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Department of Civil Aviation

Cyprus DCA

Annual Safety Review

2021

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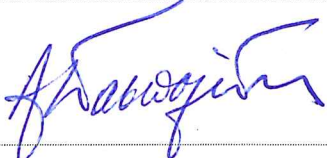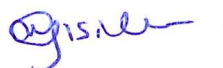**Edition Date:** 21 November 2022

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Abstract

This review presents the status of aviation safety in Cyprus, on the basis of data collected with respect to safety occurrences in the year 2021. It is prepared and published in line with Article 13(11) of Regulation (EU) 376/2014.

Keywords

safety review State Safety programme	categorization of reports	mandatory reports	voluntary reports

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DOCUMENT APPROVAL

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EXECUTIVE SUMMARY

The Department of Civil Aviation of Cyprus (DCA) has established mandatory and voluntary reporting systems to facilitate the collection of details of aviation occurrences that are reportable under Articles 4 and 5 of Regulation (EU) 376/2014. The Department processes the submitted reports and provides access to accidents and serious incidents to the Cyprus Safety Investigation Authority for further analysis and investigation.

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 2021. It also serves as one of the inputs to the Annual Safety Report of 2021 which will be produced in accordance with the provisions of the State Safety Program in force.

Aviation industry was affected by the COVID-19 pandemic for the second consecutive year. Although there was a modest recovery in traffic compared with the previous year, the overall the number of aerodrome movements and controlled flight hours failed to reach the pre-pandemic levels. This affected the number of reports submitted to the Department.

Out of 255 reports submitted to the DCA in the year 2021, one (1) was classified as an "Accident" and three (3) reports were classified as "Serious incidents".

Analysis has shown that the occurrence categories with the biggest number of occurrences were:

- ATM: ATM/CNS Occurrences involving Air traffic management (ATM) or communications, navigation, or surveillance (CNS) service issues
- NAV: Navigation errors Navigation errors Occurrences involving the incorrect navigation of aircraft on the ground or in the air.
- BIRD: Birdstrike Occurrences involving collisions / near collisions with bird(s)

Due to the small number of reports received it is difficult to draw reliable conclusions as regards to any trends. It can be concluded however that the safety levels for the year 2021 continue to remain high. Proposed actions include promoting occurrence reporting and monitoring occurrence reporting rates and human factors stressors.

Contents

EXECUTIVE SUMMARY 5

1. Background 7

2. Reporting period 7

3. Sources of information 7

4. Key Statistics 7

    4.1: Traffic levels during the year 2021 7

    4.2: Number of Accidents and Serious Incidents reported to the DCA 8

    4.3 Total number of reported occurrences 8

    4.4: Number and of submitted occurrences in the National Database based on the
    Occurrence Class 10

    4.5 Number of submitted occurrence reports based on the Occurrence Category 11

5. Flight Safety Section (Airworthiness and Flight Operations domains).....................13

    5.1 Domain specific analysis – Airworthiness 13

    5.2 Domain specific analysis – Flight Operations 15

6. Aerodromes and Ground Handling 16

7. ATM/ANS 17

8. Trends Identified and Proposed Actions 18

    8.1 Occurrence Class 18

    8.2 Top 5 Occurrence Categories 19

    8.3 Summary of proposed actions 22

APPENDIX 1: DEFINITIONS 24

APPENDIX 2: LIST OF TABLES 25

APPENDIX 3: LIST OF FIGURES 26

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 and 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 covers the year 2021.

3. Sources of information

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

It must be noted that, due to the fact that this is the third time of issuing this report, the comparison with previous years will be done only for the years 2019 and 2020.

4. Key Statistics

The cross domain key statistics are illustrated on the tables and figures below and include comparison of the years 2019, 2020 and 2021.

4.1: Traffic levels during the year 2021

Aviation was affected for a second consecutive year by the COVID-19 pandemic. Although there was a modest recovery in traffic compared with the previous year, the overall number of aerodrome movements and controlled flight hours failed to reach the pre-pandemic levels of 2019. For example, total aerodrome movements were up by 22.5% compared to the year 2020 but still around 33% lower than those of the pre-pandemic year 2019.

The table below shows a comparison of traffic movements between years 2020 and 2021.

2020		2021
6054	Local Aerodrome Flights (VFR)	10939↑
44620	International Aerodrome Traffic Movement (IFR)	51149↑
50674	Total Aerodrome Traffic Movement (VFR & IFR)	62088↑
164125	ACC Traffic Movement	255034↑
70342	Controlled Flight Hours	113454↑

Table 1: Traffic Movements [2] (2020 vs 2021)

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

One accident was reported within 2021, resulting in one serious injury. The accident involved severe turbulence encountered within the Cyprus airspace by a foreign operator, resulting in a small number of injuries including one passenger with a leg fracture.

2020		2021
1	Fatal Accidents	0
0	Non-Fatal Accidents	1
0	Number of Serious Injuries	1
5	Number of occurrences classified as Serious Incidents	3

Table 2: Key Statistics for the years 2020 and 2021

In the year 2021, three (3) serious incidents have been reported compared to five (5) serious incidents reported in the previous year. One serious incident involved partial loss of engine power of a light aircraft immediately after take-off. Another serious incident involved a declaration of emergency by a foreign operator due to low fuel. The third serious incident involved a short duration, multiple avionic systems failure on a light aircraft.

4.3 Total number of reported occurrences

A total of 255 occurrences were reported during the year 2021, a small increase of around 6% from the previous year. When comparing the last three years (Figure 1 and Figure 2) a declining trend is evident both for the absolute number of reports as well as for the rate. The rate of reported occurrences dropped slightly from 3.4 per 1000 Controlled Flight Hours (CFH) in 2020 to 2.2 per 1000 CFH in 2021.
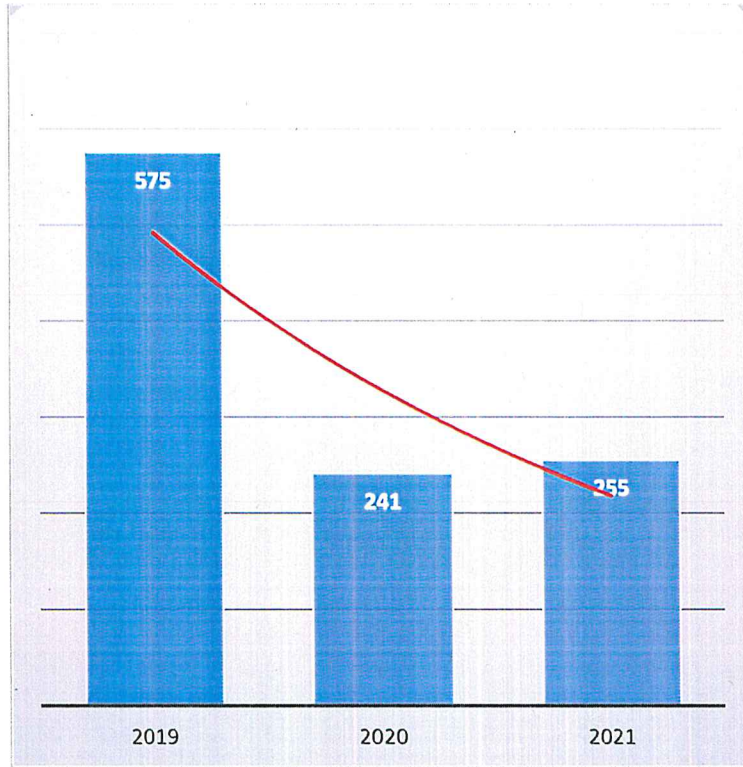
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[2] Sources: PHA and LCA ATC Towers and Eurocontrol
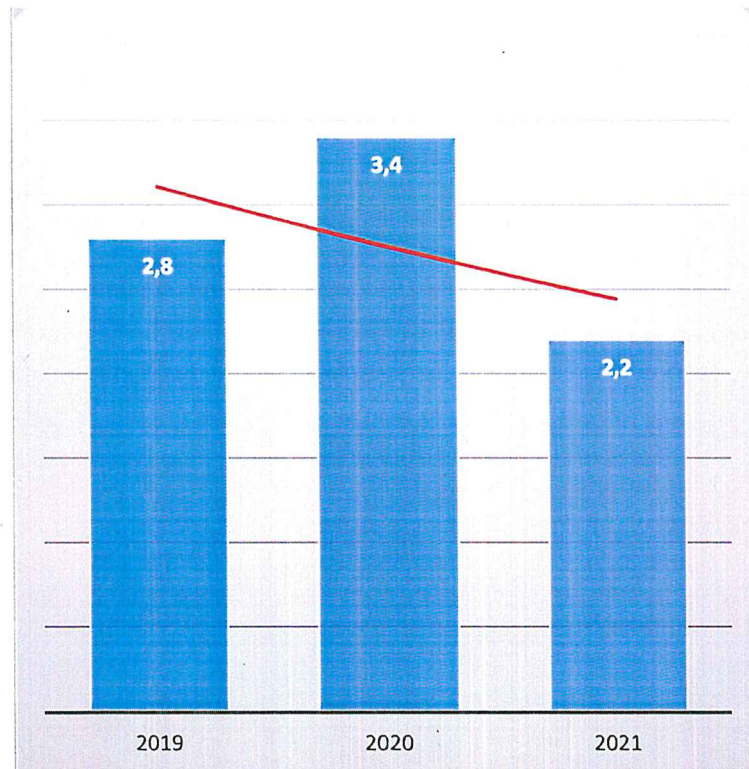
Figure 1: Number of occurrences per year and trendline

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

Figure 3 below breaks down the occurrences reported in the year 2021 by month.
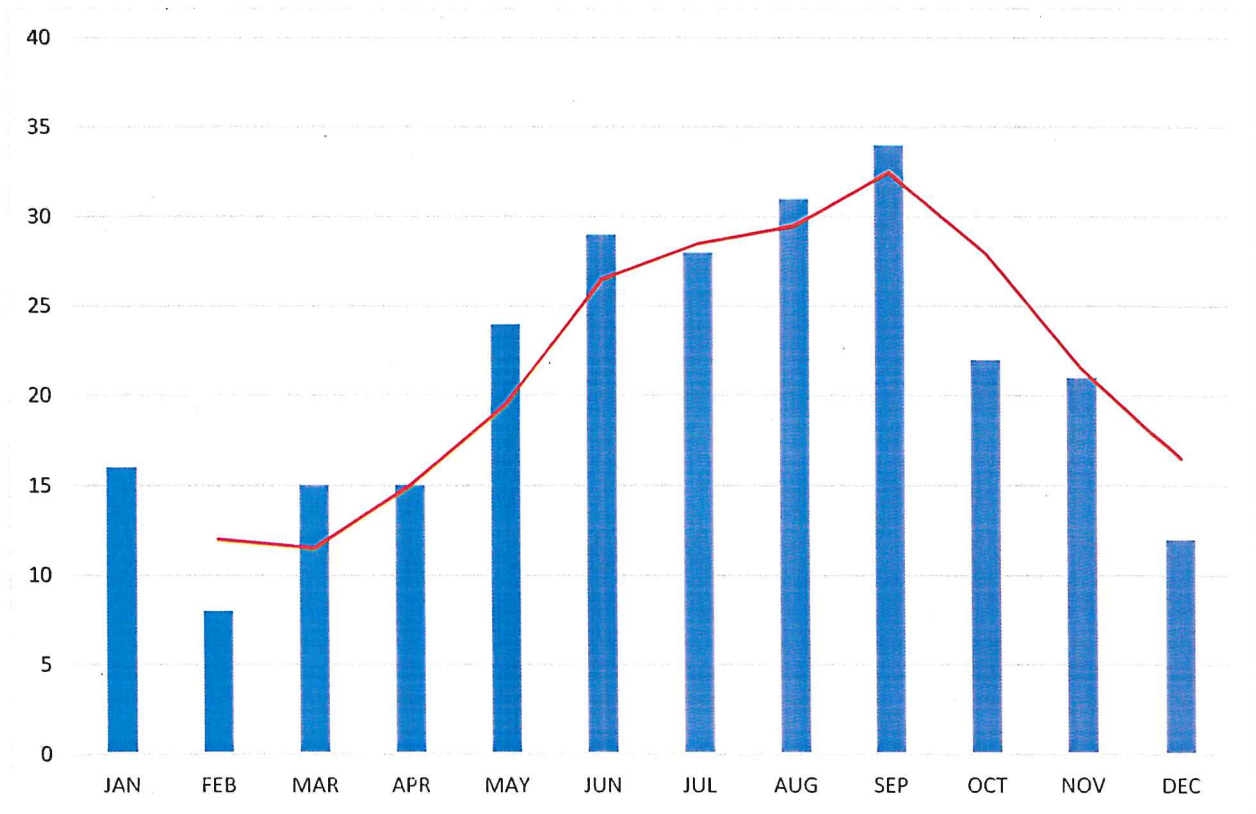

Figure 3: 2021 occurrences reported per month and the 2-month moving average

4.4: Number and of submitted occurrences in the National Database based on the Occurrence Class

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

The classification of the occurrence 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.

The classification of the 255 occurrences entered in the National database within the year 2021, based on the Occurrence Class is shown on Table 2 on the next page.

Occurrence Class	2021	
	Number	% of total (255)
Accidents	1	0,4
Serious Incidents	3	1,2
Incidents	138	54,1
Major Incidents	8	3,1
Significant Incidents	43	16,9
Occurrences with no flight intended	7	2,7
Occurrences without Safety effect	20	7,8
Observation	5	2,0
Not determined	30	11,8

Table 3: Year 2021 reported occurrences by Occurrence Class

4.5 Number of submitted occurrence reports based on the Occurrence Category

As a part of the analysis process conducted by the DCA, each occurrence report submitted to the national database is categorized based on the ICAO ADREP taxonomy. The Table below shows the occurrences submitted by the number of occurrence category, for the years 2020 and 2021.

2020	Occurrence Category	2021
Number		Number
87	ATM: ATM/CNS	90
91	NAV: Navigation error	69
40	BIRD: Birdstrike	45
10	ADRM: Aerodrome	24
20	OTHR: Other	21
23	SCF-NP: System/component failure or malfunction [non-powerplant]	21
9	SEC: Security related	17
6	MAC: Airprox/ACAS alert/loss of separation/(near) mid-air collisions	12
8	WILD: Collision Wildlife	11
12	SCF-PP: powerplant failure or malfunction	6
2	UNK: Unknown or undetermined	5
2	FUEL: Fuel related	3
2	RAMP: Ground Handling	3
0	RE: Runway excursion	3
1	ARC: Abnormal runway contact	2
2	F-NI: Fire/smoke (non-impact)	1
2	GCOL: Ground Collision	1
0	LOC-G: Loss of control - ground	1
0	MED: Medical	1
1	TURB: Turbulence encounter	1

Table 4: Number of occurrences reported by occurrence category (2020 vs 2021)

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

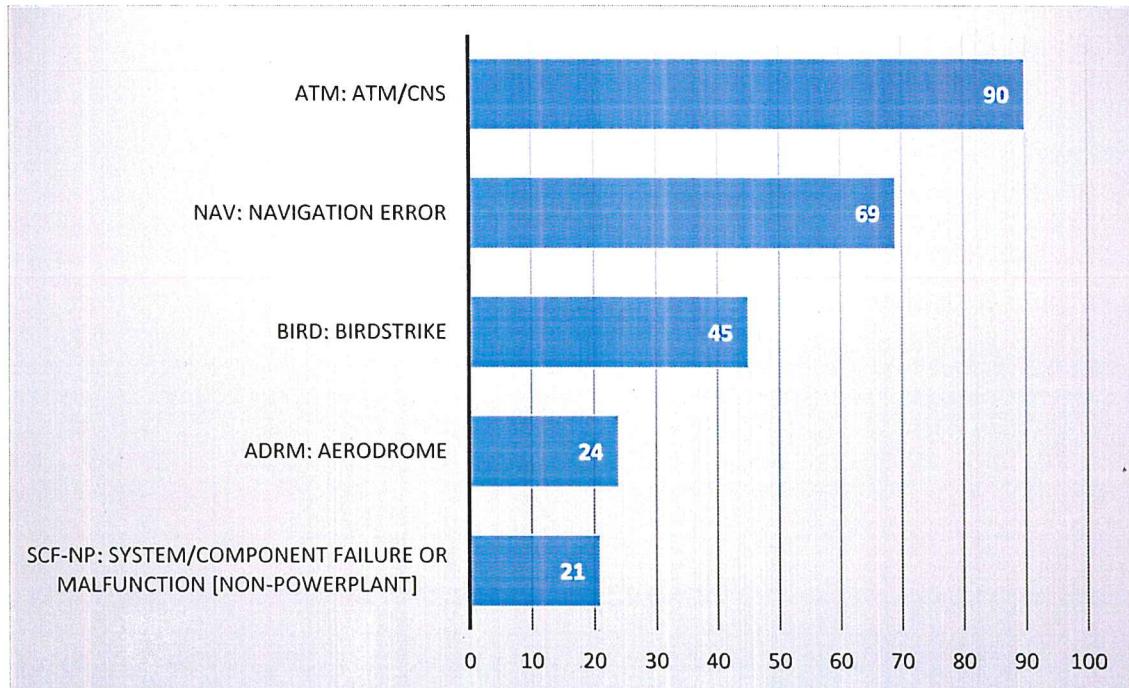Figure 4 below shows the top 5 occurrence categories by the number of occurrences.

Figure 4: Top 5 occurrence categories in 2021

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

5.1 Domain specific analysis – Airworthiness

5.1.1 General

A total of 41 occurrences related to airworthiness were reported in 2021 compared to 46 in the previous year. Of these, a total of 18 were categorized in the SCF-NP: System/component failure or malfunction [non-powerplant] occurrence category and 6 (six) in the SCF-PP: powerplant failure or malfunction.

The number of airworthiness related Serious Incidents dropped from five in year 2020 to just two in 2021. One serious incident involved partial loss of engine power of a light aircraft immediately after take-off. Another serious incident involved a short duration, multiple avionic systems failure on a light aircraft.

The distribution of the Airworthiness Domain related occurrences for the years 2019 to2021, by aircraft system, is shown in Figure 5 below:
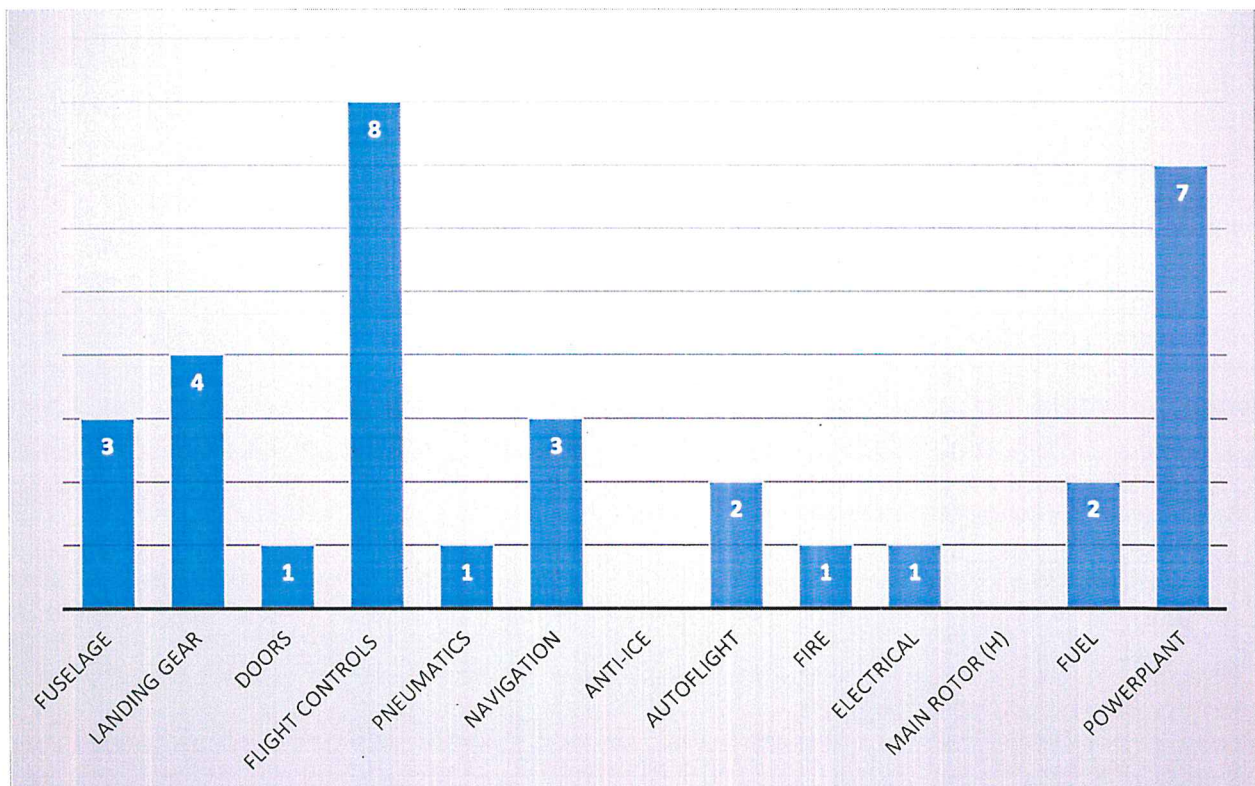
Figure 5: Number of airworthiness related occurrences for the year 2021, by aircraft system

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

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 previous year's Annual Safety Review. Figures 6 and 7 below show the numbers of reciprocating engine related occurrences, rates and trendline for the last three years:
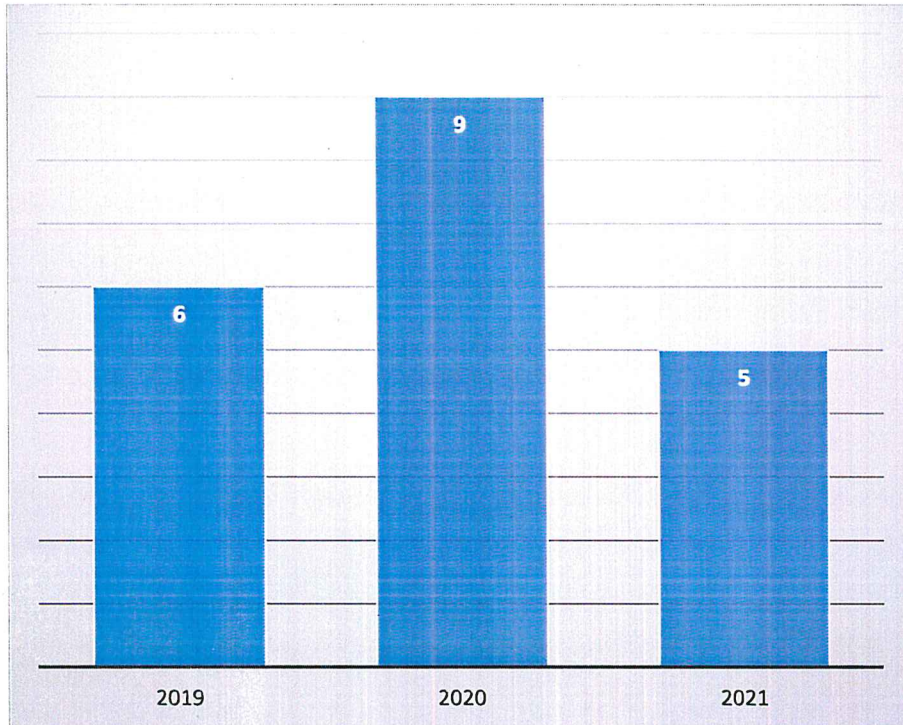
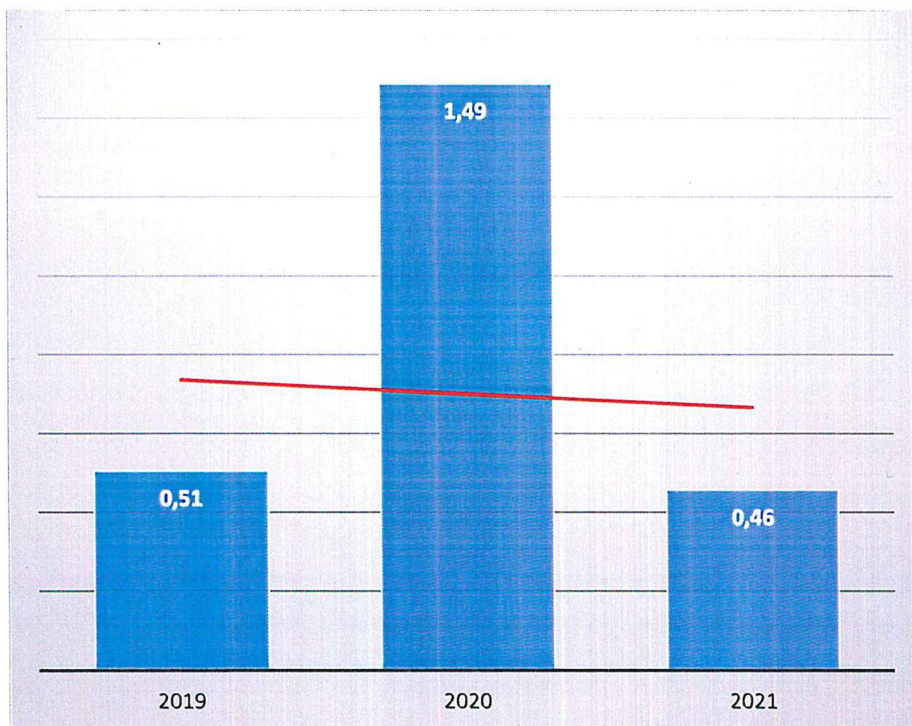*Figure 6: Number of reciprocating engine related occurrences, years 2019 to 2021*

Figure 7: Rate of reciprocating engine related occurrences per 1000 VFR flights and trendline

years 2019 to 2021

From the data, as shown in Figure 7, it is concluded that there was a temporary spike in year 2020 with the rate returning to a low level in 2021. This rate is comparable to the rate of year 2019. There is an overall downward trend for the last three years.

5.2 Domain specific analysis – Flight Operations

Regarding the NAV occurrence category, many occurrences involved taxiway incursions. There is a cross domain investigation in progress in order to be able to understand from the data what happened, at what point of the maneuvering area and at what stage of the flight operation these incidents occurred.

From the collected data, most of the occurrences involved aircraft that had just landed and subsequently entered a taxiway incorrectly and as a result parked in the wrong stand.

Taxiway incursions of this type may occur at any ground visibility by day and night and are consequences of error by either an aircraft flight crew failing to follow the acknowledged taxi-in clearance, a failure by ATC to communicate a correct or timely taxi-in clearance and the long phraseology of the clearance.

Also important is to focus on the layout of aerodrome taxiways and taxi lanes. A post landing incursion can happen at any aerodrome. Layouts with parallel taxiways or intersecting taxiways increase the probability of both ATC issuing long clearances and occurrence of incursions as a consequence of flight crew errors.

For Larnaca airport, according to the ECCAIRS data, taxiway incursions happen after landing, during taxi in and happens to a specific part of this taxiway and not to the rest of taxiways or holding points.

As examples from reports:
- *"Captain of flight stated that while taxiing along taxiway 'C' he got confused and turned onto taxi lane "CV" instead of taxi lane "CW". Air traffic control informed him of this incorrect maneuver and told him to stop where he was. He also saw a follow me car give him signs. After a short time, air traffic control gave him permission to maneuver the aircraft with 180 degrees turn back to taxiway "C" to proceed onto taxi lane "CW" and then stand 83."*
- *"landed and was instructed to taxi via C-CW for stand 82. The aircraft instead taxied via C-CV for stand 82."*
- *"The pilot, instead of proceeding to taxilane CV entered taxilane CU."*
- *"Taxi to CU instead of CT"*
- *"C, CV. Stand 74A. Reported by AMIU that entered CU instead. Made 180 on spot and proceeded via CU, C, CV to stand".*
- *"controller gave wrong directions to the flight xxxx for stand 22 instead of stand 15"*
- *"via taxiway 'C' and Taxilane 'CV' to stand 73A. The aircraft was held at the beginning of Taxilane 'CU' abeam stand 63"*

From the above examples it can be identified that along the taxiway C and crossings such as CV, CU, CW are the major point of taxiway incursions at Larnaca airport.

None of the incidents had a serious outcome but this kind of reports are categorized as *occurrence class "Incident" and Category as "NAV" Navigation error*.

6. Aerodromes and Ground Handling

Generally, the number of reports submitted within 2021 related to Aerodrome issues, was 66,6% more as compared to the number of reports submitted within 2020. At the same time, the aerodrome traffic movement of 2021 was higher by 22.5% as compared to the traffic demand of 2020. Taking into consideration the increased aerodrome movement, the safety performance can be considered stable, thus, no further action needed.

With regards to the occurrence categories BIRD / WILD, the number of reports within 2021 is at the same levels with the previous year (2020). Out of the 45 Bird Strikes/wildlife reports submitted, 4 reports were related to Wildlife while the other 41 have been reported as Birdstrikes. However, only 27 of these Birdstrikes were recorded as "confirmed ones". Comparing the number of confirmed Birdstrikes of 2021 with the number of 2020, an increase of 35% was recorded (20 within 2020). Taking into consideration the increase of aerodrome traffic movement (by 22.5%), the safety performance can be considered stable. Nevertheless, the ATAS section will monitor the particular KPI of the aerodrome operator, and if needed, further audits will be carried out within 2023.

Regarding the Occurrence reports category ADRM: Aerodrome (24) the overall numbers affect all sections; only 9 relate to the Air Transport and Aerodrome Section. Therefore, common analysis is proposed to identify potential measures to be taken.

7. ATM/ANS

Generally, the number of reports submitted within 2021 by the ANSPs, is lower by 22% (38 reports) compared to the number of reports submitted in the same period within 2020 (176 reports). At the same time, the traffic demand of 2021 was higher by 54% as compared to the traffic demand of 2020. This is an unexpected result because normally higher traffic volumes are associated with more safety occurrences. In this case, the reverse result is noted. After further analysis it was found that the number of reports related to Airspace Infringement and birdstrike/wildlife strike had a dramatic drop, despite the increased traffic.
The NSA shall consult with the ANSP to examine the reasons for the reduced number of reports (if any). Such reasons could be degradation of the safety occurrence reporting culture, need for refresher training on what is a mandatory reportable occurrence etc

With regards to the occurrences (ATM: ATM/CNS category), the number of reports within 2021 is at the same levels with the previous year (2020). However, *no safety concerns have been identified. Taking into consideration the increased traffic demand, the safety performance can be considered stable, thus, no further action needed.*

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 2021 was lower by 25% compared to the number of the same reports submitted within 2020 despite the fact the traffic demand was higher by 54%. However, a more detail analysis showed that on the one hand, a reduction of the number of reported Airspace Infringements incidents by 75% (35 reports) was recorded comparing to 2020 and on the other hand, an increase by 35% was recorded on the number of the aerodrome/ground related occurrences reported in 2021. As a result, *the assessment of the of the safety trend is not conclusive.* However, further analysis of the ground related incidents shall be conducted by the DCAC in order to identify the causal and contributing factors.

8. Trends Identified and Proposed Actions

8.1 Occurrence Class

The rate of Accidents, Serious Incidents and Incidents for the years 2019, 2020 and 2021, normalised per 1000 Controlled Flight Hours (CFH), and their associated trendlines are shown in Figures 8, 9 and 10 below. Due to the small sample and low absolute numbers it is not possible to draw reliable conclusions from this dataset.
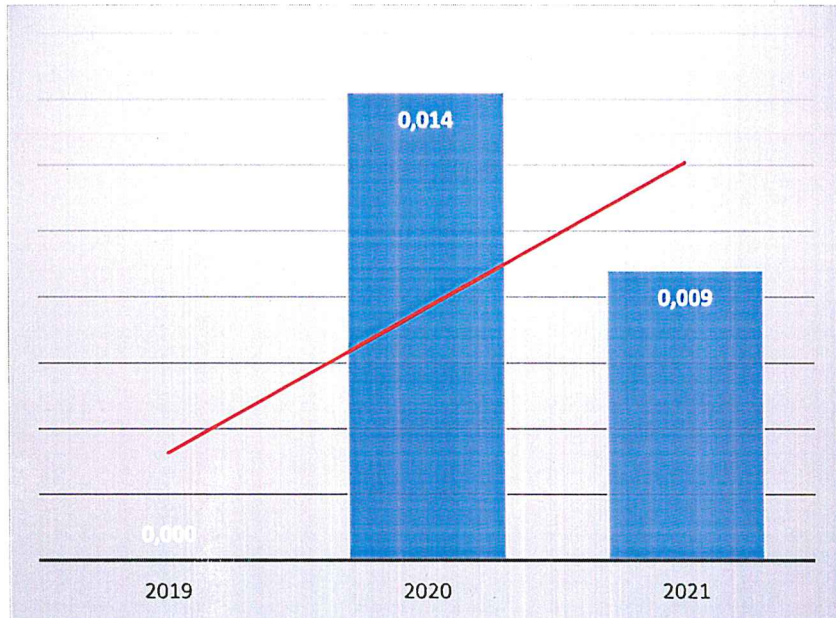

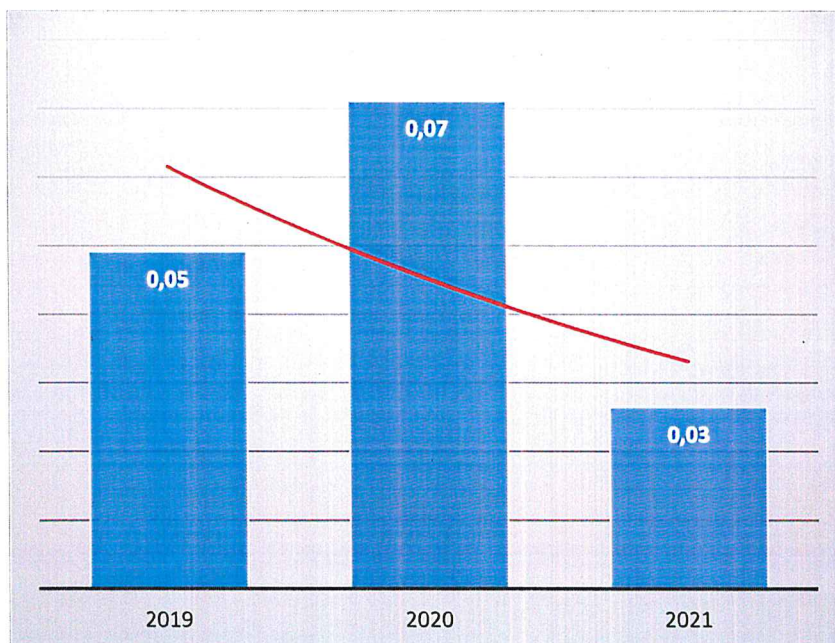*Figure 8: Rate of Accidents per 1000 CFH and trendline, years 2019-2021*

Figure 9: Rate of Serious Incidents per 1000 CFH and trendline, years 2019-2021
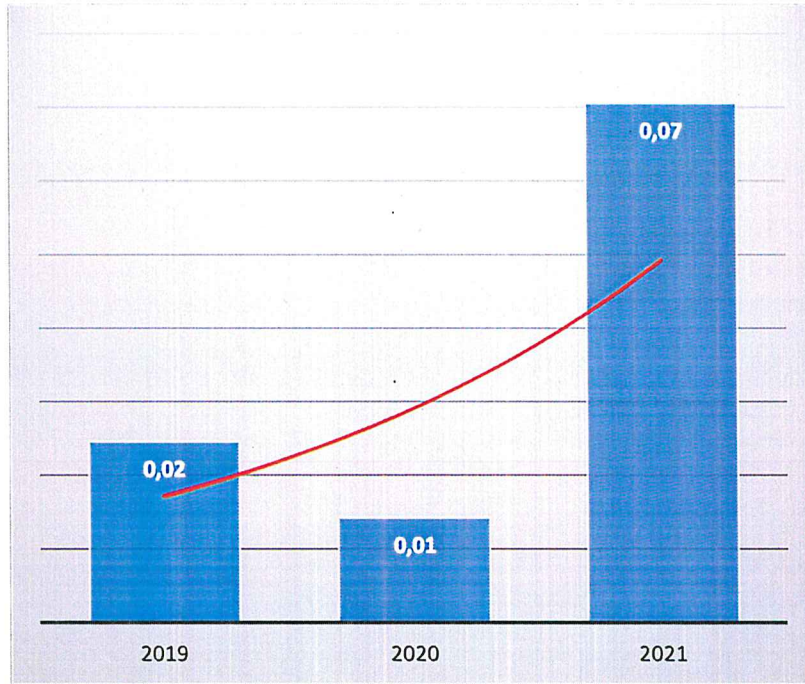
Figure 10: Rate of Major Incidents per 1000 CFH and trendline, years 2019-2021

8.2 Top 5 Occurrence Categories

The rates and trendlines, over the last three years, for the top 5 occurrence categories have been identified and are shown in Figures 11 to 15. From this analysis a noticeable upward trend is noticed for occurrences in the ADRM category, although the absolute number is small.
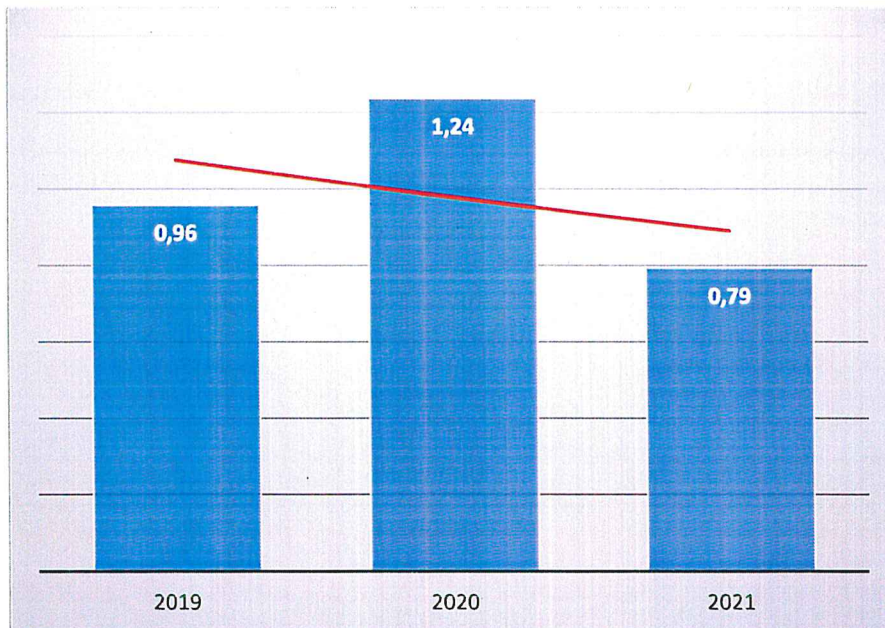
Figure 11: ATM category occurrences per 1000 CFH and trendline, years 2019-2021
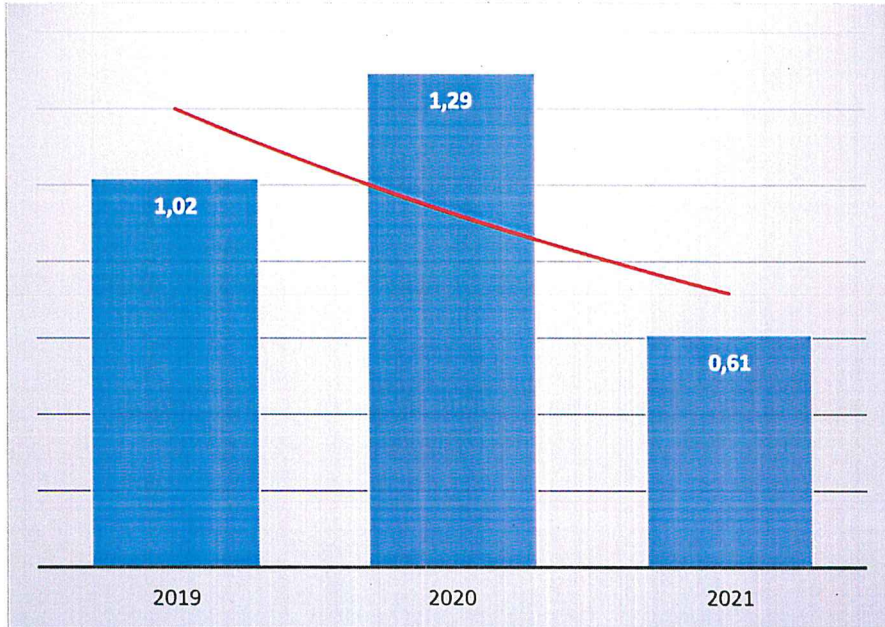
Figure 12: NAV category occurrences per 1000 CFH and trendline, years 2019-2021
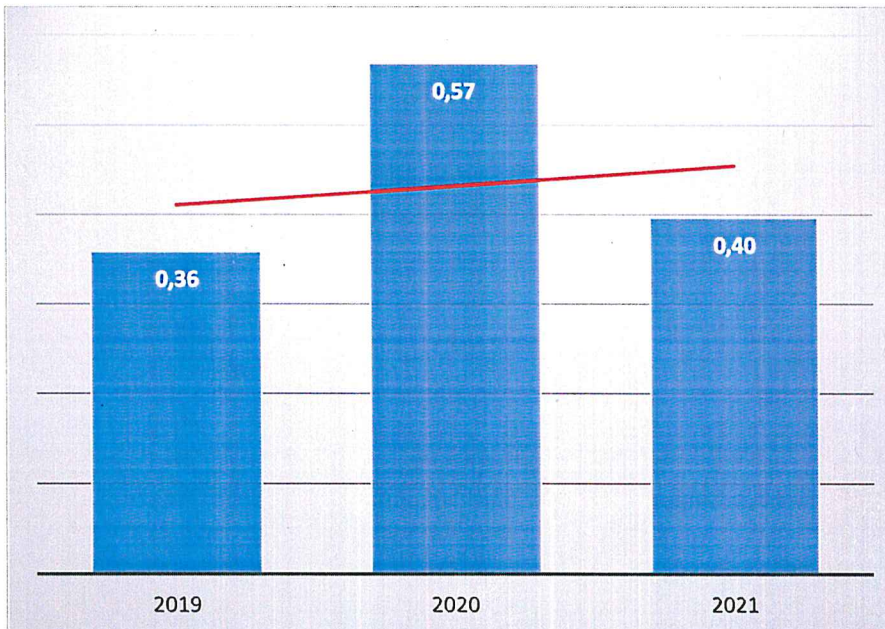
Figure 13: BIRD category occurrences per 1000 CFH and trendline, years 2019-2021
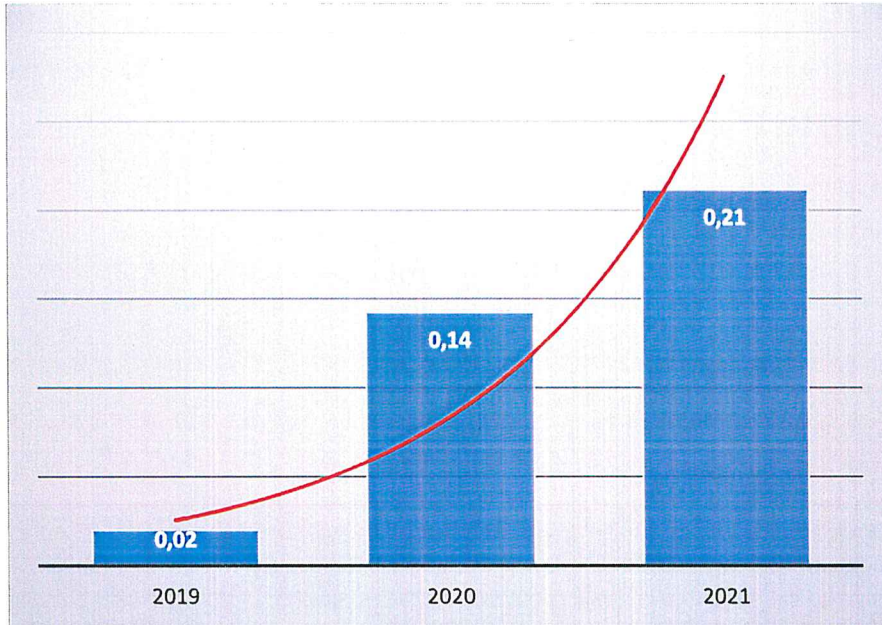
Figure 14: ADRM category occurrences per 1000 CFH and trendline, years 2019-2021
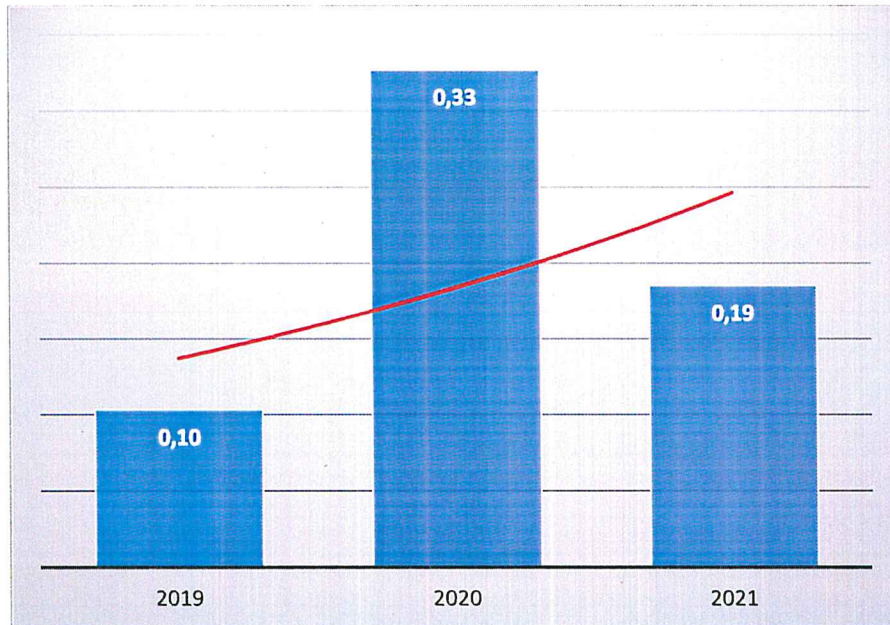
Figure 15: SCF-NP category occurrences per 1000 CFH and trendline, years 2019-2021

8.3 Summary of proposed actions

From the analysis of the information on the occurrence reports submitted in the year 2021, the following actions are proposed by the DCA Sections:

1. The NSA to consult with the ANSP to examine the reasons for the reduced number of reports. Such reasons could be degradation of the safety occurrence reporting culture, need for refresher training on what is a mandatory reportable occurrence etc.
2. The NSA to continue the close monitoring of 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.
3. Air Transport and Aerodromes Section to send written notices to aerodrome operator and ground handling agents regarding their responsibilities on the requirements for safety data collection, analysis, exchange and protection, emerging from Regulation (EU) No 376/2014.
4. A cross-domain DCA team, with regards to LCLK taxiways, to:
    a. identify Hot Spots with specific reference to designated taxi routes and check their effective display on aerodrome taxi charts
    b. review signage, markings and lighting for all taxi routes
    c. review ATC clearances to have shorter data to help and alert pilots during taxi.
5. Cross-domain analysis to be performed with regard to the occurrences in the ADRM: Aerodrome category

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;

APPENDIX 2: LIST OF TABLES

APPENDIX 3: LIST OF FIGURES