2021***	***2019-2020***	***2020-2021***	***2019-2020***	***2020-2021***	***2019-2020***	***2020-2021***
Aircraft Operations	*87*	*33*	*36259*	*10208*			***2,40*** *x 1000 FLH.*	***3.23 x*** *1000 FLH.*
Helicopters Operations	*9*	*2*	*2343*	*428*			***3,84*** *x 1000 FLH.*	***4,67 x*** *1000 FLH.*
General Aviation	*1*	*0*	*643*	*145*			***1,55*** *x 1000 FLH.*	***0 x*** *1000 FLH*
Aerodromes	*2*	*9*			*18049*	*3711*	***0,11*** *x 1000 Mv.*	***2,43*** *x 1000 Mv..*
ATM	*7*	*11*			*18049*	*3711*	***0,38 x*** *1000 MV.*	***2.96*** *x 1000 Mv.*

Exhibit 5 *- Events reported to DCA per group of activities with ratio obtained for July 2021 up to June 2022*

Occurrence Class

As part of the analysis process conducted by the DCA, each occurrence report submitted to the Department of Civil Aviation of Mauritius is classified under one of the following occurrence classes:

- Accident
- Incident
- Serious incident
- Occurrence without safety effect
- Occurrence with no flight intended

Such classification is based on the ICAO ADREP taxonomy guidance material and reference to the definitions deriving from Civil Aviation Regulations 2007, of which 'accident' and 'incident' are presented in Appendix I of this report.

Exhibit 6 provides a percentage value of the occurrence classes namely. The 'Others' incorporates event classes commonly related to terminology (ex: Occurrence without safety effect) and 'Occurrence with no flight intended' which are events identified or occurred during maintenance.

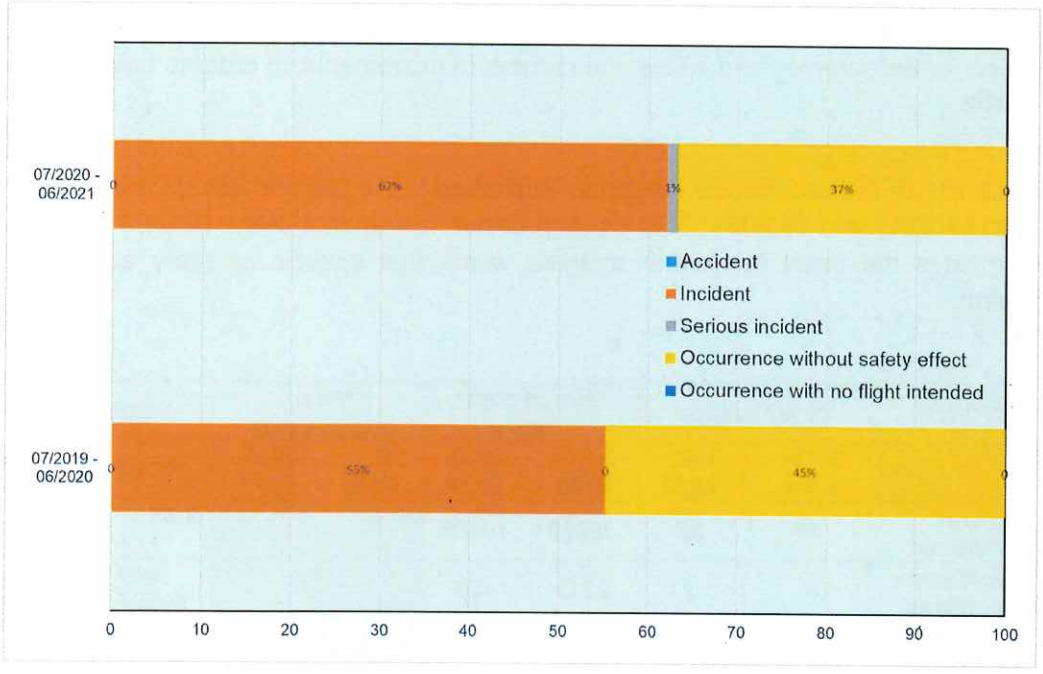


***Exhibit 6** - Occurrence Class (% of total)*

The majority of MOR's received for the period July 2019 to June 2021 have been classified as 'incident' or 'occurrence without safety effect'. One local event being investigated by the DCA investigation team in the period July 2019 to June 2021 regarding the loss of engine cowl on ATR on 28 December 2020 has been classified as 'serious incident'.

Occurrence Categories

As part of the analysis process managed by the DCA, each occurrence report received in the DCA database is categorised to allow for a top-level visibility of events. In order to select the correct category and reflect as closely as possible the event, DCA utilizes the ICAO resources, namely the document prepared by the ICAO Common Taxonomy Team (CICTT) *'Aviation Occurrence Categories – Definitions and Usage Notes'*. These common taxonomies and definitions are intended to improve the aviation community's capacity to focus on common safety issues. Some occurrences related to the aviation activities in Mauritius has been added to the ICAO Taxonomy list and recognizable by the definition "DCA" before the abbreviation of the occurrence.

The categories presented in Exhibit 6 are based on the ICAO ADREP taxonomy and DCA specific Taxonomy and are provided as follows:

Taxonomy abbreviation	*Description*	*Taxonomy abbreviation*	*Description*
ARC	Abnormal Runway Contact	**LOC-G**	Loss of Control-Ground
AMAN	Abrupt Manoeuvre	**LOC-I**	Loss of Control-Inflight
ADRM	Aerodrome	**LOLI**	Loss of Lifting Conditions En-Route
MAC	Airprox/TCAS Alert/Loss of Separation/Near Mid-Air Collisions/Mid-Air Collisions	**LALT**	Low Altitude Operations
ATM	ATM/CNS	**MED**	Medical
BIRD	Bird strike	**NAV**	Navigation Errors
CABIN	Cabin Safety Events	**OTHR**	Other
CTOL	Collision with Obstacle(s) during Take-Off and Landing	**RE**	Runway Excursion
CFIT	Controlled Flight into or toward Terrain	**RI**	Runway Incursion
EVAC	Evacuation	**SEC**	Security related
EXTL	External Load Related Occurrences	**SCF-NP**	System/Component Failure or Malfunction (Non-Powerplant)
F-NI	Fire/Smoke (non-impact)	**SCF-PP**	System/Component Failure or Malfunction (Powerplant)
F-POST	Fire/Smoke (post-impact)	**TURB**	Turbulence Encounter
FUEL	Fuel related	**USOS**	Undershoot/Overshoot
GTOW	Glider Towing related events	**UIMC**	Unintended Flight in IMC
GCOL	Ground Collision	**UNK**	Unknown or Undetermined
RAMP	Ground Handling	**WILD**	Wildlife Collision
ICE	Icing	**WSTRW**	Wind Shear or Thunderstorm
DCA-ABTO	Aborted Take Off	**DCA-GA**	Go Around
DCA-CC	Cabin Crew	**DCA-LASER**	Laser attack
DCA-DG	Dangerous Goods	**DCA-MP**	Maintenance Personnel
DCA-FC	Flight Crew (Cockpit)	**DCA-PG**	Paragliding

Exhibit 7 *- Occurrence Categories based on ICAO ADREP taxonomy and DCA Specific Issues*

Exhibit 8 lists the occurrence categories reported during the period July 2019 to June 2020, in descending order.

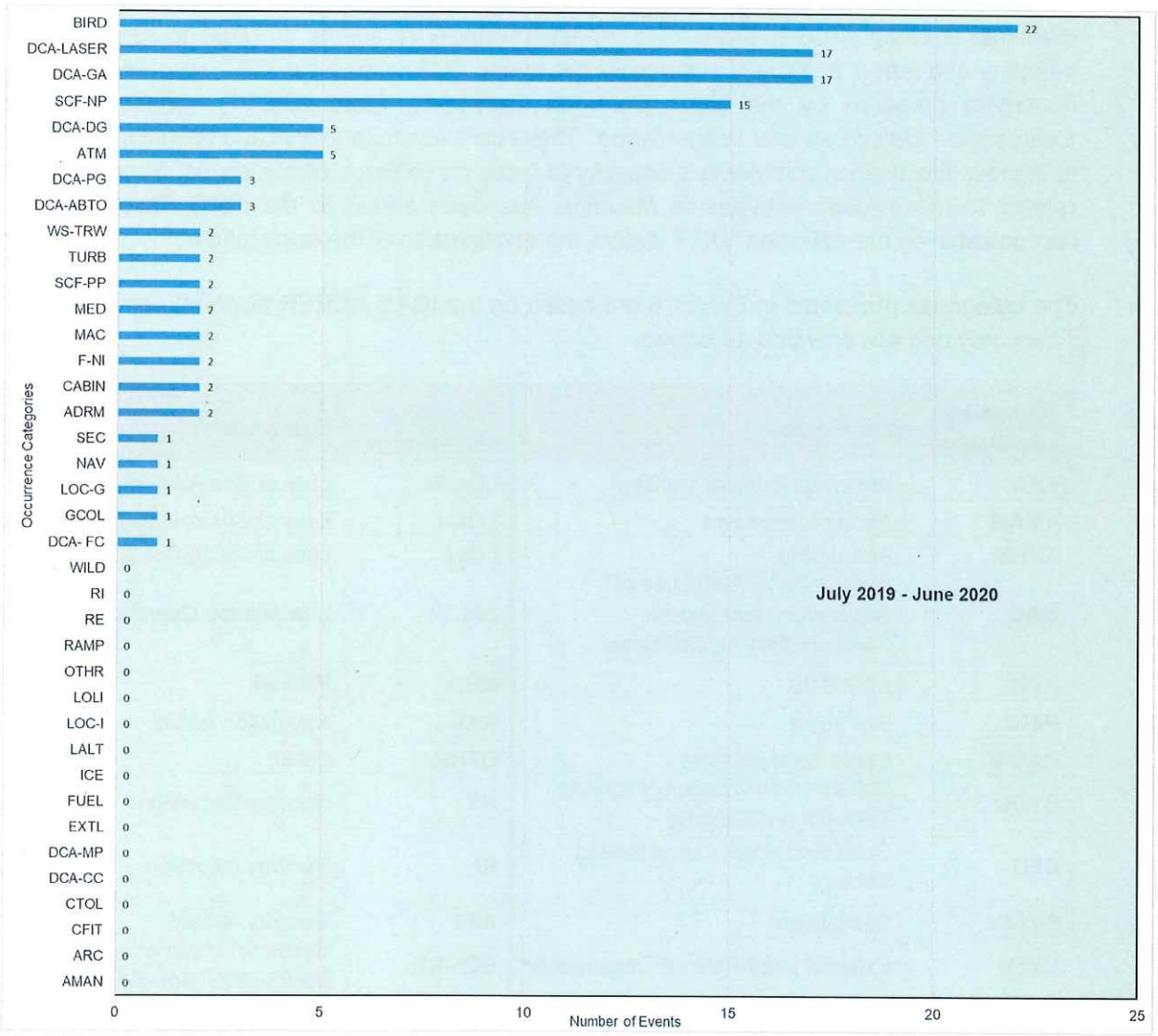


Exhibit 8 *- Occurrence categories of MOR events (07/2019 – 06/2020) in descending order*

Exhibit 9 lists the occurrence categories reported during the period July 2020 to June 2021, in descending order.

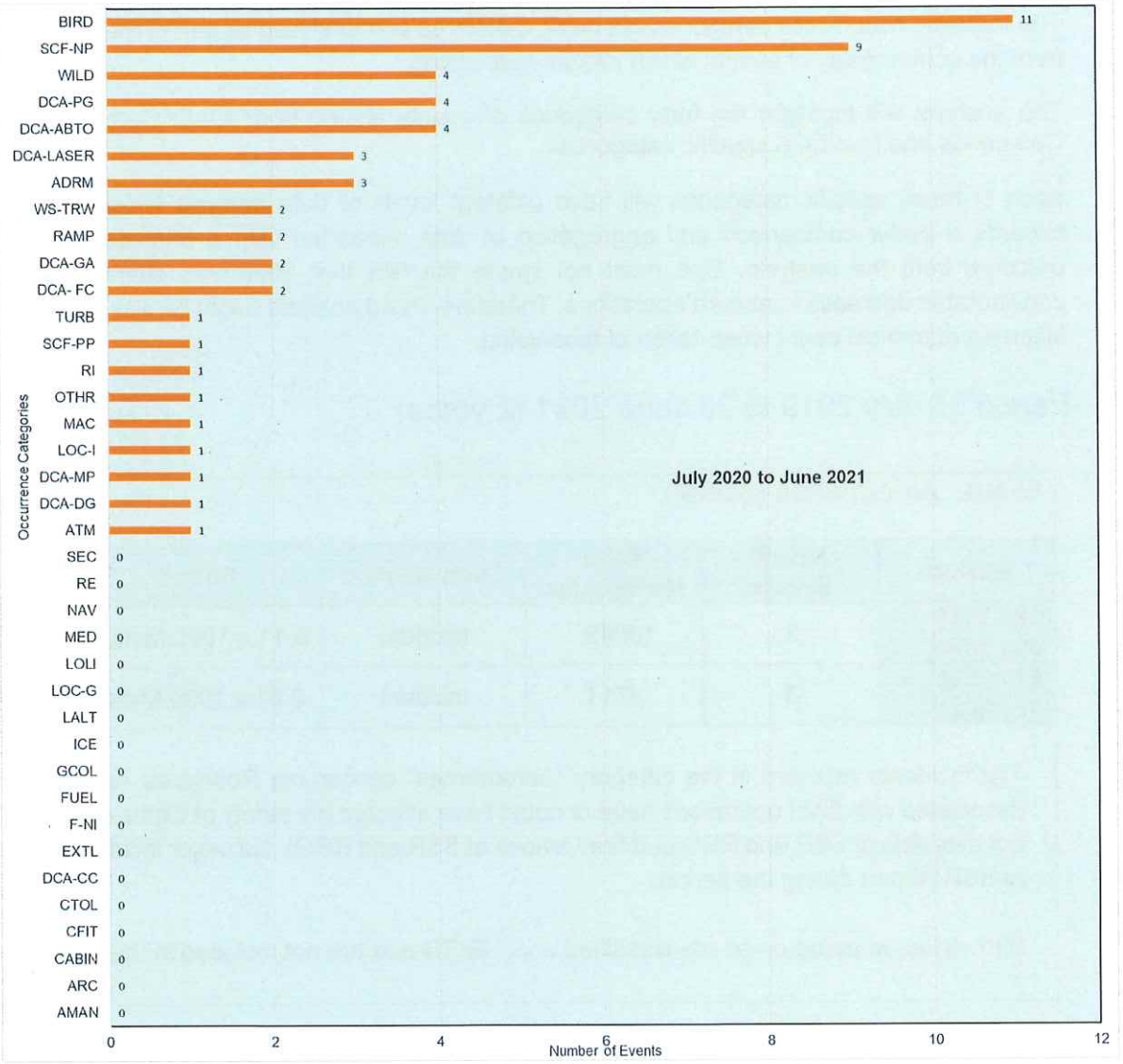


Exhibit 9 *- Occurrence categories of MOR events (07-2020 to 06/2021)*

Bird Strikes (22), Laser attacks (17) and Go-Around (17) were the riskiest categories in 2019 - 2020 which gave up their places to Bird Strikes (11) and System/Component Failure or Malfunction (Non-Power plant) (9) in 2020 - 2021. The decrease in the number of Laser attacks and Go-around is related to the significant decrease in air traffic due to Covid-19 pandemic.

Nevertheless, the most common event category does not necessarily constitute the highest safety risk. The DCA is monitoring these specific categories to ensure that it does not constitute a negative impact on operational safety and help identify and address realistic Safety Performance Indicators (SPIs) and targets (SPTs) by the respective operators/organisations.

Specific Occurrence Category Analysis

The following occurrence categories are being monitored and analysed as part of the threats deriving from the commonality of events which require addressing.

The analysis will highlight the forty categories of events issued from ICAO Common Taxonomy Categories and four DCA specific categories.

Each of these specific categories will have different levels of data analysis which will contribute towards a better comparison and aggregation of data supported with a brief description of the outcome from the analysis. One must not ignore the fact that 2020 was characterised with a considerable decrease in aircraft operations. Therefore, trend analysis might be skewed and provide incorrect numerical count when taken at face-value.

Period 01 July 2019 to 30 June 2021 (2 years)

Event: Aerodromes (ADRM)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	2	18049	Incident	0.11 x 1000 Mvts.	0.46
07 / 2020 06 / 2021	3	3711	Incident	0.81 x 1000 Mvts	

The incidents reported in the category "Aerodromes" concerning Rodrigues Airport (RRG) associated with flight operations have or could have affected the safety of flights (PAPI Lights not available at SSR and RRG and fire / smoke at SSR and RRG). No major incident reported at SSR Airport during the period.

Bird strikes at aerodromes are classified under BIRD and are not included in this category.

Event: AIRPROX / TCAS Alert / Loss of separation / Near MID-AIR Collision / MID-AIR Collision (MAC)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	2	39245	Incident	0.05 x 1000 flight hours	0.07
07 / 2020 06 / 2021	1	10778	Incident	0.09 x 1000 flight hours	

This category includes occurrence events related to Airprox, TCAS alerts, loss of separation as well as near collisions or collisions between aircraft in flight. This aspect is of crucial importance towards a safe aviation environment. DCA treats such events seriously and considers the occurrence class as a Significant Incident. Nevertheless, each event has its

own impact of safety whereby separation criteria and resolution actions are taken into consideration when analysing each case.

Due to the operational nature of 2020, it is difficult to compare MAC reports to previous years. In addition, following the optimisation in categorisation introduced in late 2019, the data cannot provide a relative mean. In 2019, the DCA classified two events as MAC and one in 2020 with a risk ratio almost double. Due to the fact that the State of occurrence was not Mauritius, none of the MAC event from 2019 is being investigated by the DCA.

Event: ATM / CNS (ATM)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	5	18049	Incident	0.28 x 1000 Mvts.	0.27
07 / 2020 06 / 2021	1	3711	Incident	0.27 x 1000 Mvts	

Three incidents reported in the category "ATM" associated with flight operations have or could have affected the safety of flights (Clearance for Take-off given with traffic - Frequency mistake - No wind indication at RRG).

Other incident reported (Wrong Parking allocation – Unidentified object (Balloon) at RRG and communication issue at RRG) did not affect the Safety of operations.

Event: Bird Strikes (BIRD)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	14	18049	Incident	0.78 x 1000 Mvts.	1.47
07 / 2020 06 / 2021	8	3711	Incident	2.16 x 1000 Mvts	

This category includes occurrences involving collisions/near collisions with bird(s) or bat(s).

22 bird strikes and 11 bird strikes have been reported for the period 2019-2020 and 2020-2021 respectively. For statistic purpose, only Bird Strikes events at SSR International Airport and Plaine Corail Airport have been considered.

An analysis of bird strikes occurrences is detailed in section National Average of Occurrences.

Event: Cabin Safety Events (CABIN)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	2	39245	Incident	0.05 x 1000 flight hours	0.03
07 / 2020 06 / 2021	0	10778		0 x 1000 flight hours	

This occurrence category includes miscellaneous occurrences in the passenger cabin of transport category aircraft.

Two incidents were reported to DCA in the category "CABIN" involving unruly passengers on foreign aircraft bringing the ratio for the 2019-2020 period to 0.05 incident per thousand flight hours. Ratio to be maintained as AVERAGE for the next period.

Event: Fire and Smoke (Non-impact) (F-NI)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	2	39245	Incident	0.05 x 1000 flight hours	0.03
07 / 2020 06 / 2021	0	10778		0 x 1000 flight hours	

This category includes occurrences where fire or smoke was reported in or on the aircraft, in flight, or on the ground, which was not the result following impact of the aircraft. The events differed from contaminated air in the aircraft air-conditioning system, component failure and galley appliance failures.

Two separate events, one fire and smoke on an ATR and the other just smoke in the cabin of a helicopter.

The reference ratio for these two events (0.05) remains acceptable and can be used as a reference risk level for the coming periods.

Event: Ground Collision (GCOL)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	1	18049	Incident	0.06 x 1000 Mvts.	0.03
07 / 2020 06 / 2021	0	3711		0 x 1000 Mvts	

This category includes occurrences involving collisions on ground involving vehicles, airplanes and equipment parked on the ramp.

The only reported event was a private jet being damaged on December 30, 2019, during a cyclone at SSR International Airport in Plaine Magnien.

Event: Ground Handling (RAMP)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	0	18049	Incident	0 x 1000 Mvts.	0.13
07 / 2020 06 / 2021	1	3711	Incident	0.27 x 1000 Mvts	

The following analysis includes RAMP events in Mauritius and those under this category that were reported by Mauritian registered operators

This category includes all events occurring on the ramp during aircraft services, loading/unloading of baggage or catering, aircraft refuelling and fixed or mobile bridge incidents.

In two years there have been only two incidents, a damage caused by a loading vehicle on an A330 in London (LHR) and an oil spillage from truck servicing an A330 at SSR International airport in Plaine Magnien.

For statistic purpose, only the RAMP event at SSR International Airport has been considered.

Event: Loss of Control – Ground (LOC-G)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	1	18049	Incident	0.06 x 1000 Mvts.	0.03
07 / 2020 06 / 2021	0	3711		0 x 1000 Mvts	

This category includes all events such as loss of control of aircraft on the runway, taxi-way and arrival/departure paths to the parking area.

Only one event occurred during this period in this category, namely the loss of steering control of a foreign Embraer 190, landing at SSR International Airport (MRU).

Event: Lost of Control – Inflight (LOC-I)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	0	39245		0 x 1000 flight hours	0.05
07 / 2020 06 / 2021	1	10778	Incident	0.09 x 1000 flight hours	

This category is quite vast and include occurrences where there was a loss of aircraft control, or deviation from intended flight path inflight. LOC-I remains one of the most significant contributors to fatal accidents worldwide. LOC-I can result from a range of interferences

including engine failures, icing, or stalls. It is one of the most complex accident categories, involving numerous contributing factors that act individually or, more often, in combination.

Reducing this accident category, through understanding of causes and possible intervention strategies, is an industry priority.

Fortunately, only one LOC-I event has been recorded by the DCA during the last two years on an A319 aircraft registered in Mauritius, which was an ECAM NAV Fault.

Event: Medical – inflight (MED)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	2	39245	Incident	0.05 x 1000 flight hours	Not Applicable
07 / 2020 06 / 2021	0	10778		0 x 1000 flight hours	

Two incidents on foreign aircraft have occurred during the period 2019-2020. Both of them were related to sick passengers on board after take-off, which required the return of the planes to SSR International Airport and the treatment of the sick passengers by the airport's medical services.

Event: Navigation Errors (NAV)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	1	39245	Incident	0.03 x 1000 flight hours	0.01
07 / 2020 06 / 2021	0	10778		0 x 1000 flight hours	

There was only one incident involving navigation errors during the period 07/2019 -06/2022. A foreign A320 missed the localizer on approach for a landing on runway 32 at MRU.

Event: Runway incursion (Vehicle, aircraft, persons) (RI)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	0	18049		0 x 1000 flight hours	0
07 / 2020 06 / 2021	0	3711		0 x 1000 flight hours	

In 2020 - 2021 the DCA received one report of RI events which occurred in Meda, Mozambique, following a military crossing of the runway which forced the Let 410 crew to a last minute go-around.

For statistic purpose, only Runway Incursion events at SSR International Airport and Plaine Corail Airport have been considered.

Event: Security related (SEC)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	1	39245	Incident	0.03 x 1000 flight hours	Not Applicable
07 / 2020 06 / 2021	0	10778		0 x 1000 flight hours	

Passenger mistake boarding on A350 aircraft at Paris CDG Airport

Event: System Component Failure or Malfunction (Non – Powerplant)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	15	39245	Incident	0.38 x 1000 flight hours	0.61
07 / 2020 06 / 2021	9	10778	Incident	0.84 x 1000 flight hours	

The incidents reported concerning the System and components failures which do not concern the motorization of the aircraft are varied and cannot be grouped into sub-categories.

Two incidents concern helicopters (Cyclic control fault and loss of the left sliding door in flight).

An analysis of System Component Failure or Malfunction occurrences is detailed in section National Average of Occurrences.

Event: Wildlife Collision (WILD)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	0	18049		0 x 1000 flight hours	0.54
07 / 2020 06 / 2021	4	3711	Incident	1.08 x 1000 flight hours	

An analysis of Wildlife Collision occurrences is provided in section National Average of Occurrences

Event: Winds shear or Thunderstorm (WS-TRW)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	2	39245	Incident	0.05 x 1000 flight hours	Not Applicable
07 / 2020 06 / 2021	2	10778	Incident	0.19 x 1000 flight hours	

Four incidents reported in this category weather:

- A return to MRU for a flight to SEZ (Seychelles) due to bad weather in the Seychelles.
- One holding at DAR for an A 319 due to a Wind Shear situation reported at Dar es Salaam airport.
- Two returns to MRU for ATR flights to RRG due to bad weather at RRG airport.

Event: Turbulence Encounter & Weather (TURB)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	2	39245	Incident	0.05 x 1000 flight hours	Not Applicable
07 / 2020 06 / 2021	1	10778	Incident	0.09 x 1000 flight hours	

One report of turbulence on the MRU-BOM route and two reports of MRU -RRG flights with diversions/returns to MRU due to bad weather conditions at RRG.

Event: GO-AROUND (DCA-GA)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	17	18049	Incident	0.94 x 1000 Mvts.	0.74
07 / 2020 06 / 2021	2	3711	Incident	0.54 x 1000 Mvts	

A **go-around** is an aborted landing of an aircraft that is on final approach or has already touched down.
An analysis of go-around occurrences is detailed in section National Average of Occurrences.

Event: Flight Crew (DCA-FC)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	1	39245	Incident	0.03 x 1000 flight hours	0.11
07 / 2020 06 / 2021	2	10778	Incident	0.19 x 1000 flight hours	

The three events concerning the flight crew was about one rest time not respected on a humanitarian flight and two flights operated out of valid recency of flight (more than 90 days without recent flight experience – COVID-19 period).

Event: Aborted Take Off (DCA-ABTO)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	3	18049	Incident	0.17 x 1000 Mvts.	0.62
07 / 2020 06 / 2021	4	3711	Incident	1.08 x 1000 Mvts	

An aborted take-off is the actions taken when it is decided to abandon the takeoff and stop an aircraft during the takeoff roll.

An analysis of aborted take-off occurrences is detailed in section National Average of Occurrences.

Event: Laser Attacks (DCA-LASER)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	17	18049	Incident	0.94 x 1000 Mvts.	0.88
07 / 2020 06 / 2021	3	3711	Incident	0.81 x 1000 Mvts	

An analysis of laser attack occurrences is detailed in section National Average of Occurrences.

Event: Dangerous Goods Issues (DCA-DG)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	5	18049	Incident	0.28 x 1000 Mvts.	0.27
07 / 2020 06 / 2021	1	3711	Incident	0.27 x 1000 Mvts	

Four missing declarations, one undeclared Dangerous Goods item and one wrong labelling is the summary of the Mandatory Occurrence Reports received at DCA for the two years period.

It is interesting to note that the ratio (very low) of events per thousand movements is approximately the same for both years.

Event: Paragliding (DCA-PG)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	3	18049	Incident	0.17 x 1000 Mvts.	0.62
07 / 2020 06 / 2021	4	3711	Incident	1.08 x 1000 Mvts	

The DCA has received 7 reports from helicopter Pilots on illegal paragliding activities during the period July 2020 to June 2021.

Specific Occurrence Category that are not a safety concern

The following categories of occurrences, which are part of the ICAO and DCA occurrence list, were not reported and did not constitute a concern for the safety of air operations in Mauritius and for 3B registered aircraft.

- → Abnormal Runway Contact (ARC)
- → Abrupt Manoeuver (AMAN
- → Collision with Obstacle(s) during Take Off and Landing (CTOL)
- → Controlled Flight into or Towards Terrain (CFIT)
- → External Load Related Occurrences (EXTL)
- → Fuel related (FUEL)
- → Loss of Lifting Conditions En-Route (LOLI)
- → Low Altitude Operations (LALT)
- → Runway Excursion (RE)
- → Cabin Crew (DCA-CC)

National Average of Occurrences

Mauritius has recorded **0** accident for the period July 2019 to June 2021. No runway incursion (Vehicle, aircraft, persons) was recorded at SSR International Airport and Plaine Corail Airport.

The National Average of occurrences, all categories included, for the period July 2019 to June 2021 is **0.37**.

The National Average of occurrences related to per 1000 Flight Hours, for the period July 2019 to June 2021 is **0.13**. **One of the categories analysed with respect to per 1000 Flight Hours falls above the National Average of 0.13, which is System Component Failure or Malfunction (0.61).**

The National Average of occurrences related to per 1000 Aircraft Movements, for the period July 2019 to June 2021 is **0.51**. **Six of categories analysed with respect to per 1000 Aircraft Movements fall over the national average (0.51), which are BIRD STRIKE (1.47), WILDLIFE COLLISION (0.54), GO AROUND (0.74), ABORTED TAKE OFF (0.62), LASER ATTACKS (0.88) and PARAGLIDING (0.62).**

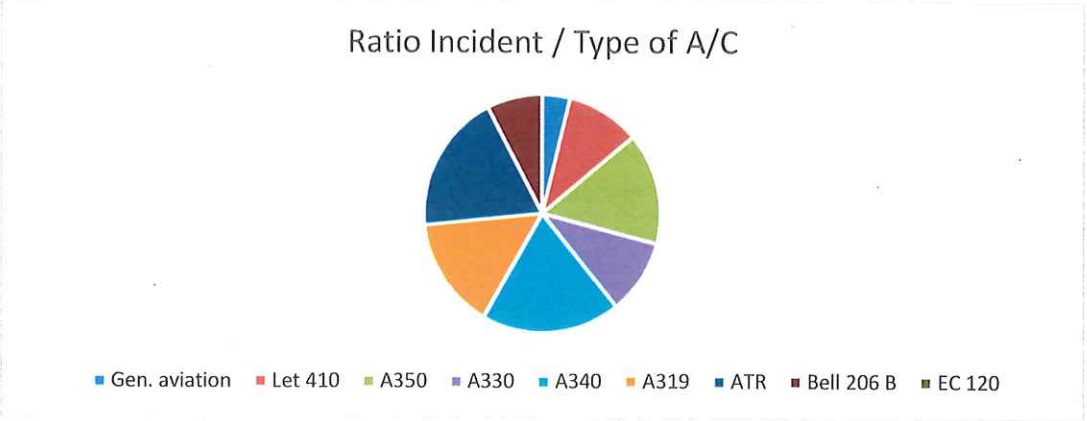
We next provide a detailed analysis of the above mentioned categories.

Event: System Component Failure or Malfunction (Non – Powerplant)

Period	Nb. of Events	Total Flight Time (hrs)	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	15	39245	Incident	0.38 x 1000 flight hours	0.61
07 / 2020 06 / 2021	9	10778	Incident	0.84 x 1000 flight hours	

The incidents by type of aircraft are divided as follows:

Type of A/C	Nb. of A/C	Nb. of incident	Ratio: Incident per type of A/C
General Aviation	5	1	0.2
Beech 1900	2	1	0.5
Let 410	4	4	1.0
A350	2	1	0.5
A330	4	3	0.75
A340	2	5	2.5
A319	2	4	2.0
ATR	3	7	2.33
Bell 206B	2	2	1.0
EC 120	2	0	0

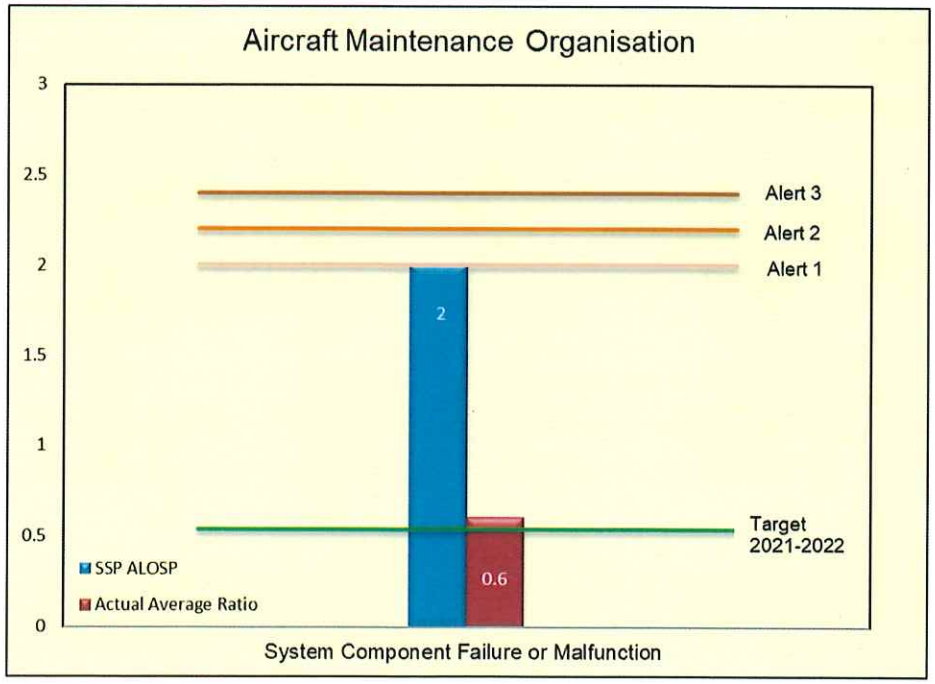


Highest ratio incident per type of aircraft is registered for A340, A319 and ATR.

Considering that A 319 and A340 are not anymore in 3B's operators fleet, particular attention should be dedicated to the ATR fleet.

Period	Actual Average Ratio	SSP ALOSP	Alert 1	Alert 2	Alert 3	Target 2021-2022
07/2019 06/2021	0.61	2	2.000	2.200	2.400	0.550

As per Appendix II, B (Aircraft Maintenance Organisation), the acceptable level of safety is 200 major aircraft defect incidents per 100,000 hours flown (2 per 1000 Flight Hours). The ratio 0.61 is above National Average of occurrences but still below the acceptable level of 2 per 1000 Flight Hours.



Event: Wildlife Collision (WILD)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019-2021
07 / 2019 06 / 2020	0	18049		0 x 1000 flight hours	0.54
07 / 2020 06 / 2021	4	3711	Incident	1.08 x 1000 flight hours	

The four reported incidents concerned animals on or near the runway during operations (Dogs and Hares at SSR International airport and goats at Rodrigues Plaine Corail airport). None of the reports involved damage to aircraft or injuries to people on board of aircraft.

Event: Bird Strikes (BIRD)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019 2021
07 / 2019 06 / 2020	14	18049	Incident	0.78 x 1000 Mvts.	1.47
07 / 2020 06 / 2021	8	3711	Incident	2.16 x 1000 Mvts	

This category includes occurrences involving collisions/near collisions with bird(s) or bat(s). This natural phenomenon is highly dependent on the location of the aerodrome and surrounding areas. To aid our analysis, such events taking into consideration two sources, namely bird strikes reported at the only certified aerodrome (MRU & RRG) and bird strikes reported by Mauritius-registered operators at foreign locations.

The table above clearly shows a significant increase in reported bird strikes during 2020 - 2021. While there was a large decrease in such type of events at MRU and RRG Airports (0,77 for 2019 – 2020), the reported events of bird strikes at aerodromes has spiked during the period 2020 -2021. This phenomenon has been attributed to the lower activity at airports, allowing for birds and wildlife to use such open spaces for rest and nesting.

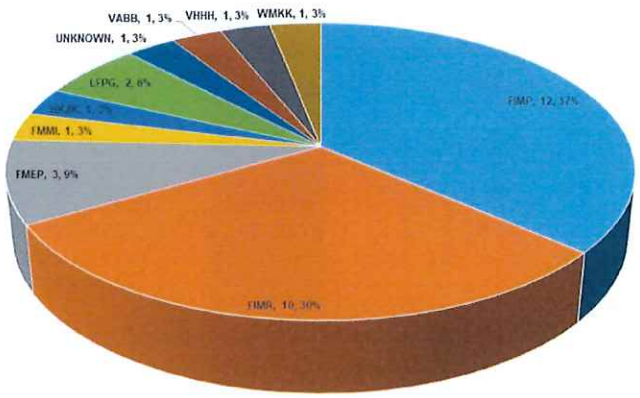


Exhibit 10: Bird Strike Incidents by Airport

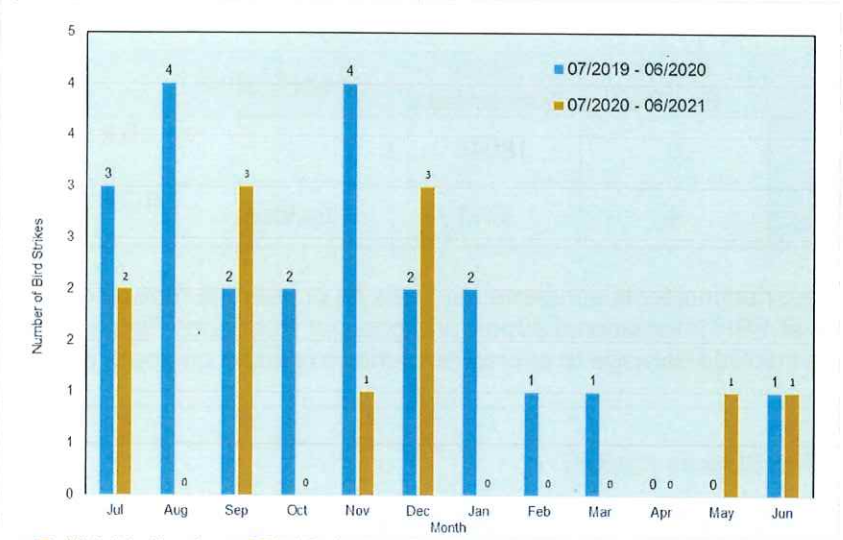
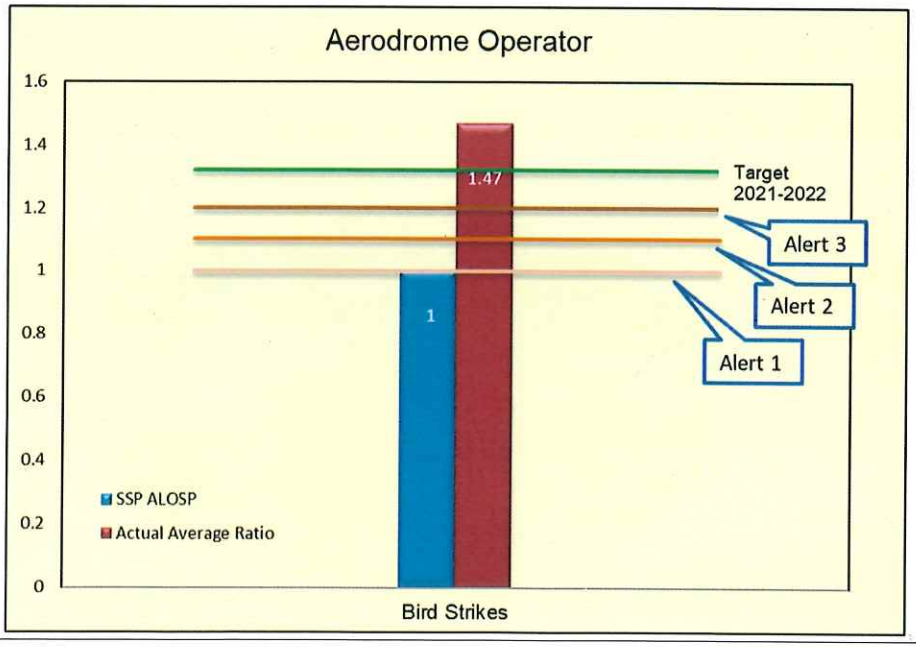


Exhibit 11: Number of Bird Strike events per month during the period observe

Exhibit 11 shows that the peak period for bird strike incidents is during the spring and austral summer.

Period	Actual Average Ratio	SSP ALOSP	Alert 1	Alert 2	Alert 3	Target 2021-2022
07/2019 06/2021	1.47	1	1.000	1.100	1.200	1.323

According to Appendix II, A (Aerodrome Operator), 1 bird strike per 1000 aircraft movement is acceptable and the ratio 1.47 is above the acceptable level of 1 per 1000 Flight Hours.

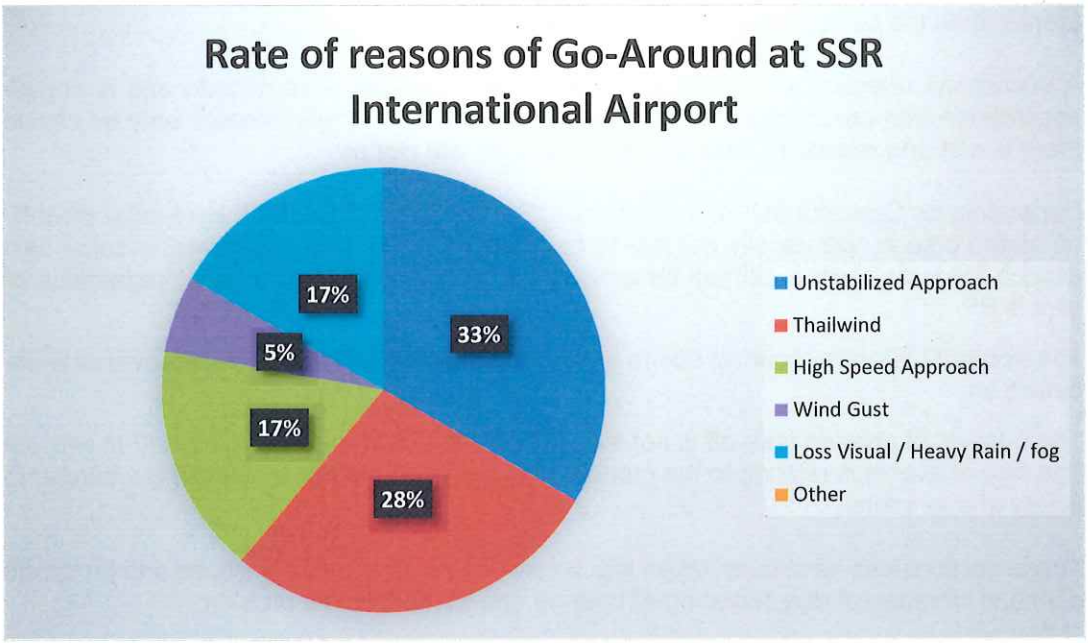


Event: GO-AROUND (DCA-GA)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019 2021
07 / 2019 06 / 2020	17	18049	Incident	0.94 x 1000 Mvts.	0.74
07 / 2020 06 / 2021	2	3711	Incident	0.54 x 1000 Mvts	

A **go-around** is an aborted landing of an aircraft that is on final approach or has already touched down.

A go-around can either be initiated by the pilot flying or requested by air traffic control for various reasons, such as an unstabilized approach or an obstruction on the runway.



The two major reasons for go around at Plaine Magnien Airport are the non-stabilized approaches (33%) and the tailwind in short final (28%).

Considering that a go-around is an operational action taken to prevent eventual incident/accident, especially during short bad weather event (tail wind, wind gust, heavy rain, fog or thunderstorm) at SSR International Airport, this category has been studied for statistic purpose to ensure safe operation procedures.

Event: Aborted Take Off (DCA-ABTO)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019 2021
07 / 2019 06 / 2020	3	18049	Incident	0.17 x 1000 Mvts.	0.62
07 / 2020 06 / 2021	4	3711	Incident	1.08 x 1000 Mvts	

An aborted take-off is the actions taken when it is decided to abandon the takeoff and stop an aircraft during the takeoff roll.

In the event of an engine malfunction, the recognition of a significant abnormality, or an ATC instruction to stop the aircraft during the take-off roll, transport aircraft in Performance Category 'A' should be able to safely reject the take off if the decision to do so is made at a speed not greater than the correctly calculated decision speed (V1).

A successful rejection should be achieved if the response is immediate and is completed in accordance with prescribed procedures (SOPs). After V1, a reject should ***only*** be considered if there is a strong reason to believe that the aircraft ***will not fly***.

Depending on Operator SOPs, a call of "STOP" ("ABORT', "REJECT") to reject a takeoff, based on stated criteria, will usually be able to be made by either pilot. However, in some cases, the actions following such a call will be only for the pilot in command to take, regardless of which pilot is PF.

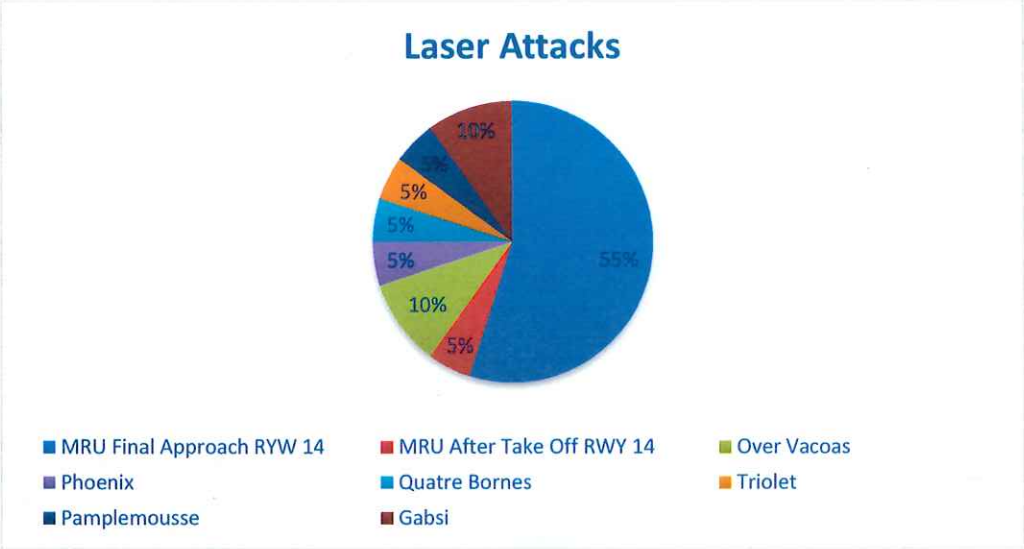
The aborted take-offs occurred due to mechanical and system problems discovered while rolling before V1

The number of aborted take-off is not significant at SSR International airport (7 in two years). The rate of events in relation to the number of movements does not represent a danger for the safety of operations.

These occurrences have been taken into consideration for statistic purpose and for monitoring eventual increase of rejected/aborted take-off due to mechanical problem.

Event: Laser Attacks (DCA-LASER)

Period	Nb. of Events	Total Movements	Classification	Ratio	AVERAGE 2019 2021
07 / 2019 06 / 2020	17	18049	Incident	0.94 x 1000 Mvts.	0.88
07 / 2020 06 / 2021	3	3711	Incident	0.81 x 1000 Mvts	



55% of the Laser attacks occurred at low altitude, on final approach to Runway 14 at SSR International airport, representing a high risk of loss of control of the aircraft by the pilots

Under certain conditions, laser light or other bright lights (spotlights, searchlights) directed at aircraft can be a hazard. The most likely scenario is when a bright visible laser light causes distraction or temporary flash blindness to a pilot, during a critical phase of flight such as landing or take-off. It is far less likely, though still possible, that a visible or invisible beam could cause permanent harm to a pilot's eyes. Although laser weapons are under development by armed forces, these are so specialized, expensive and controlled that it is improbable for non-military lasers to cause structural damage to an aircraft.
The risk is greatest when the exposure comes during a time of high workload: takeoffs, critical or emergency maneuvers, and landings.
In addition, pilots can make the situation worse if they overreact, stare at the light to try to locate its source, or carry out unnecessary evasive maneuvers.

Regarding the results of this survey specific to Mauritius, the ratio for the year 2019-2020 is high. The one for 2020-2021 is not very significant due to COVID 19. It will be interesting to compare the ratio for the coming year to see if additional surveillance and enforcement measures will be needed around the airport and heli stations.

This occurrence category is not part of the SSP. However, it has been included due to the proximity of runway 14 with the Public access at SSR International Airport.

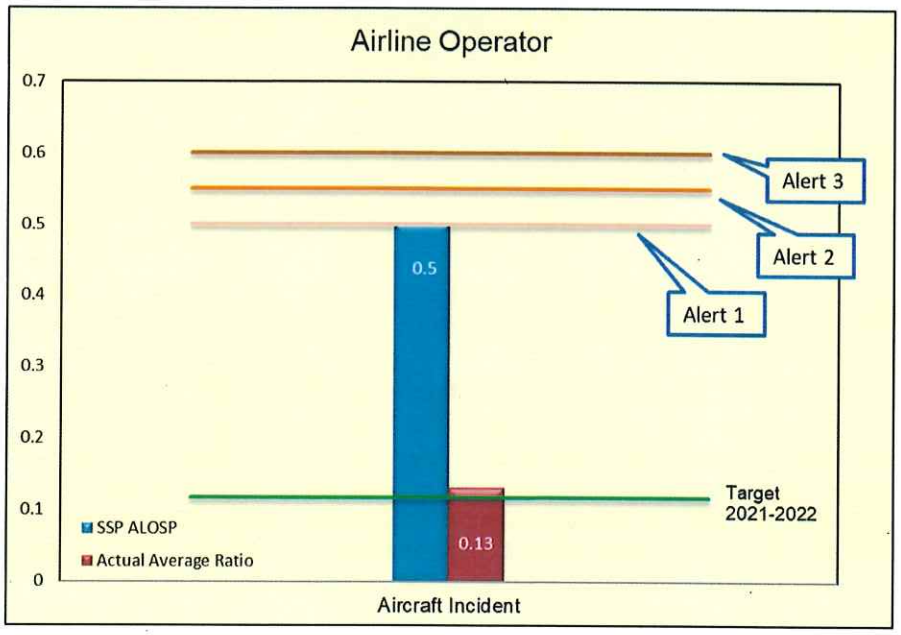
There has never been any reported incident involving damage to aircraft or injuries to people on board of aircraft due to the laser attack.

National Average for Airline Operators

According to Appendix II, C (Airline Operator), the acceptable levels of safety are 0.5 fatal accidents per 100,000 departures (0.01 per 1000 departures) and 50 aircraft incidents per 100,000 hours flown (0.5 per 1000 Flight Hours).

No accident has occurred during the period under review (**0** per 1000 departures) and the National Average of occurrences related to per 1000 Flight Hours, for the period July 2019 to June 2021 is **0.13**, which is below the acceptable level of 0.5 per 1000 Flight Hours.

Period	Actual Average Ratio	SSP ALOSP	Alert 1	Alert 2	Alert 3	Target 2021-2022
07/2019 06/2021	0.13	0.5	0.500	0.550	0.600	0.117



Conclusions

Comparing Mauritius to the world statistics, published by Region (RASG – Regional Aviation Safety Group), which only take into account accidents and fatalities, the country's aviation activity does not present any risk since no accident occurred during the period under review.

In the context of accident prevention, this report analyses the incidents/occurrences that have occurred in the context of aviation activities in Mauritius and wherever Mauritian registered aircraft (3B) operate.

These occurrences analysis have identified the most important and frequent occurrences during the last 2 years as well as the identification of the locations where they occurred.

The worst ratio recorded during the period is the Bird Strike result during the year 2020 - 2021, i.e. 8 incidents bringing the ratio to **2.16 per 1000** aircraft movements

Special attention and follow-up should be given to the following operational categories:

→ **Laser Attacks**: 17 occurrences in 2019-2020 – Ratio 0.94
3 occurrences in 2020-2021 - Ratio 0.81

→ **Go-Around**: 17 occurrences in 2019-2020 - Ratio 0.94
2 occurrences in 2020-2021 – Ratio 0.54

→ **Bird Strike**: 14 occurrences in 2019-2020 - Ratio 0.78
8 occurrences in 2020-2021 – Ratio 2.16

→ **Paragliding**: 3 occurrences in 2019-2020 - Ratio 0.17
4 occurrences in 2020-2021 – Ratio 1.08

→ **Wildlife Collision**: 0 occurrences in 2019-2020 - Ratio 0
4 occurrences in 2020-2021 – Ratio 1.08

→ **System/ Component Failure or malfunction (non-power plant)**:
15 occurrences in 2019-2020 - Ratio 0.38
9 occurrences in 2020-2021 – Ratio 0.84

MOR Observations: Impact of Reduced Operations due to COVID-19

The disruption in air operations due to the COVID-19 pandemic has brought with it a change in the safety-identification and analysis scenario within the industry. The disruption has affected all aspects of aviation operation and this was noticed in the analysis conducted when reviewing the MOR's.

In terms of human performance (crew/personnel actions) special attention should be worn with the resumption of the activities towards the normal with regards to:

- Unstabilised approaches
- High Speed approaches/Overspeed
- Crew responsiveness events/Aircraft Configuration errors
- Specific ramp personnel errors
- Situational awareness/attention

Report Follow-up

The aim of safety occurrence reporting is to improve the safe operation of the aviation industry, thus making this mode of transport safer than yesterday. DCA Mauritius fosters the notion of Just Culture and it is not the intention of the DCA to attribute blame to an event on an individual. In addition, based on the occurrence reports received, the DCA may conduct its own fact-finding and/or issue any relevant Safety Information/Notice.

As part of the analysis, the DCA expects that organisations provide a follow-up report especially if the event has revealed an actual or potential aviation safety risk. The DCA MOR section manages this follow-up process in liaison with the respective inspector/inspecting officer from the other Units within the DCA. The goal is to identify operational hazards and system deficiencies which must be addressed by means of added mitigation measures and actions as necessary.

Hence, operators/organisations are expected to conduct an effective root-cause analysis and/or identification of causal factors and introduce any possible mitigation measures. This process must be an integral part of the organisations' SMS and approach towards improving aviation safety.

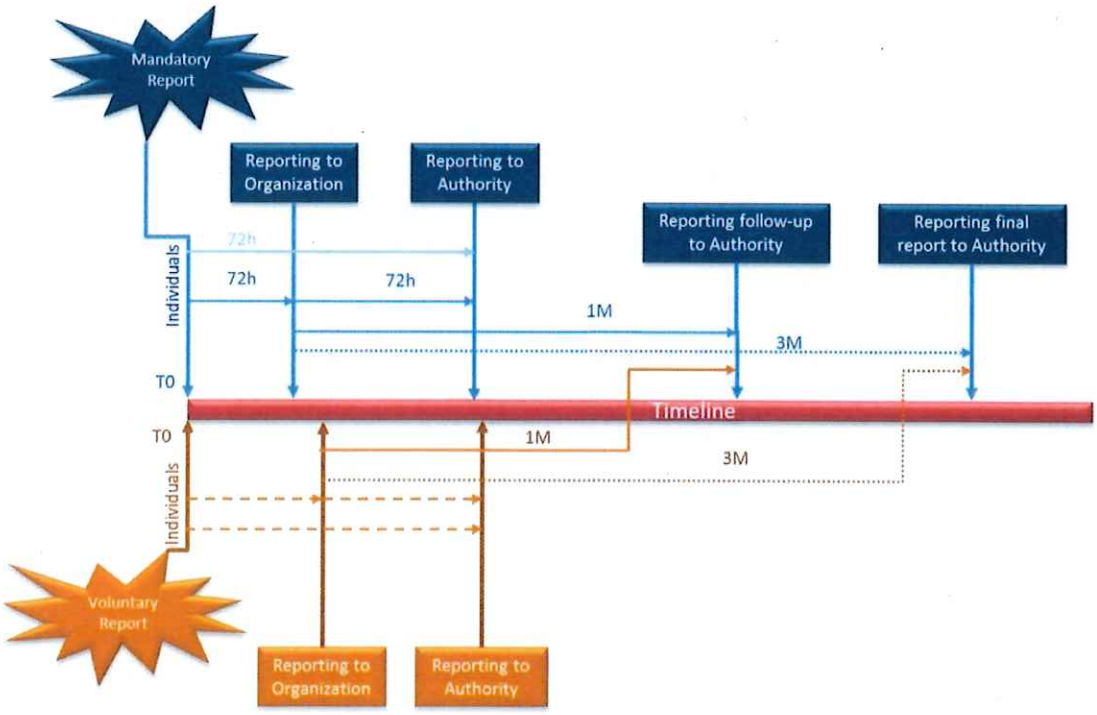


Exhibit 12 *- Reporting flow implied by Regulation*

Appendix I – Occurrence Class Definitions

These definitions derive from Civil Aviation Regulations 2007.

'accident' means an occurrence associated with the operation of an aircraft which, in the case of a manned aircraft, takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, or in the case of an unmanned aircraft, takes place between the time the aircraft is ready to move with the purpose of flight until such time it comes to rest at the end of the flight and the primary propulsion system is shut down, in which:

(a) a person is fatally or seriously injured as a result of:
- being in the aircraft, or,
- direct contact with any part of the aircraft, including parts which have become detached from the aircraft, or,
- direct exposure to jet blast, except when the injuries are from natural causes, self-inflicted or inflicted by other persons, or when the injuries are to stowaways hiding outside the areas normally available to the passengers and crew; or

(b) the aircraft sustains damage or structural failure which adversely affects the structural strength, performance or flight characteristics of the aircraft, and would normally require major repair or replacement of the affected component, except for engine failure or damage, when the damage is limited to a single engine, (including its cowlings or accessories), to propellers, wing tips, antennas, probes, vanes, tires, brakes, wheels, fairings, panels, landing gear doors, windscreens, the aircraft skin (such as small dents or puncture holes) or minor damages to main rotor blades, tail rotor blades, landing gear, and those resulting from hail or bird strike, (including holes in the random); or

(c) the aircraft is missing or is completely inaccessible.

'incident' means an occurrence, other than an accident, associated with the operation of an aircraft which affects or could affect the safety of operation.

Appendix II –Acceptable Level(s) of Safety Performance

These Acceptable Level(s) of Safety Performance derive from Appendix – H of the State Safety Programme of Mauritius.

A. Aerodrome Operator

DCA and the aerodrome operator agree on an acceptable level of safety to be achieved by the aerodrome operator SMS:

(a) No more than one runway incursion per 40,000 aircraft movements (safety indicator); a 40 per cent reduction in a 12-month period (safety target);
The establishment of low visibility taxi procedures (safety requirement).

(b) 1.0 bird strike per 1, 000 aircraft movements (safety indicator) with a 50 per cent reduction in five years (safety target);
The establishment of wildlife/bird strike hazard assessment and reduction programme (safety requirement).

B. Aircraft Maintenance Organisation

DCA and an aircraft maintenance organisation (AMO) agree on an acceptable level of safety to be achieved by the AMO SMS:

(a) 200 major aircraft defect incidents per 100, 000 hours flown (safety indicator) with a 25 per cent reduction over the last three-year average (safety target);

C. Airline Operator

DCA and an airline operator agree on an acceptable level of safety to be achieved by the operator SMS:

(a) 0.5 fatal accidents per 100,000 departures (safety indicator); a 40 percent reduction in five years (safety target);
The development of GPS approaches for airfields without ILS approaches (safety requirement).

(b) 50 aircraft incidents per 100, 000 hours flown (safety indicator) with a 25 per cent reduction in three years (safety target);

D. ATS Service provider

DCA and ATS provider agree on an acceptable level of safety to be achieved by the service provider SMS:

(a) No more than one runway incursion per 40,000 aircraft movements (safety indicator); a 40 per cent reduction in a 12-month period (safety target);
The establishment of low visibility taxi procedures (safety requirements).

(b) 40 airspace incidents per 100, 000 hours flown (safety indicators) with a 30 per cent reduction over the five-year moving average (safety target);