



**Ministry of Transport, Communications and Works
Department of Civil Aviation**

Cyprus Department of Civil Aviation

Annual Safety Review

2022

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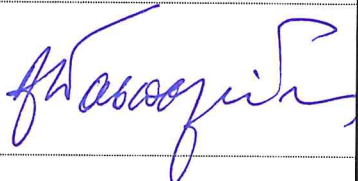
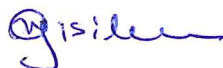


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<p>This review presents the status of aviation safety in Cyprus, on the basis of data collected with respect to safety occurrences in the year 2022. It is prepared and published in line with Article 13(11) of Regulation (EU) 376/2014.</p>			
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DOCUMENT APPROVAL

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EXECUTIVE SUMMARY

This report is prepared and published in line with Article 13(11) of Regulation (EU) 376/2014 and presents the status of aviation safety in Cyprus, on the basis of data collected with respect to safety occurrences within the year 2022. It also serves as the main input to the Annual Safety Report of 2022 which is produced in accordance with the provisions of the State Safety Program in force.

The aviation industry in Cyprus experienced a significant recovery in 2022 compared to the previous two years, but it is still below pre-pandemic levels. The number of flights in 2022 increased by 36.3% compared to 2021, however, it is still down by 10.4% compared to 2019.

A total of 693 mandatory and voluntary reports were submitted to the DCA in 2022, which were processed by the Department and consolidated to a total of 623 occurrences. This number has more than doubled from the 255 occurrences reported in the previous year. The trend for the last four years shows a slightly increasing trend both for the absolute number of reports and for the reporting rates.

There was one non-fatal Accident during 2022, involving a military Unmanned Air Vehicle (UAV) that ditched into the sea near Paphos for unknown reasons. Out of five Serious Incidents reported, four involved Separation Minima Infringements (SMIs), with one instance triggering a TCAS Resolution Advisory (RA). The fifth Serious Incident concerned a declaration of fuel emergency by a foreign-registered ultralight aircraft (gyrocopter) flying from Rhodes to Paphos, which landed safely. No serious injuries were reported.

The occurrence reports were classified into different classes based on the ICAO ADREP taxonomy and the definitions of Accidents, Serious Incidents, and Incidents derived from Reg. (EU) 996/2010. There is a slightly downward trend for serious incidents, and a clear upward trend for major incidents over the last four years.

The top five Occurrence Categories in 2022, based on the number of occurrences, were ATM/CNS, Birdstrike, Navigation Error, Security-related, and Other. There is an upward trend for the ATM/CNS and Birdstrike categories in the last four years, while the other categories show a downward trend.

From the analysis of the occurrence reports several actions are proposed in this report, including monitoring the implementation of safety improvement actions by the ANSP, verifying Birdstrike/Wildlife collision occurrences by on-site audits, recalling a specialized officer from the Game and Wildlife Department to investigate possible actions or omissions, and conducting a cross-domain investigation to look at laser attacks in the vicinity of airports and consider possible actions such as information campaigns.

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1. Background

This report has been elaborated in accordance with the provisions of the Department of Civil Aviation (DCA) "Occurrence Reporting Procedure Edition 1.4, dated 19/09/2022. It is prepared and published in line with the requirements of European Union Regulation (EU) 376/2014 Article 13(11) as amended.

Occurrence reporting is one of the active systems that enables the identification of safety-related hazards and helps the development of proactive approaches and strategies to mitigate undesired outcomes while enhancing overall aviation safety.

The Occurrence Reporting System's main goal is to provide a statistical analysis of the safety performance of the past year as well as trends over a longer period. This document helps the Cyprus DCA to identify safety priorities for the upcoming State Safety Plan (SSP).

2. Reporting period

This report gives an analysis of the occurrences received by the DCA during the year 2022.

3. Sources of information

The analysis is based on the data received through the DCA mandatory and voluntary reporting systems, processed and stored in the National Database of Safety Occurrences and subsequently shared to the European Central Repository (ECR) of occurrence reports. Processing and storing of reports is performed in accordance with Reg. (EU) 376/2014 "on the reporting, analysis and follow-up of occurrences in civil aviation".

Data from previous Annual Safety Reviews as well as air traffic data from EUROCONTROL and other sources are used to identify trends.

4. Key Statistics

The cross domain key statistics consist of data for fatal and non-fatal accidents, serious injuries and occurrences that are classified as serious incidents. They are illustrated in the tables and figures below and include comparison with previous year's data.

4.1: Traffic levels during the year 2022

The aviation industry experienced a significant recovery in the year 2022 compared to the previous two years, but it is still below the pre-pandemic levels. According to EUROCONTROL¹ air traffic data for Cyprus, the number of flights in 2022 has increased by 36.3% compared to the previous year 2021, however it is still down by 10.4% compared to the year 2019.

¹ EUROCONTROL: <https://www.eurocontrol.int/Economics/2022-DailyTrafficVariation-States.html>

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The table below shows a comparison of traffic movements and controlled flight hours between years 2021 and 2022.

2021		2022
10939	Local Aerodrome Flights (VFR)	6941
51149	International Aerodrome Traffic Movement (IFR)	72901
62088	Total Aerodrome Traffic Movement (VFR & IFR)	79842
255034	ACC Traffic Movement	343646
113454	Controlled Flight Hours (CFH)	153232

Table 1: Traffic Movements and Controlled Flight Hours ² (2021 vs 2022)

4.2: Number of Accidents and Serious Incidents reported to the DCA

One non-fatal accident was reported within 2022. The accident involved a military Unmanned Air Vehicle (UAV) that ditched into the sea near Paphos, for unknown reasons. No serious injuries were reported during 2022.

2021		2022
0	Fatal Accidents	0
1	Non-Fatal Accidents	1
1	Number of Serious Injuries	0
3	Number of occurrences classified as Serious Incidents	5

Table 2: Key Statistics for the years 2021 and 2022

Out of five Serious Incidents that were reported in the year 2022, four involved Separation Minima Infringements (SMIs). In one of these instances a TCAS Resolution Advisory (RA) was triggered.

The fifth Serious Incident concerned a declaration of fuel emergency by a foreign registered ultralight aircraft (gyrocopter) flying from Rhodes to Paphos. The gyrocopter managed to land safely at Paphos airport.

4.3 Total number of occurrences

A total of 693 mandatory and voluntary reports were submitted to the DCA during the year 2022. These were processed by the Department and were consolidated to a total number of 623 occurrences. The number has more than doubled from the total of 255 occurrences reported in the previous year. Comparing the number of reports submitted and the reporting rates (number

² Sources: PHA and LCA ATC Towers and EUROCONTROL

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per 1000 CFH) for the last four years (Figure 1 and Figure 2) we see a slightly increasing trend both for the absolute number of reports as well as for the rates.

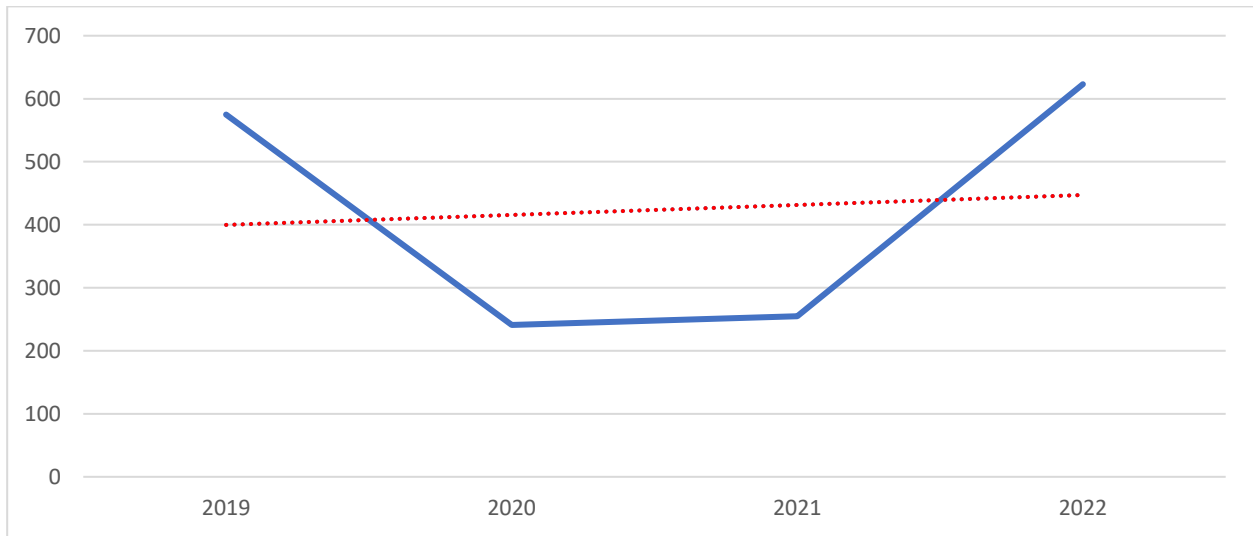


Figure 1: Number of occurrences per year and trendline

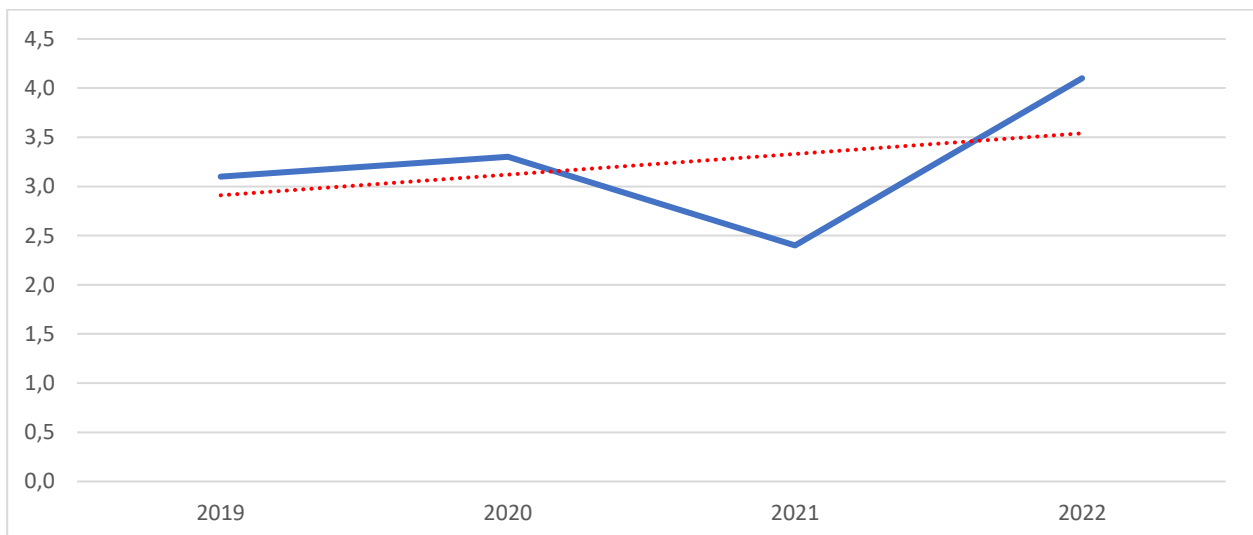


Figure 2: Rate of occurrences per 1000 Controlled Flight Hours (CFH) and trendline

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Figure 3 below breaks down the occurrences reported in the year 2022 by month.

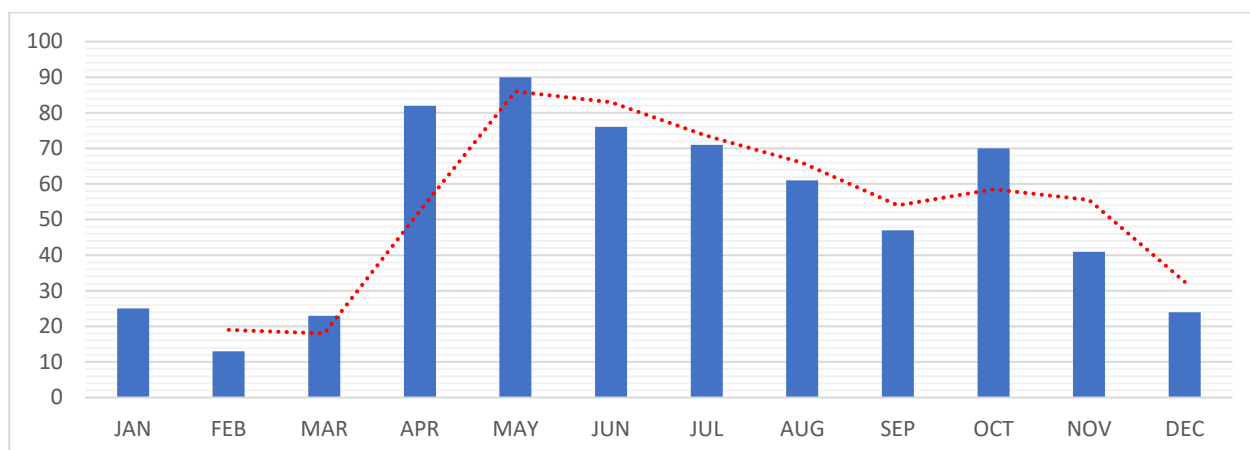


Figure 3: 2022 occurrences reported per month and the 2-month moving average

4.4: Occurrences in 2022 by Occurrence Class

As a part of the analysis process conducted by the DCA, each occurrence entered into the national database is classified based on its occurrence class.

The classification of the occurrences is based on the ICAO ADREP taxonomy and the definitions of Accidents, Serious Incident and Incidents derived from Reg. (EU) 996/2010 that are presented in Appendix 1 of this report.

Table 3 below shows the numbers of occurrences by Occurrence Class and as a percentage of the total:

Occurrence Class	2022	
	Number	% of total (623)
Accidents	1	0,2
Serious Incidents	5	0,8
Incidents	389	62,4
Major Incidents	13	2,1
Significant Incidents	54	8,7
Occurrences with no flight intended	14	2,2
Occurrences without Safety effect	62	10,0
Observation	30	4,8
Not determined	55	8,8

Table 3: Year 2022 reported occurrences by Occurrence Class and percentage over the total

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4.5 Occurrences in 2022 by Occurrence Category

As a part of the analysis process conducted by the DCA, each occurrence entered into the national database is categorized based on the ICAO ADREP taxonomy. The Table below shows the occurrences by Occurrence Category for the year 2022.

Occurrence Category	2022 (Number)
ATM: ATM/CNS	328
BIRD: Birdstrike	110
NAV: Navigation error	72
SEC: Security related	27
OTHR: Other	26
WILD: Collision Wildlife	19
MAC: Airprox/ACAS alert/loss of separation/(near) midair collisions	16
SCF-NP: System/component failure or malfunction [non-powerplant]	15
RAMP: Ground Handling	6
SCF-PP: powerplant failure or malfunction	6
ADRM: Aerodrome	5
RI: Runway incursion - vehicle, aircraft or person	3
F-NI: Fire/smoke (non-impact)	2
MED: Medical	2
UNK: Unknown or undetermined	2
ARC: Abnormal runway contact	1
FUEL: Fuel related	1
LOC-I: Loss of control - inflight	1
USOS: Undershoot/overshoot	1
WSTRW: Windshear or thunderstorm	1

Table 4: Number of occurrences reported by Occurrence Category (2022)

It must be noted that some incidents have been categorized in more than one Occurrence Category.

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Figure 4 below shows the top 10 occurrence categories by the number of occurrences.

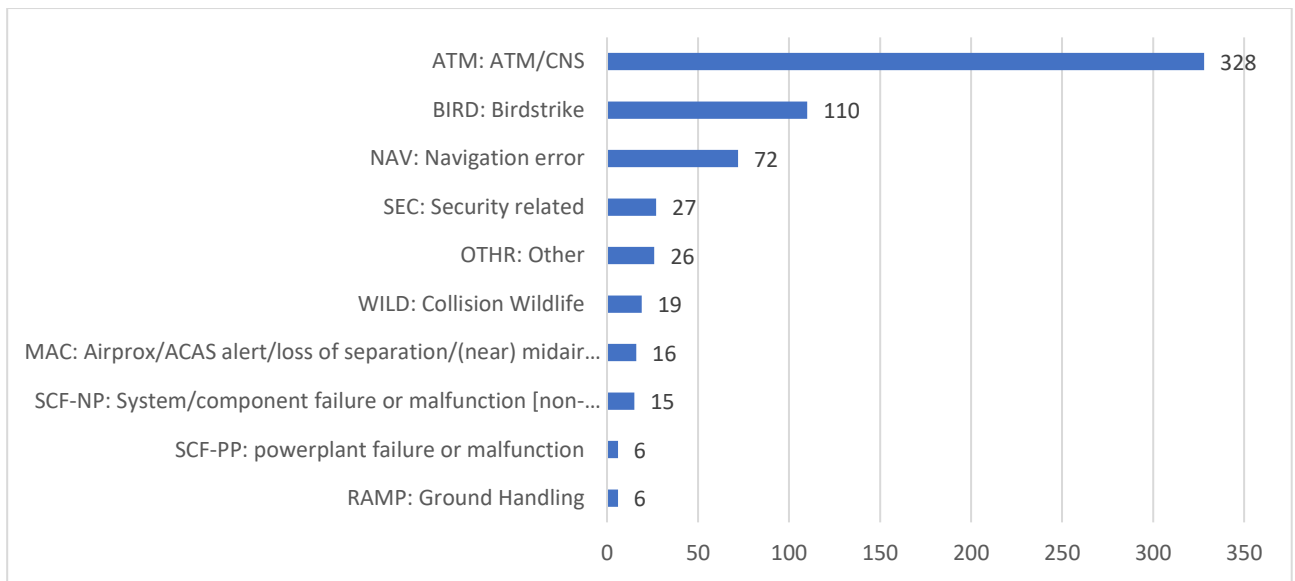


Figure 4: Top 10 Occurrence Categories in 2022

5. Flight Safety Section (Airworthiness and Flight Operations domains)³

5.1 Domain specific analysis – Airworthiness

5.1.1 General

A total of 35 occurrences related to airworthiness were reported in 2022, compared to 41 in the previous year. Of these, a total of 15 were categorized in the SCF-NP: System/component failure or malfunction [non-powerplant] category and 6 (six) in the SCF-PP: powerplant failure or malfunction. Two were categorized as F-NI: Fire/smoke (non-impact) and the remaining 12 as OTHR: Other. Figure 5 below shows the percentage of airworthiness related occurrences by occurrence category.

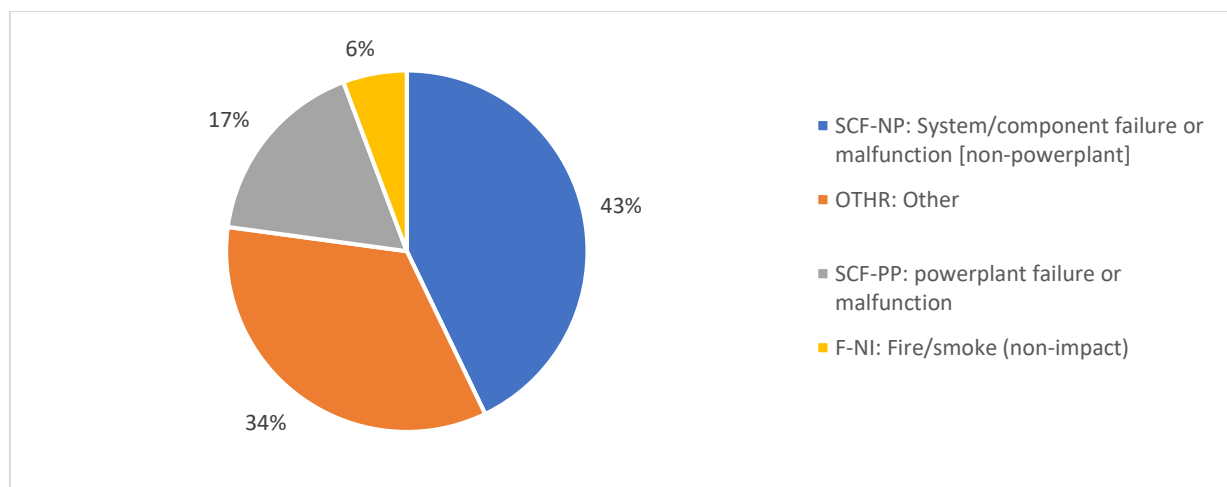


Figure 5: Percentage of airworthiness related occurrences by Occurrence Category, 2022

No airworthiness related Accidents or Serious Incidents were reported in the year 2022. Of the 35 occurrences, 23 were classified as Incidents (a percentage of 66%) and the remaining 12 as Occurrences with No Flight Intended (34%).

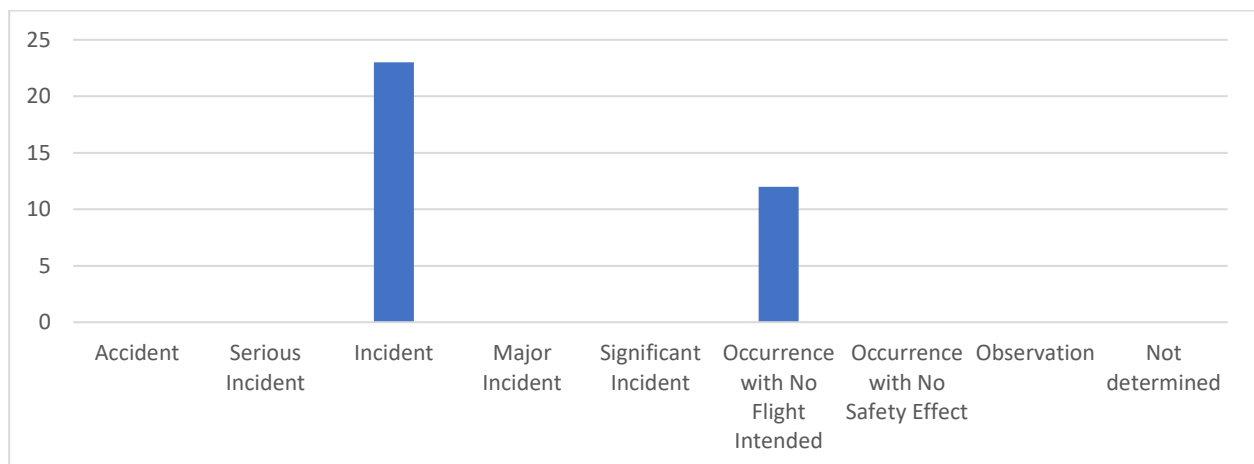


Figure 6: Number of airworthiness related occurrences by Occurrence Class, 2022

³ Occurrences received from Flight Training Organisations or Declared Training Organisations were processed according to their related domain, either Flight Operations or Airworthiness

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The distribution of year 2022 occurrences related to aircraft system malfunctions / defects, found during operation or aircraft maintenance, is given in Figure 7 below:

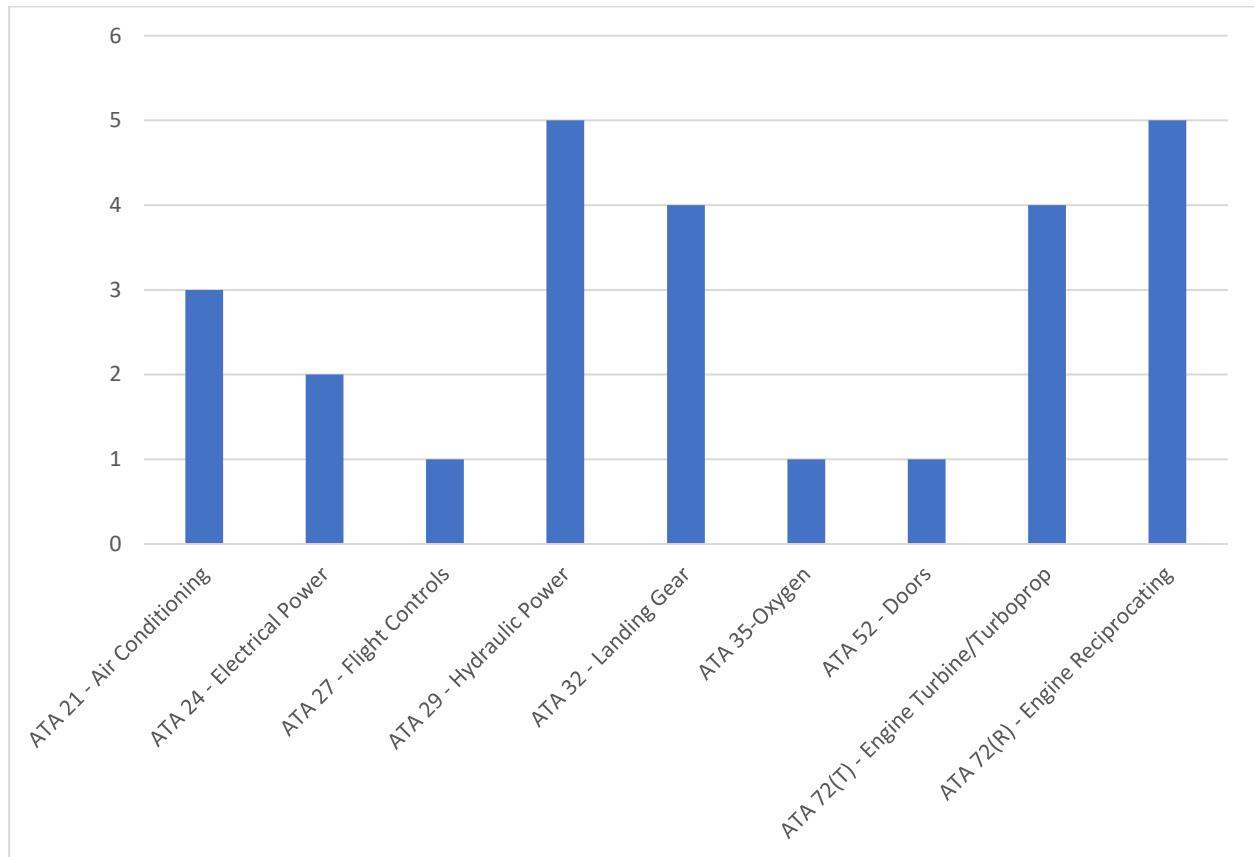


Figure 7: Distribution of year 2022 occurrences related to aircraft system malfunctions / defects

Occurrence reports linked to ATA⁴ chapters refer to defects found during aircraft operation or aircraft maintenance. No specific trend or safety issue could be identified.

The remaining nine reports were related to occurrences that took place during aircraft maintenance activities. Out of these, five were related to procedures not followed during maintenance.

⁴ ATA Specification 2200 Numbering System used in aircraft product technical information

5.1.2 Reciprocating engine occurrences

The Airworthiness Section has been monitoring the occurrences related to the malfunction of reciprocating engines, an issue that had been highlighted in the year 2020 Annual Safety Review. Analysis has shown that this kind of occurrence was reported five times during the year 2022. Figures 7 and 8 below show the numbers of reciprocating engine related occurrences, rates and trendline for the last four years:

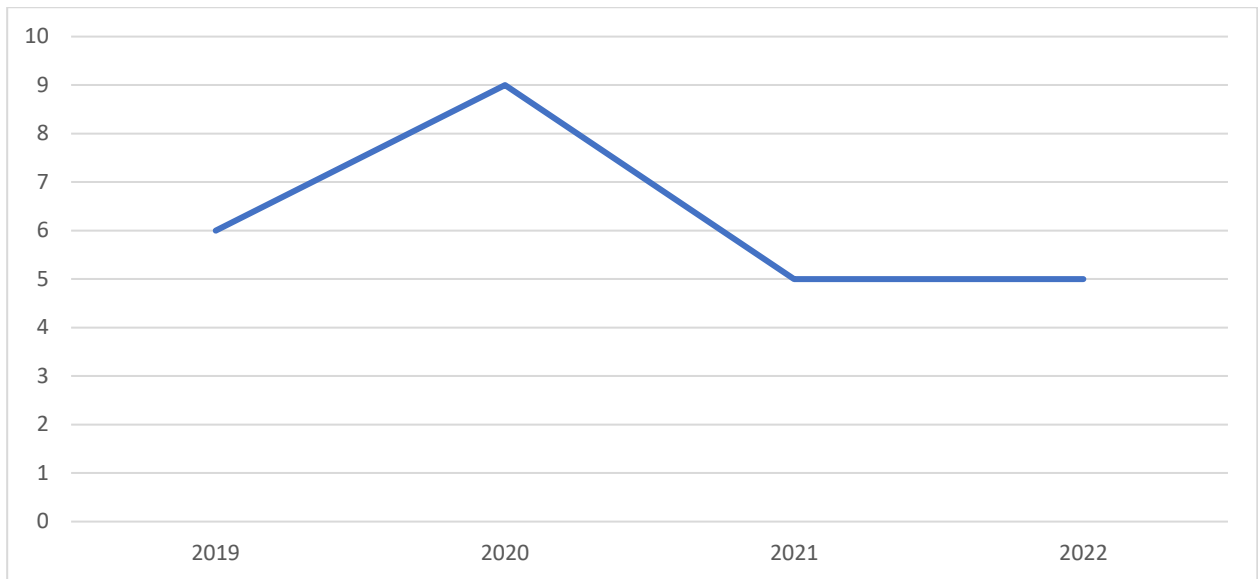


Figure 8: Number of reciprocating engine related occurrences, years 2019 to 2022

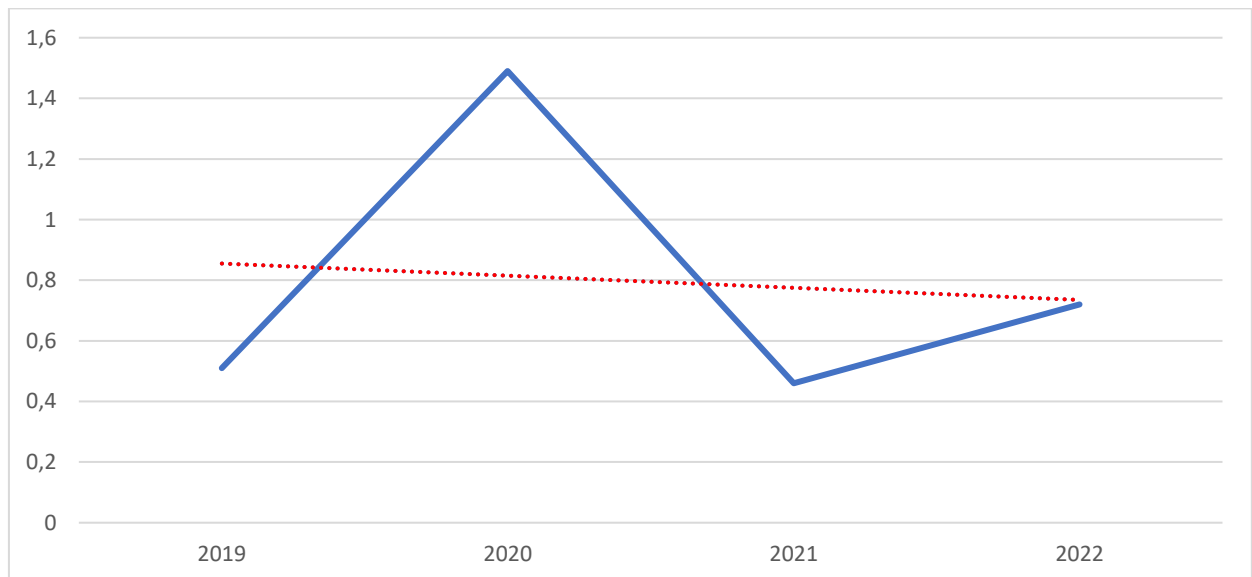


Figure 9: Rate of reciprocating engine related occurrences per 1000 VFR flights and trendline, years 2019 to 2022

From the data as shown above, and considering the small number and classification of the reciprocating engine related occurrences in the last four years, it is concluded that there is no

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adverse safety trend. Overall there is a slight downward trend and at this time the reciprocating engine failure related occurrences are not considered to be a safety issue.

5.2 Domain specific analysis – Flight Operations

The number of reports submitted within 2022 indicates that occurrences related to taxiway and taxi lane incursions have decreased. This may be due to the DCA decision to involve all domains and implement additional mitigation actions. The total number of occurrences related to taxiway and taxi lane incursions in 2022 was five.

The effectiveness of all mitigations must be continuously monitored by all domains to reassess whether the actions are effective and within acceptable limits.

In 2022, there has been an increase in occurrence reports related to Bird Strikes compared to the previous year, a total number of 16 occurrences. Most of these occurrences did not take place within Nicosia FIR, occurred during commercial operations and involved Cyprus registered aircraft. The majority of Bird Strike occurrence reports are classified as “occurrences without safety effect”, with a few classified as “incidents”. The tendency of Bird Strike reports shall continue to be monitored, considering the available data from the previous year, in order to make informed decisions and implement further mitigations to improve and control the number of occurrences.

Further reports for CAT flight operations are related to flight crew errors such as late landing configuration, landing outside the touch down zone and airspeed exceedance.

From the General Aviation sector, there is one report classified as a “serious incident” in the “Fuel” occurrence category. The report pertains to an Auto Gyro en route from the island of Rhodes, Greece to Paphos airport.

Regarding training flights, there have been a few reports classified as “incidents”. These reports are related to a heavy landing by a light aircraft and a few instances of deviations from ATC clearance.

In relation to state operations, one “accident” has been reported involving a military UAS that ditched into the sea. This accident did not affect civilian flight operations.

6. Aerodromes and Ground Handling

6.1 Key Safety Areas

The number of reports related to Aerodromes submitted within 2022 was 147, which is 81 reports more than those submitted within 2021, an increase of 122.7%. At the same time, the aerodrome traffic movement of 2022 was higher by 35% as compared to the traffic demand of 2021.

Occurrence Category	Number
ATM: ATM/CNS	0
NAV: Navigation error	6
BIRD: Birdstrike	95
ADRM: Aerodrome	5
SEC: Security related (including laser attacks)	20
WILD: Collision Wildlife	17
RAMP: Ground Handling	4
RE: Runway excursion	0

Table 5: Number of ATAS related occurrences in the year 2022

6.2 Detailed Analysis

With regards to Birdstrike/Collision Wildlife occurrences, out of a total of 112 Birdstrike/Collision Wildlife reports submitted in 2022, 17 reports were related to Collision Wildlife while 95 were reported as Birdstrikes. Out of the 95 Birdstrikes, 75 were recorded as “confirmed”. Compared to 2021, the number of confirmed Birdstrikes/Collision Wildlife in 2022 increased by 178%.

The ATAS section will monitor the on-aerodrome bird strike Key Performance Indicators (KPIs) established by the aerodrome operator. This monitoring will be conducted for each aerodrome individually, and joint audits of the Wildlife and Safety Management System will be conducted.

The aerodrome operator has already identified the confirmed on-aerodrome Birdstrike increase for Paphos aerodrome (12 in 2022 vs 6 in 2021, an increase of 200%) and launched actions to mitigate the problem.

For Larnaka aerodrome the verification of Birdstrike/Collision Wildlife occurrences will be examined by onsite audit of the aerodrome operator.

From the analysis of the remaining 35 aerodrome reports submitted in 2022, the major occurrence categories of those reports are as follows:

- Security related: Out of 20 security related incidents, reported within 2022, 18 i.e. a percentage of 90% had to do with laser attacks. There is a significant increase by 350% to the number of incidents (18 for 2022 vs 4 for 2021). This issue must be further examined by all DCA domains.

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- FOD: 5 vs 2 for 2021, increased by 150%: Taking into consideration the increase of aerodrome traffic movement, the performance is considered stable, thus, no further action is needed.
- Ground incidents (i.e., wrong stand number, taxiway incursions etc.): 6 vs 12 for 2021, decreased by 50%: Taking into consideration the increase of aerodrome traffic movement, the performance is considered positive thus, no further action is needed.
- Ramp: (Ground Handler) 4 vs 2 within 2021, increased by 100%: Taking into consideration the increase of aerodrome traffic movement, the performance is considered stable. The airport operator and the related ground handlers have taken appropriate corrective/mitigation measures.

7. ATM/ANS

A total of 504 reports were submitted within 2022, which is 265% higher from the levels of the number of reports submitted in the same period within 2021 (138 reports). At the same time, it should be noted that the traffic demand of 2022 was higher by 36.2% as compared to the traffic demand of 2021.

Another point to note is that in 2021 and before, all occurrences relating to GPS Loss were recorded and used for internal monitoring (i.e. they were not reported in ECCAIRs). From the beginning of 2022, all occurrences relating to GPS Loss were reported to ECCAIRS through the SMS reporting system as "GPS Loss" incidents (224 such incidents). This is the main reason for having such big increase in the number of reports from the previous year (2021). Considering this, and taking into account the increased traffic, a higher number of reports is regarded as an anticipated and typical outcome.

With regards to the ATM/CNS category of occurrences, the number of reports (238) within 2022 was higher by 265% with reference to the levels of the previous year (2021). The most critical incidents were the Separation Minima Infringements (SMIs), the Runway Incursions (RIs) while the GPS Loss ones were the most in terms of absolute numbers.

In total, three (3) RI incidents have been reported within 2022 (2 at Larnaka and 1 at Paphos airport), whilst zero (0) incidents had been reported in 2021. Taking into account the 35% increase of the traffic movement at both airports recorded within 2022 and the fact that the investigations conducted by the ANSPs concluded that there was no ATM/ANS contribution, this particular safety risk can be considered "stable".

On the other hand, a significant increase was recorded in the number of SMIs (i.e., 7 SMIs for 2022 vs 4 SMIs for 2021). Despite the fact that the controlled flight hours in 2022 were also by 44% higher than 2021 the NSA considered the higher number of SMIs as an "area of concern" conducted a focused audit at the SMS Unit in order to review the ANSP actions to mitigate this negative trend. The NSA is closely monitoring the implementation of the ANSP's corrective actions which include among others, the introduction of human factor stressors and the human error analysis in the investigation reports.

Finally, regarding the GPS Loss incidents, the 55% of the total number of incidents reported within 2022 were related to GPS failure. This issue appeared in the last years and affects the south eastern Mediterranean area, including the Nicosia FIR and is believed to be associated with the volatile geopolitical situation in the region. No records of such events were kept from previous years; thus, no comparison can be contacted. Nevertheless, the ANSP and the DCAC is closing monitoring the GPS related incidents and the relevant EASA safety bulletins issued from time to time.

With regards to the occurrences related to Navigation errors (*navigation error covers all Occurrences involving the incorrect navigation of aircraft on the ground or in the air*), the number of occurrences reported within 2022 was more or less at the same levels of 2021 despite the fact the traffic demand was higher by 36.2% (i.e., 72 for 2022 vs 60 for 2021). However, a more detail analysis identified an increase by 73% (32 reports) of the number of reported Airspace

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Infringements incidents as compared to 2021 (44 and 12 reported incidents for 2022 and 2021 respectively). The ratio of airspace Infringements to the total number of reported occurrences is the same (i.e., “stable”) (0.087 for both 2021 and 2022). Taking into consideration the 44% increase of the controlled flight hours within 2022, the safety level of this particular area is considered stable. Finally, a decrease in the number of reports with regards to the Aerodrome/Ground related occurrences was recorded within 2022 compared to the 2021 (i.e., 8 for 2022 vs 17 for 2021). Most of the occurrences had to do with taxiway incursions, wrong taxi lanes in the apron and wrong stand numbers. Considering the increased levels of airport traffic movements, the safety trend is considered “improved”.

8. Trends Identified and Proposed Actions

8.1 Occurrence Class

The number of Accidents, Serious Incidents and Major Incidents for the years 2019 – 2022, their rates normalised per 1000 Controlled Flight Hours (CFH) and their associated trendlines are shown in Figures 10, 11, 12 and 13 below.

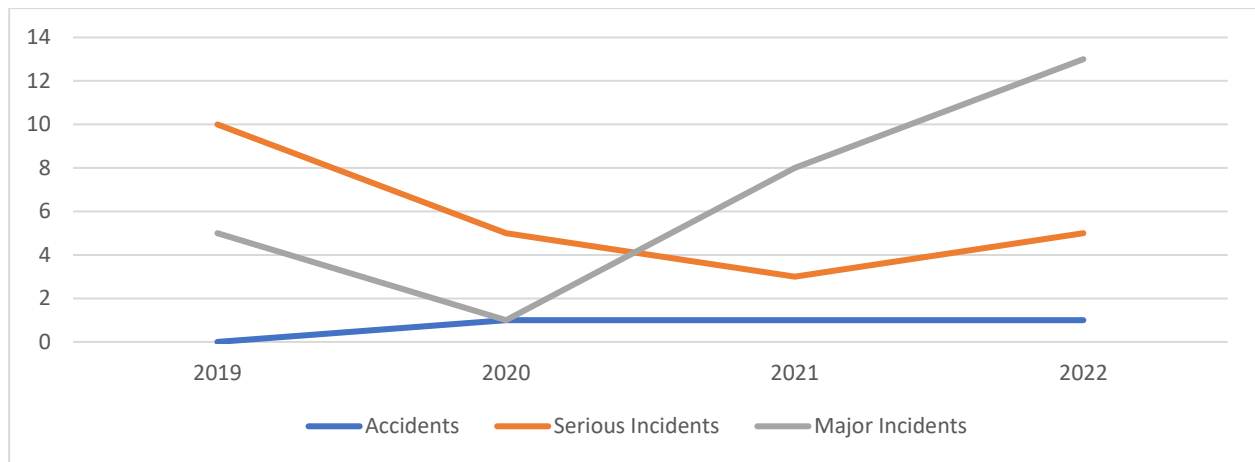


Figure 10: Accidents, Serious Incidents and Major Incidents number for the last four years

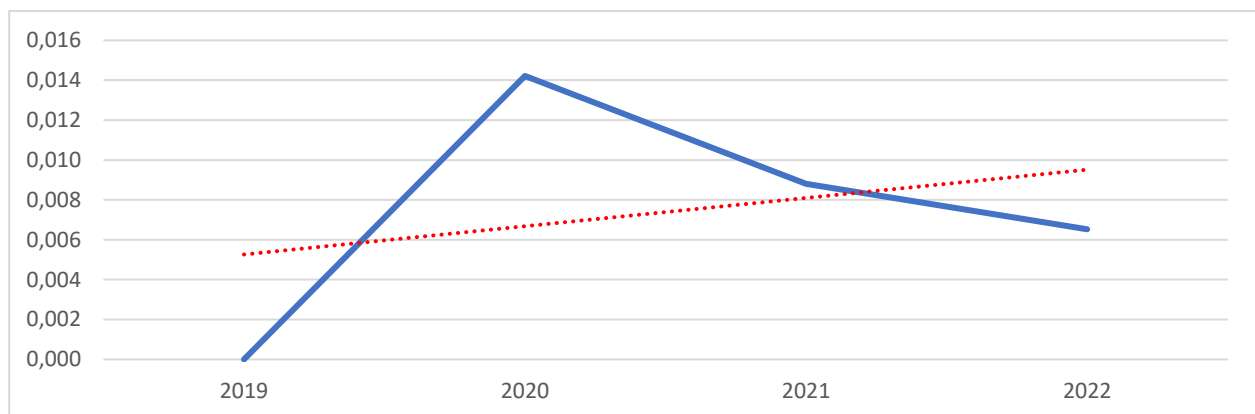


Figure 11: Rate of Accidents per 1000 CFH and trendline, years 2019-2022

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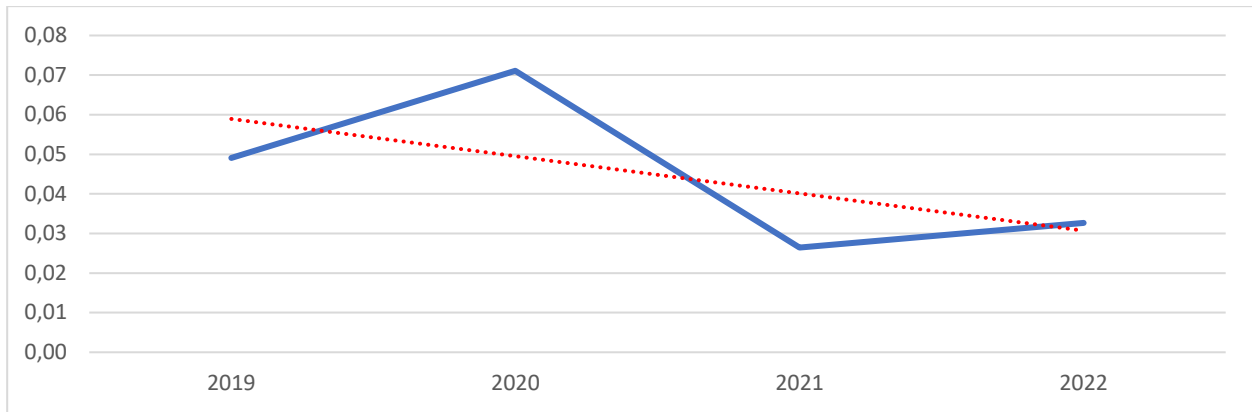


Figure 12: Rate of Serious Incidents per 1000 CFH and trendline, years 2019-2022

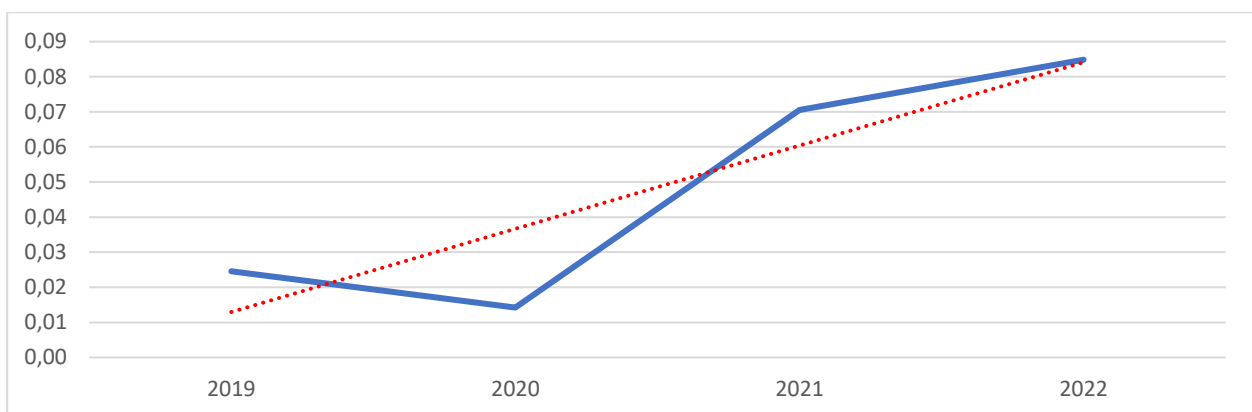


Figure 13: Rate of Major Incidents per 1000 CFH and trendline, years 2019-2022

In the case of Accidents, even though there is a slight upward trend, due to the small sample and low absolute numbers it is not possible to draw reliable conclusions from this dataset. For Serious Incidents we note a slightly downward trend. However, for Major Incidents a clear upward trend is evident in the last four years.

8.2 Top 5 Occurrence Categories

The Top-5 Occurrence Categories reported in the year 2022, by number of occurrences were:

1. ATM: ATM/CNS with 328 Occurrences,
2. BIRD: Birdstrike with 110 Occurrences,
3. NAV: Navigation error with 72 Occurrences,
4. SEC: Security related with 27 Occurrences, and
5. OTHR: Other with 26 Occurrences

Their rates and trendlines over the last four years have been identified and are shown in Figures 14 to 17.

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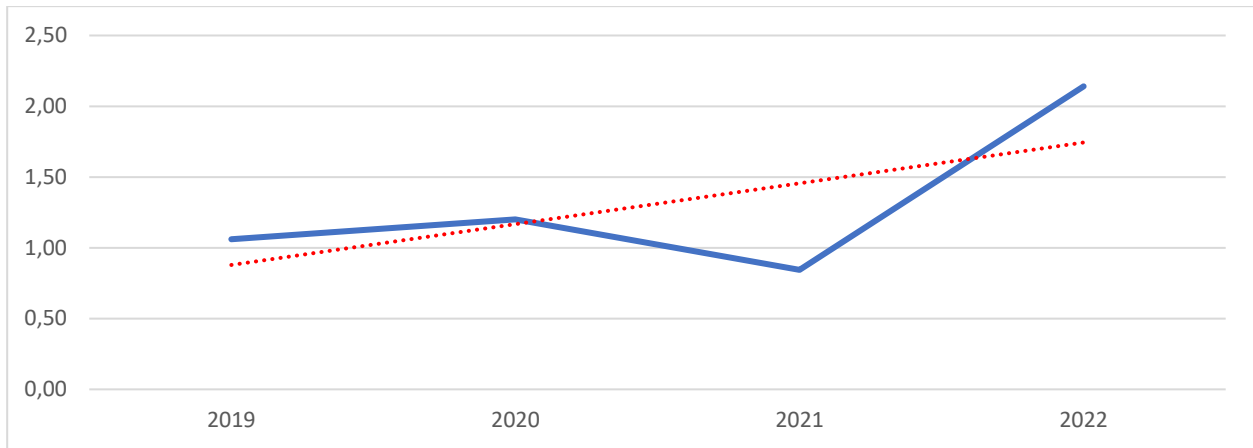


Figure 14: ATM category occurrences per 1000 CFH and trendline, years 2019-2022

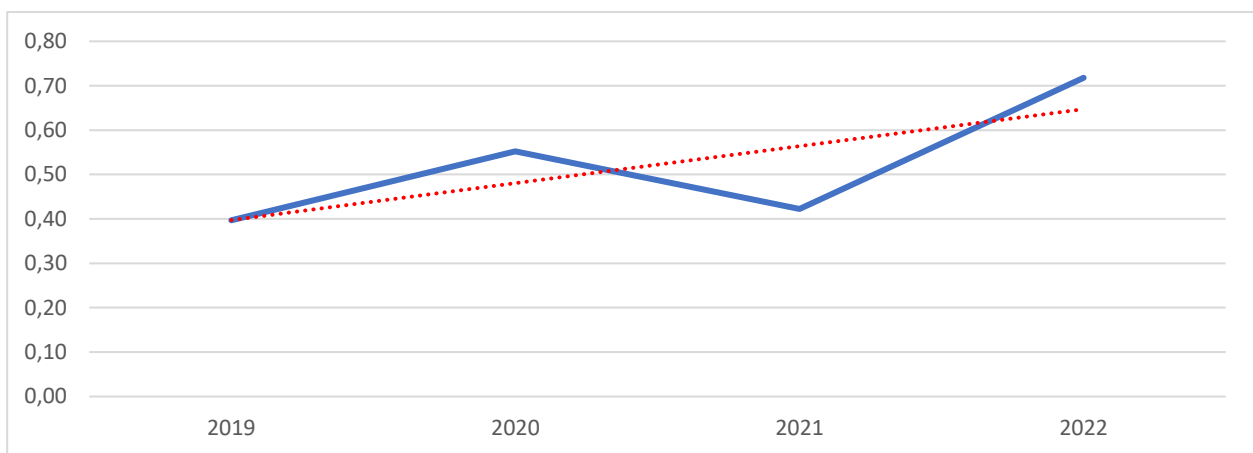


Figure 15: BIRD category occurrences per 1000 CFH and trendline, years 2019-2022

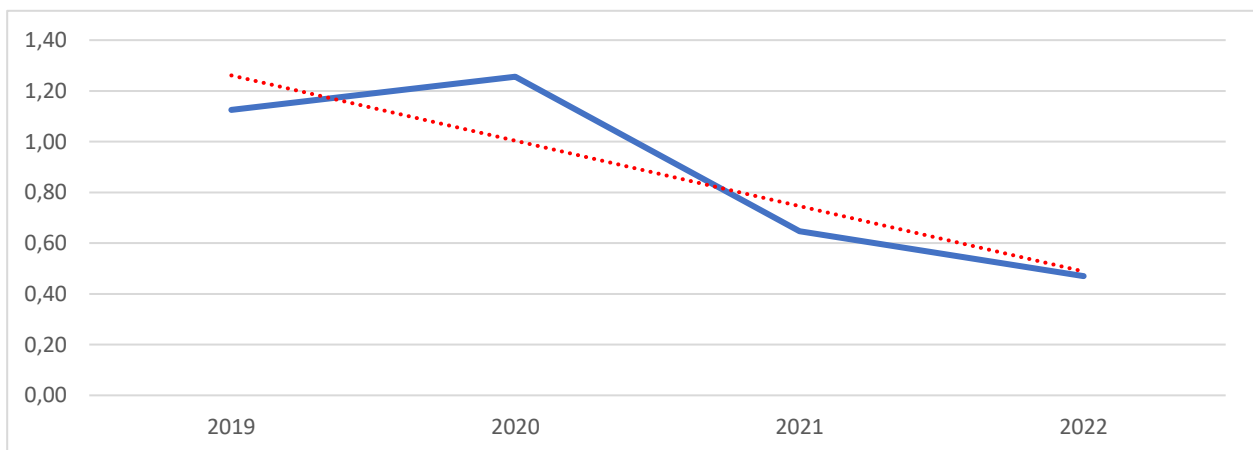


Figure 16: NAV category occurrences per 1000 CFH and trendline, years 2019-2021

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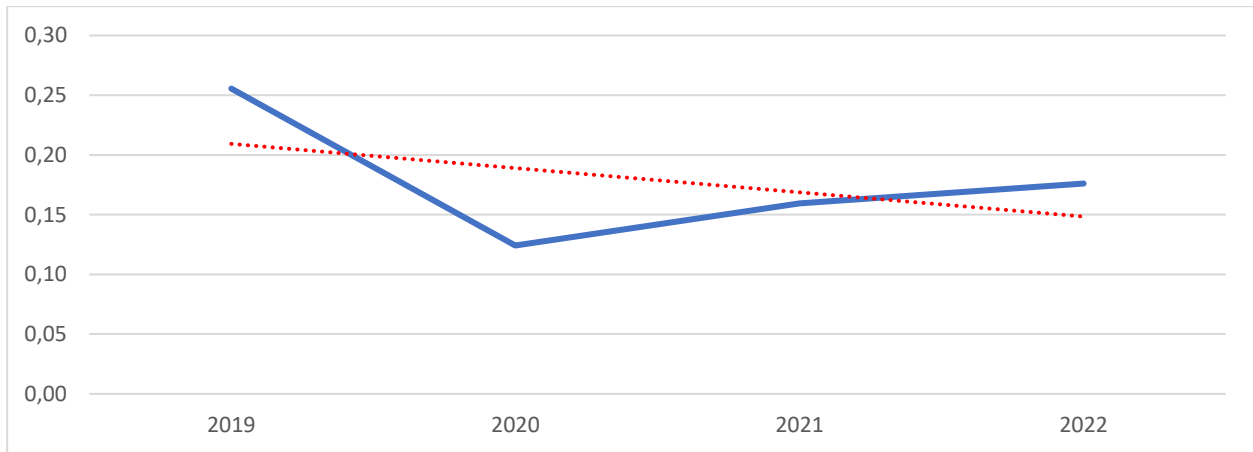


Figure 17: SEC category occurrences per 1000 CFH and trendline, years 2019-2021

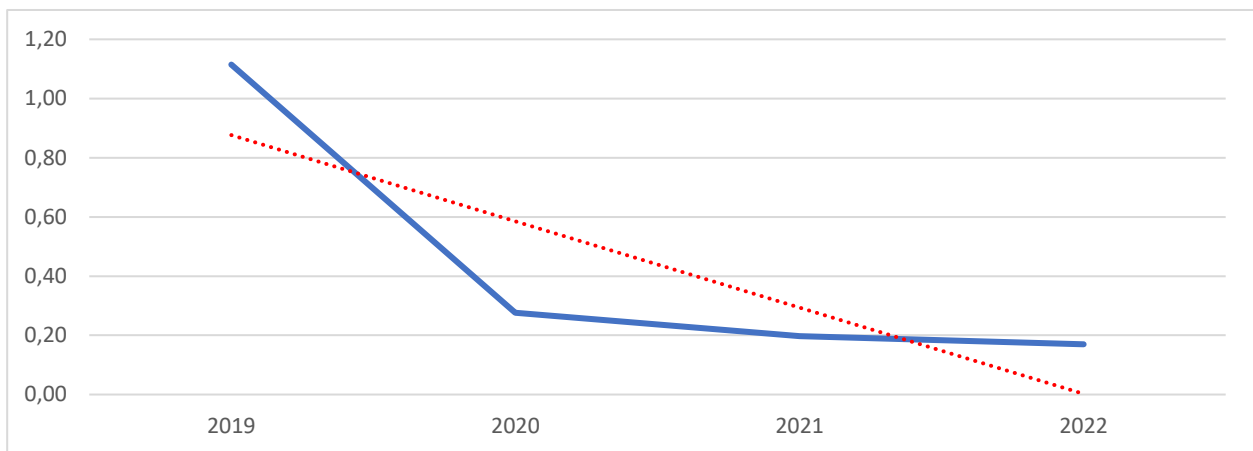


Figure 18: OTHR category occurrences per 1000 CFH and trendline, years 2019-2021

From this analysis, an upward trend is noticed for the ATM and BIRD Occurrence Categories, while the remaining Occurrence Categories (NAV, SEC and OTHR) all demonstrate a downward trend.

8.3 Summary of proposed actions

From the analysis of the information on the occurrence reports submitted in the year 2022, the following actions are proposed by the DCA Sections:

1. The NSA to monitor closely the implementation of the ANSP's safety improvement actions which have been decided in the context of safety investigations which include, among others, the analysis of human factor aspects and the mitigation of the impact of human error
2. The Airports Section to examine, for Paphos and Larnaka airports, the verification of Birdstrike / Collision Wildlife occurrences by onsite audit
3. The Airports Section to recall a specialised Officer from the Game and Wildlife Department, Ministry of Interior (Υπηρεσία Θήρας και Πανίδας, Υπουργείο Εσωτερικών) to investigate possible actions that can be taken, or omissions.
4. A cross-domain investigation to look at laser attacks in the vicinity of airports and possible actions such as information campaign etc.

APPENDIX 1: DEFINITIONS

The following definitions derived from Reg. (EU) 996/2010 on the investigation and prevention of accidents and incidents in civil aviation

'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 radome); or
- c) the aircraft is missing or is completely inaccessible;

'Serious incident' means an incident involving circumstances indicating that there was a high probability of an accident and is 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. A list of examples of serious incidents is set out in the Annex;

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

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⁵ Sources: PHA and LCA ATC Towers and EUROCONTROL

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