skeyes nice to guide you

Runway Performance Report **2023**

BRUSSELS SOUTH CHARLEROI AIRPORT

skeyes / tervuursesteenweg 303 / b-1820 Steenokkerzeel
T +32 2 206 21 11 / F +32 2 206 22 88
Member of FABEC

www.skeyes.be

Runway performance report

Brussels South Charleroi Airport

EXECUTIVE SUMMARY

The world-wide aviation sector is on a rapid recovery and so it is Brussels South Charleroi Airport, reaching in 2023 a 107% of 2019 traffic. This report gives an overview of the Air Traffic Management (ATM) performance at Brussels South Charleroi Airport. ATM Performance is driven by four Key Performance Areas (KPAs): safety, capacity, environment, and cost-efficiency. This report focuses on skeyes' operations at Brussels South Charleroi Airport (International Civil Aviation Organization – ICAO code: EBCI). Its aim is to provide our main stakeholders with traffic figures for 2023 and relevant data on the performance of our operations at Brussels South Charleroi Airport, namely on three of the four KPA's: safety, capacity and punctuality and environment.

Traffic

Traffic in Brussels South Charleroi Airport surpassed 2019 levels in 2022 and traffic continued to increase in 2023. skeyes controlled 87,905 movements at Brussels South Charleroi Airport in 2023, an increase of 5% compared to 2022. Especially the winter months registered the highest increase compared to 2022, going up to +22% in December.

The daily traffic pattern is showing similar trends in 2023 as in the previous year: less pronounced peaks and a more uniform distribution of traffic throughout the day. The busy periods of 07:00 and 22:00 (local time) are still there, but with a lower peak, followed/preceded by a more continuous and steady increase/decrease of traffic during the morning/evening. As in the previous years, runway 24 is the most used runway. In April, May and June, the use of this runway was lower due to the usual North-East winds.

Safety

Safety is a crucial pillar in air traffic control. As such, safety occurrences and missed approaches are followed up by skeyes' safety unit who analyses the situations, trends and, when relevant, investigates.

The number of missed approaches, a procedure used when the approach cannot be continued for a safe landing, and particularly their cause can indicate which measures are to be taken to improve the safety of air navigation service provision. In 2023, there were 80 missed approaches, an increase of 51% compared to 2022, having an increase in the number of arrivals of 5%. Unstable approach and weather (thunderstorm – windshear) were the leading reasons, accounting for 72% of the missed approaches in 2023.

For safety occurrences, the report shows that there were six runway incursions in Brussels South Charleroi Airport in 2023, three classifieds as having no ATM ground contribution and three as a severity 'E – No safety effect'. One taxiway incursion and nine taxiway/apron events were reported in 2023. These occurrences are discussed in the Local Runway Safety Team (LRST) with the purpose to make all stakeholders aware and discuss possible actions.

Capacity and Punctuality

Brussels South Charleroi Airport has a declared capacity for the used runway configurations. This capacity is based on a theoretical throughput capacity following certain assumptions and rules. In this report, the declared IFR capacity is given together with a view on the effectively used capacity. In 2023, the declared capacity was exceeded on eight days, during which times at least 70% of the traffic was VFR. For VFR traffic the IFR separation rules do not apply.

Since 2015 skeyes is subject to an annual target regarding ATFM arrival delay, delay of a flight caused by a regulation attributable to the terminal and air navigation services of the destination airport. Brussels South Charleroi Airport is not considered as a contributor airport to this target. In 2023, Brussels South Charleroi Airport registered 285 minutes of ATFM arrival delay, due to 'G-Aerodrome Capacity' (airport electrical issues) and 'A-Accident/Incident' (security issue in the terminal due to a bomb threat).

Environment

A preferential runway system (PRS) is in place at Brussels South Charleroi Airport and defines runway 24 as the preferred runway to use, when the necessary conditions are met. The PRS was followed for 79% of the time, following the trend of the last years. A view is given on the wind direction and speed, the main factor that influences the runway selected.

Brussels South Charleroi Airport normally operates from 06:30 to 23:00 local time. Due to late arrivals, the airport had to extend the opening hours on 353 days. Despite the days with extension, the night traffic in 2023 decreased by 25% compared to 2022. The chapter closes with statistics on the continuous descent operations (CDO). A new 'CDO flag' has been incorporated, in order to consider only 'CDO relevant flights' and to increase data consistency, the historical CDO data has been updated on an annual basis. CDO Fuel (flying a CDO from FL100) and CDO Noise (flying a CDO from FL60) are steady in the last years. A new C DO indicator has been introduced in the report this year, the 'average level-off time below certain altitude' (10,000 ft, 6,000 ft and 3,000 ft). In addition, skeyes promotes the increased use of performance-based navigation (PBN) procedures and is currently working on the PBN transition at Brussels South Charleroi Airport. Such approach procedures fit in the on-going transition towards a PBN Environment (EU regulation), and greatly improve predictability for the flight crews such that CDO performance can be improved. As a result of skeyes investments towards a more sustainable aviation, skeyes obtained the GreenATM level 3 accreditation in 2023.

SYNOPSIS

Le secteur de l'aviation connaît dans le monde entier une reprise rapide et il en va de même à Brussels South Charleroi Airport, qui a atteint en 2023 107% du trafic de 2019. Ce rapport donne un récapitulatif des performances de la gestion du trafic aérien (Air Traffic Management (ATM) Performance) à Brussels South Charleroi Airport. Les performances ATM reposent sur quatre domaines de performance clés (KPA, Key Performance Areas) : la sécurité, la capacité, l'environnement et l'efficacité économique. Ce rapport se focalise sur les opérations de skeyes à Brussels South Charleroi Airport (code de l'Organisation de l'Aviation civile internationale (OACI) : EBCI). Son objectif est de fournir aux principaux stakeholders les chiffres du trafic pour 2023 et des données pertinentes sur la performance des opérations à Brussels South Charleroi Airport, à savoir pour trois des quatre KPA : la sécurité, la capacité et l'environnement.

Trafic

Le trafic à Brussels South Charleroi Airport a dépassé les niveaux de 2019 en 2022 et le trafic a continué à augmenter en 2023. skeyes a contrôlé 87.905 mouvements à Brussels South Charleroi Airport en 2023, soit une augmentation de 5% comparé à 2022. Ce sont surtout les mois d'hiver qui ont enregistré la plus forte augmentation par rapport à 2022, jusqu'à +22% en décembre.
Les tendances du trafic quotidiennes sont en 2023 similaires à celles de l'année précédente : des pics moins prononcés et une répartition plus uniforme du trafic tout au long de la journée. Les périodes chargées de 07h00 et 22h00 (heures locales) existent toujours, mais avec un pic plus bas, suivi/précédé d'une augmentation/diminution plus continue et régulière du trafic durant la matinée/soirée. Comme les années précédentes, la piste 24 est la plus utilisée. En avril, mai et juin, l'utilisation de cette piste a été plus faible en raison des vents habituels du nord-est.

Sécurité

La sécurité est un pilier essentiel du contrôle aérien. C'est pourquoi les événements de sécurité et les approches interrompues font l'objet d'un suivi par la Safety Unit de skeyes, qui analyse les situations, les tendances et, le cas échéant, mène des enquêtes.
Le nombre d'approches interrompues, une procédure utilisée lorsque l'approche ne peut être poursuivie pour effectuer un atterrissage en toute sécurité, et en particulier leur cause, peuvent indiquer les mesures à prendre pour améliorer la sécurité de la fourniture des services de navigation aérienne. En 2023, il y a eu 80 approches interrompues, une augmentation de 51% par rapport à 2022, avec une augmentation du nombre d'arrivées de 5%. Une approche instable et les conditions météorologiques (des orages – des cisaillements de vent) en ont été les raisons principales, soit pour 72% des approches interrompues en 2023.
Pour ce qui a trait aux événements liés à la sécurité, le rapport indique qu'il y a eu six incursions de piste à Brussels South Charleroi Airport en 2023, trois classées comme n'étant pas imputables à l'ATM au sol et deux comme étant de classe 'E - Sans effet sur la sécurité'. Une incursion sur une voie de circulation (taxiway) et neuf événements sur une voie de circulation/aire de trafic ont été signalés en 2023. Ces événements font l'objet d'une discussion au sein de la Local Runway Safety Team (LRST) dans le but de sensibiliser tous les stakeholders et de discuter des actions possibles.

Capacité et ponctualité

Brussels South Charleroi Airport dispose d'une capacité déclarée pour les configurations de pistes utilisées. Cette capacité repose sur un débit théorique suivant certaines hypothèses et règles. Le présent rapport comporte la capacité IFR déclarée ainsi qu'un aperçu de la capacité effectivement utilisée. En 2023, la capacité déclarée a été dépassée pendant huit jours, au cours desquels au moins 70% du trafic était de type VFR. Pour le trafic de type VFR, les règles de séparation du trafic IFR ne s'appliquent pas.
Depuis 2015, skeyes est soumise à un objectif annuel concernant le retard ATFM à l'arrivée, c'est-à-dire le retard d'un vol causé par une régulation imputable aux services terminaux et de navigation aérienne de l'aéroport de destination. Brussels South Charleroi Airport n'est pas considéré comme un aéroport contributeur pour cet objectif. En 2023, Brussels South Charleroi Airport a enregistré 285 minutes de retard ATFM à l'arrivée, en raison d'une mesure G 'Aerodrome Capacity' (problèmes électriques à l'aéroport) et d'une mesure A 'Accident/Incident' (problème de sécurité dans le terminal en raison d'une alerte à la bombe).

Environnement

Un système de pistes préférentielles (PRS, Preferential Runway System) est en place à Brussels South Charleroi Airport et définit la piste 24 comme préférentielle, lorsque les conditions requises sont réunies. Le PRS a été suivi pendant 79% du temps, dans la continuité des dernières années. Un aperçu est présenté sur la direction et la vitesse du vent, le facteur principal qui influence la piste sélectionnée.
Brussels South Charleroi Airport est normalement ouvert de 06h30 à 23h00, heures locales. En raison des arrivées tardives, l'aéroport a dû prolonger ses heures d'ouverture pendant 353 jours. Malgré ces jours d'extension, le trafic de nuit en 2023 a diminué de 25% par rapport à 2022.
Le chapitre se termine par des statistiques sur les Continuous Descent Operations (CDO). Un nouvel 'indicateur CDO' a été intégré, afin de ne prendre en compte que les 'vols pertinents pour les CDO' et, pour améliorer la cohérence des données, les données historiques relatives aux CDO ont été mises à jour sur une base annuelle. Les indicateurs relatifs aux CDO Fuel (vols CDO à partir du niveau de vol 100) et aux CDO Noise (vols CDO à partir du niveau de vol 60) sont restés stables ces dernières années. Un nouvel indicateur CDO a été introduit dans le rapport cette année, le 'temps moyen de mise en palier en dessous d'une certaine altitude' (10.000 pieds, 6.000 pieds et 3.000 pieds). En outre, skeyes encourage l'utilisation accrue des procédures PBN (Performance Based Navigation) et travaille actuellement sur la transition vers la PBN à Brussels South Charleroi Airport. Ces procédures d'approche s'inscrivent dans la transition en cours vers un environnement PBN (réglementation de l'UE) et améliorent considérablement la prévisibilité pour les équipages, ce qui permet d'améliorer la performance des CDO. Grâce aux investissements de skeyes en faveur d'une aviation plus durable, skeyes a obtenu l'accréditation GreenATM de niveau 3 en 2023.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY

AIP: — Aeronautical Information Publication
AMC: — Acceptable Means of Compliance
AMS: — Airport Movement System
ANSP: — Air Navigation Service Provider
A-SMGCS: — Advanced-Surface Movement Guidance and Control System
ATC: — Air Traffic Control
ATCO: — Air Traffic Control Officer
ATFM: — Air Traffic Flow Management
ATM: — Air Traffic Management
BCAA: — Belgian Civil Aviation Authority
CAA — Civil Aviation Authority
CCO: — Continuous Climb Operations
CDO: — Continuous Descent Operations
CISP — Common Information Service Provider
COVID-19: — Coronavirus Disease 2019
CRSTMP: — C-Capacity, R-Routeing, S-Staffing, T-Equipment, M-Airspace Management, P-Special Event
CTR: — Control Zone
DEP — Departure
DSA: — Drone Service Application
EASA — European Union Safety Agency
EBAW: — Antwerp International Airport ICAO Code
EBBR: — Brussels Airport ICAO Code
EBCI: — Brussels South Charleroi ICAO Code
EBKT: — Kortrijk-Wevelgem International Airport ICAO Code
EBLG: — Liège Airport ICAO Code
EBOS: — Ostend–Bruges International Airport ICAO Code
FABEC — Functional Airspace Block Europe Central
ICAO: — International Civil Aviation Organization
IFR: — Instrument Flight Rules
ILS — Instrument Landing System
LRST: — Local Runway Safety Team
MCT: — Maximum Throughput Capacity
MVT: — Mixed Volume Traffic
NM: — Network Manager
PBN — Performance Based Navigation
RAT — Risk Analysis Tool
RMZ: — Radio Mandatory Zone
RNP — Required Navigation Performance
RWY: — Runway
PRS: — Preferential Runway System
UAS: — Unmanned Aircraft System
VFR: — Visual Flight Rules
Wx: — Weather

TRAFFIC

In this chapter, traffic at Brussels South Charleroi Airport (International Civil Aviation Organization (ICAO) code: EBCI) is presented as recorded by the Airport Movement System (AMS). The AMS is an in-house developed tower air traffic control (ATC) system and records the movements at an aerodrome and within its Control Zone (CTR). The movements are defined as an aircraft either crossing the CTR, landing or taking off at the aerodrome.

The figures presented throughout the report consider a movement as a take-off or landing of all traffic (flights under Visual Flight Rules (VFR) and Instrumental Flight Rules (IFR), helicopters and airplanes, commercial, military or general aviation). As this report considers runway performance, movements such as crossings of CTRs are not considered. As per BCAA's (Belgian Civil Aviation Authority)

- **one take-off = one departure movement**
- **one landing = one arrival movement**
- **one touch-and-go = two movements: one departure & one arrival**

Traffic Overview

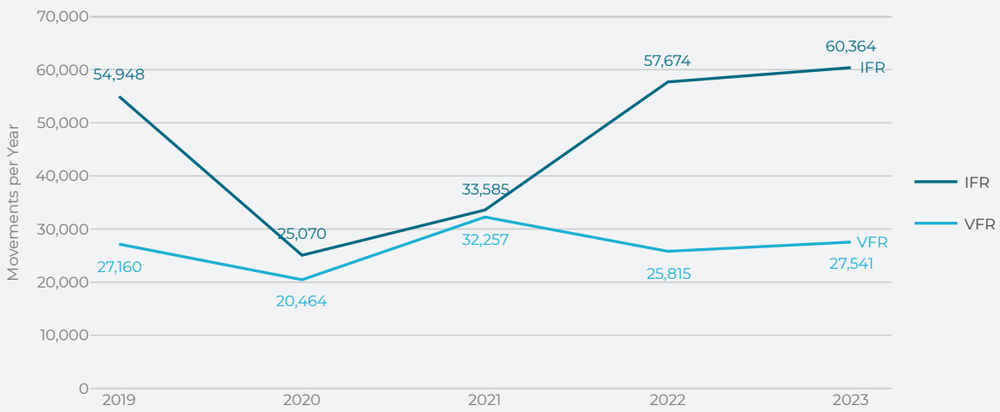
YEARLY FIGURES

Traffic at Brussels South Charleroi Airport already surpassed 2019 traffic numbers in 2022 (increase of 2%) and in 2023 it has continued increasing to 7% more traffic than in 2019. The number of aircraft movements for the last five years are as follows:

2019: **82,108 movements** (54,948 IFR, 27,160 VFR),
2020: **45,534 movements** (25,070 IFR, 20,464 VFR)
2021: **65,842 movements** (33,585 IFR; 32,257 VFR)
2022: **83,489 movements** (57,674 IFR; 25,815 VFR)
2023: **87,905 movements** (60,364 IFR; 27,541 VFR)

Figure 1.1 shows the traffic evolution at Brussels South Charleroi Airport during the last five years. Over these last five years, COVID-19 has been the event with the biggest impact on traffic, from which Charleroi Airport has already recovered. The forecast by the network manager EUROCONTROL foresees traffic full recovery in Europe in 2025.

Figure 1.1: *Yearly traffic overview*



MONTHLY FIGURES

Figure 1.2 provides information about the monthly evolution of the traffic at Brussels South Charleroi Airport for the previous five years, considering not only total movements, but also the split between Instrumental Flight Rules (IFR) traffic and Visual Flight Rules (VFR) traffic. In 2021, there was a peak of VFR traffic during the months with less IFR movements due to COVID-19, reaching 4,118 VFR movements that February.

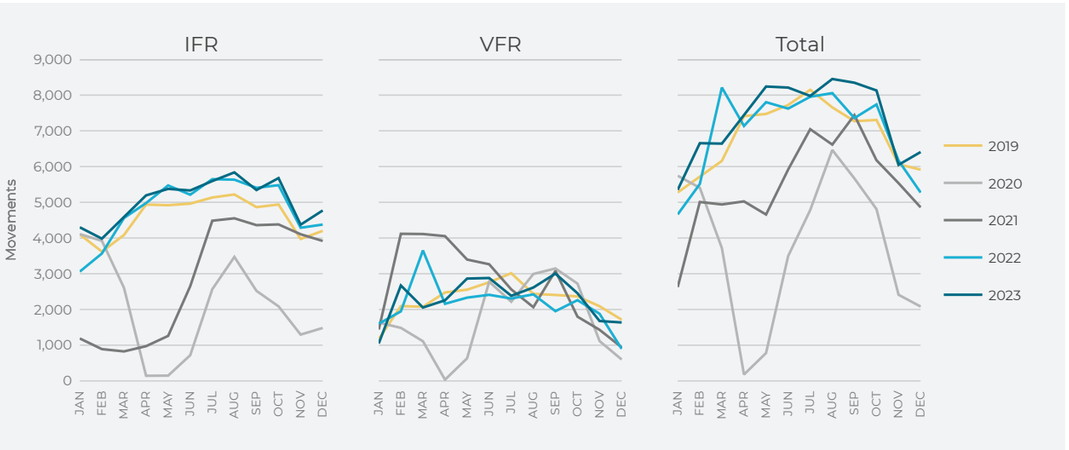
In March 2022, by decision of the Belgian authorities, all restrictions related to Covid-19 were lifted starting the end of the emergency epidemic situation, also generating the highest peak of VFR traffic that year. The subsequent reopening of the borders had a significant impact on Charleroi airport, which experienced a high volume of flights from countries such as Morocco. These factors generated the highest peak of traffic in 2022 on March, with 8,212 movements.

In 2023, the monthly IFR movements were between 5% and 15% higher compared to the same months in 2019, resulting in the highest IFR (60,364) and total movements (87,905) for Charleroi airport in the last years. According to Charleroi Airport's Chairman of the board of directors and the CEO, this recovery can be explained by the profile of the main airlines operating at Charleroi airport: Companies such as Ryanair, Wizz Air, Pegasus and Volotea have captured new market shares from traditional airlines[1].

Table 1.1 shows traffic figures monthly figures per month and flight rule from 2019 to 2023, along with a comparison of 2023 versus 2022 and 2019. Arrival and departure figures are given in ***Table 1.2***

The highest amount of monthly traffic in 2023 was recorded in August with 8,451 movements. On the other hand, comparing 2023 traffic with the previous year, December registered the biggest increase (+22%).

Figure 1.2: *Monthly movements per year*



1. Brussels South Charleroi Airport 2022 Activity Report
https://www.brussels-charleroi-airport.com/sites/default/files/inline-files/BSCA_RA_DESIGN2022_EN-FINAL_0.pdf
URL retrieved on 11/02/2024)

Table 1.1: *Monthly movements per flight rule per year*

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
IFR	**2019**	4,102	3,618	4,084	4,936	4,918	4,962	5,134	5,219	4,864	4,938	3,973	4,200	**54,948**
	2020	4,109	3,921	2,607	144	148	719	2,566	3,471	2,520	2,087	1,296	1,482	**25,070**
	2021	1,188	890	826	972	1,260	2,651	4,484	4,551	4,360	4,380	4,105	3,918	**33,585**
	2022	3,060	3,566	4,560	4,978	5,471	5,212	5,647	5,633	5,405	5,479	4,287	4,376	**57,674**
	2023	4,300	3,982	4,588	5,193	5,375	5,331	5,594	5,837	5,343	5,677	4,373	4,771	**60,364**
	2023 *vs* 2019	+5%	+10%	+12%	+5%	+9%	+7%	+9%	+12%	+10%	+15%	+10%	+14%	+10%
	2023 *vs* 2022	+41%	+12%	+1%	+4%	-2%	+2%	-1%	+4%	-1%	+4%	+2%	+9%	+5%
VFR	**2019**	1,174	2,094	2,075	2,476	2,554	2,760	3,015	2,437	2,406	2,366	2,090	1,713	**27,160**
	2020	1,633	1,485	1,110	35	632	2,776	2,216	2,993	3,147	2,723	1,115	599	**20,464**
	2021	1,439	4,118	4,112	4,053	3,397	3,265	2,562	2,063	3,081	1,797	1,430	940	**32,257**
	2022	1,601	1,946	3,652	2,158	2,331	2,410	2,306	2,423	1,952	2,260	1,879	897	**25,815**
	2023	1,049	2,672	2,054	2,256	2,865	2,880	2,382	2,614	3,004	2,453	1,676	1,636	**27,541**
	2023 *vs* 2019	-11%	+28%	-1%	-9%	+12%	+4%	-21%	+7%	+25%	+4%	-20%	-4%	+1%
	2023 *vs* 2022	-34%	+37%	-44%	+5%	+23%	+20%	+3%	+8%	+54%	+9%	-11%	+82%	+7%
Total	**2019**	5,276	5,712	6,159	7,412	7,472	7,722	8,149	7,656	7,270	7,304	6,063	5,913	**82,108**
	2020	5,742	5,406	3,717	179	780	3,495	4,782	6,464	5,667	4,810	2,411	2,081	**45,534**
	2021	2,627	5,008	4,938	5,025	4,657	5,916	7,046	6,614	7,441	6,177	5,535	4,858	**65,842**
	2022	4,661	5,512	8,212	7,136	7,802	7,622	7,953	8,056	7,357	7,739	6,166	5,273	**83,489**
	2023	5,349	6,654	6,642	7,449	8,240	8,211	7,976	8,451	8,347	8,130	6,049	6,407	**87,905**
	2023 *vs* 2019	+1%	+16%	+8%	+0%	+10%	+6%	-2%	+10%	+15%	+11%	-0%	+8%	+7%
	2023 *vs* 2022	+15%	+21%	-19%	+4%	+6%	+8%	+0%	+5%	+13%	+5%	-2%	+22%	+5%

Table 1.2: *Monthly arrival and departure movements per year*

		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Arrivals	**2019**	2,638	2,850	3,081	3,707	3,734	3,859	4,075	3,829	3,634	3,653	3,031	2,958	**41,049**
	2020	2,873	2,702	1,860	89	385	1,751	2,389	3,232	2,835	2,408	1,203	1,039	**22,766**
	2021	1,316	2,503	2,468	2,514	2,329	2,962	3,518	3,310	3,719	3,089	2,769	2,430	**32,927**
	2022	2,329	2,757	4,106	3,566	3,901	3,813	3,973	4,030	3,677	3,871	3,085	2,638	**41,746**
	2023	2,677	3,327	3,318	3,722	4,124	4,104	3,988	4,225	4,172	4,064	3,024	3,206	**43,951**
	2023 *vs* 2019	+1%	+17%	+8%	+0%	+10%	+6%	-2%	+10%	+15%	+11%	-0%	+8%	+7%
	2023 *vs* 2022	+15%	+21%	-19%	+4%	+6%	+8%	+0%	+5%	+13%	+5%	-2%	+22%	+5%
Departures	**2019**	2,638	2,862	3,078	3,705	3,738	3,863	4,074	3,827	3,636	3,651	3,032	2,955	**41,059**
	2020	2,869	2,704	1,857	90	395	1,744	2,393	3,232	2,832	2,402	1,208	1,042	**22,768**
	2021	1,311	2,505	2,470	2,511	2,328	2,954	3,528	3,304	3,722	3,088	2,766	2,428	**32,915**
	2022	2,332	2,755	4,106	3,570	3,901	3,809	3,980	4,026	3,680	3,868	3,081	2,635	**41,743**
	2023	2,672	3,327	3,324	3,727	4,116	4,107	3,988	4,226	4,175	4,066	3,025	3,201	**43,954**
	2023 *vs* 2019	+1%	+16%	+8%	+1%	+10%	+6%	-2%	+10%	+15%	+11%	-0%	+8%	+7%
	2023 *vs* 2022	+15%	+21%	-19%	+4%	+6%	+8%	+0%	+5%	+13%	+5%	-2%	+21%	+5%

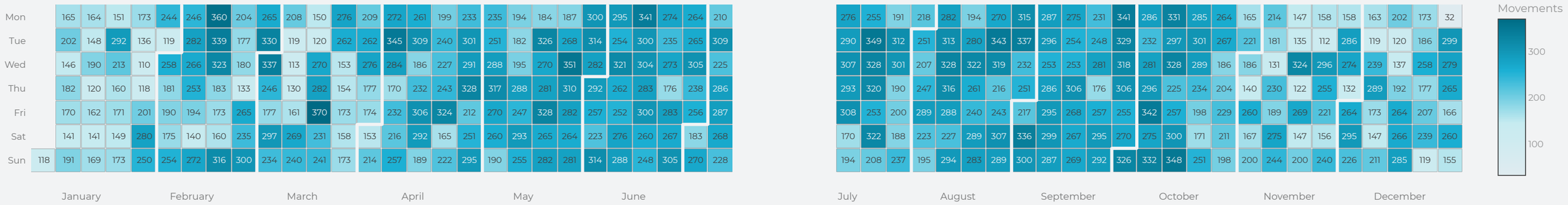


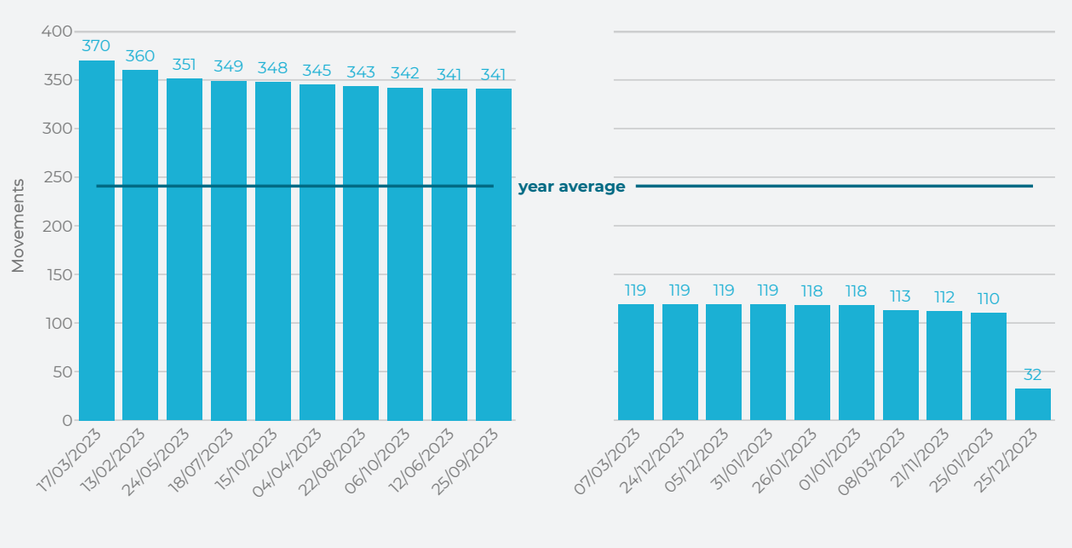
Figure 1.3: *Calendar view of movements per day in 2023*

DAILY FIGURES

On average, there were 241 movements per day in 2023. ***Figure 1.4*** shows the top ten days with the highest traffic and the ten days with the lowest traffic. ***Figure 1.3*** shows a visualization of the movements per day in a calendar view.

The busiest period during 2023 was from May until October, despite the national strike that took place on the 5th of October and Ryanair strikes in July (15th & from 16th until 29th & 30th), August (14th &15th) and September (14th &15th). The two busiest days took place outside the busiest period of the year, being the busiest day the 17th of March with 370 movements and the second busiest the 13th of February with 360 movements. The bottom ten days of traffic took place during the winter period, being the one with the lowest traffic the 25th of December (Christmas day).

Figure 1.4: *Top ten and bottom ten days in traffic in 2023*



HOURLY TRAFFIC PATTERNS

The graph in ***Figure 1.5*** shows the average hourly movements throughout the day, in local time (LT), over the period from 2019 to 2023. This figure illustrates a noticeable difference in the distribution of traffic over the day, reflecting the changes in air travel resulting from the COVID-19 pandemic. It can be seen that the change in pattern started to happen since the beginning of the pandemic, with less pronounced peaks and a more uniform distribution of traffic. Despite having higher traffic in 2022 and 2023 compared to 2019, the morning peak followed by a big drop in traffic has almost disappeared, being replaced by a lower peak, but with a more continuous and steady increase of traffic during the morning. Also, the evening peak is becoming flatter compared to 2019.

Figure 1.5: *Average hourly movements per year*

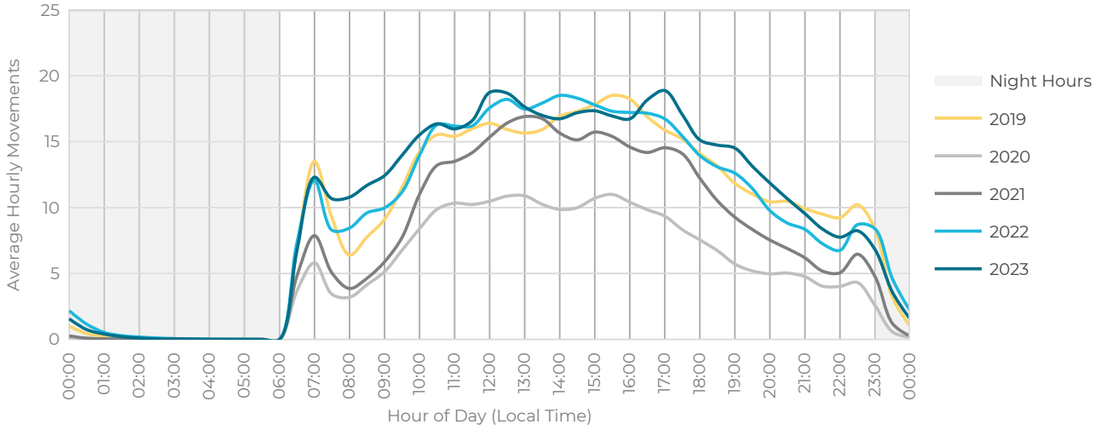


Figure 1.6 and ***Figure 1.7*** provide a yearly comparison for the period from 2019 to 2023 of the traffic patterns for IFR and VFR traffic, respectively. As already mentioned before, IFR traffic in 2023 was above 2019 traffic, and this is also clearly visible here. A peak can be seen at 12:00, which is slightly different than in the pre-COVID years, where a peak was visible around 15:00.

In opposition to IFR traffic, VFR flights don't have a morning and evening peak, being the busiest times of the day, between 10:00 and 17:00.

Figure 1.6: *IFR hourly average movements per year*

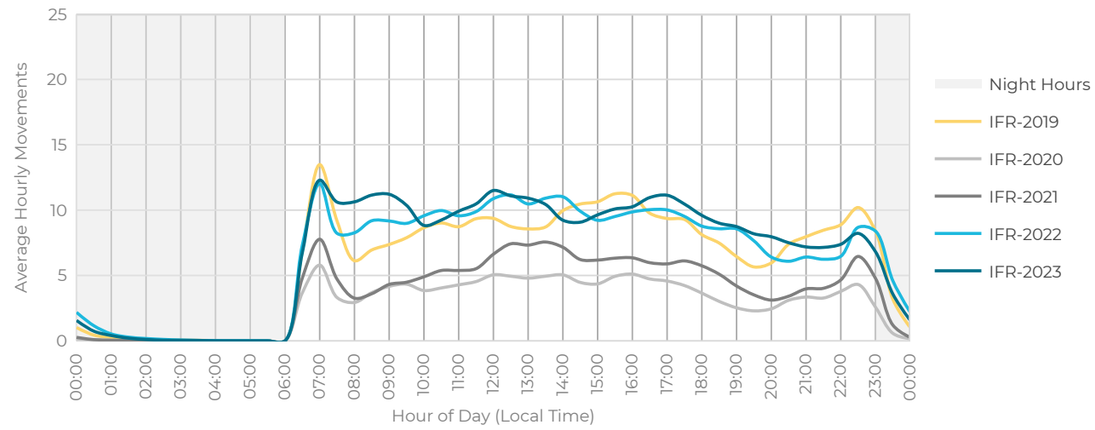
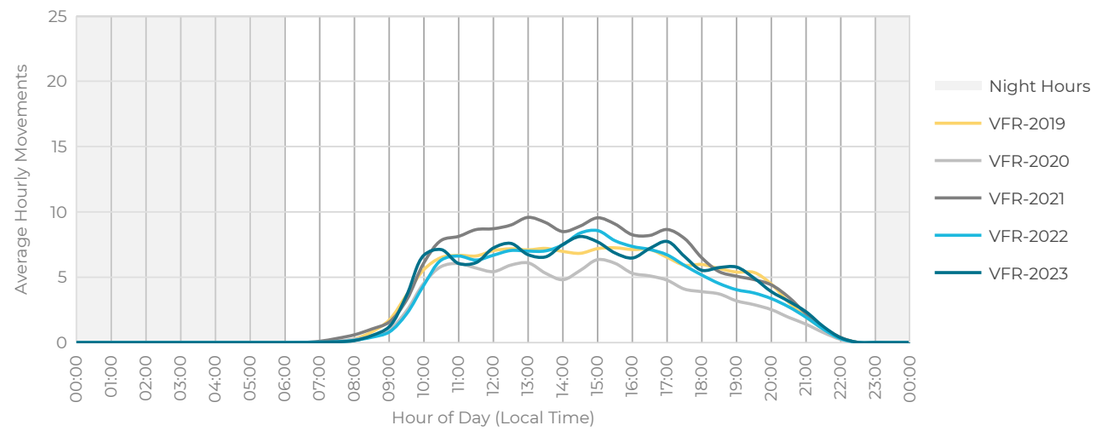


Figure 1.7: *VFR hourly average movements per year*



Runway Use

The use of one runway configuration over another depends on several factors that have to be taken into account, such as meteorological conditions or runway equipment for example. In Brussels South Charleroi Airport, there is a preferential runway system to be used, as mentioned in the Aeronautical Information Publication (AIP).

Runway 24 is the preferred runway for take-off and landing. The preferred use of runway 24 is explained by the wind blowing from a south-westerly direction in Charleroi Airport most of the time. ***Figure 1.8*** shows the runway in Charleroi Airport as published in the Aerodrome Chart - ICAO in the eAIP.

Figure 1.8: *Aerodrome ground movement chart - ICAO*

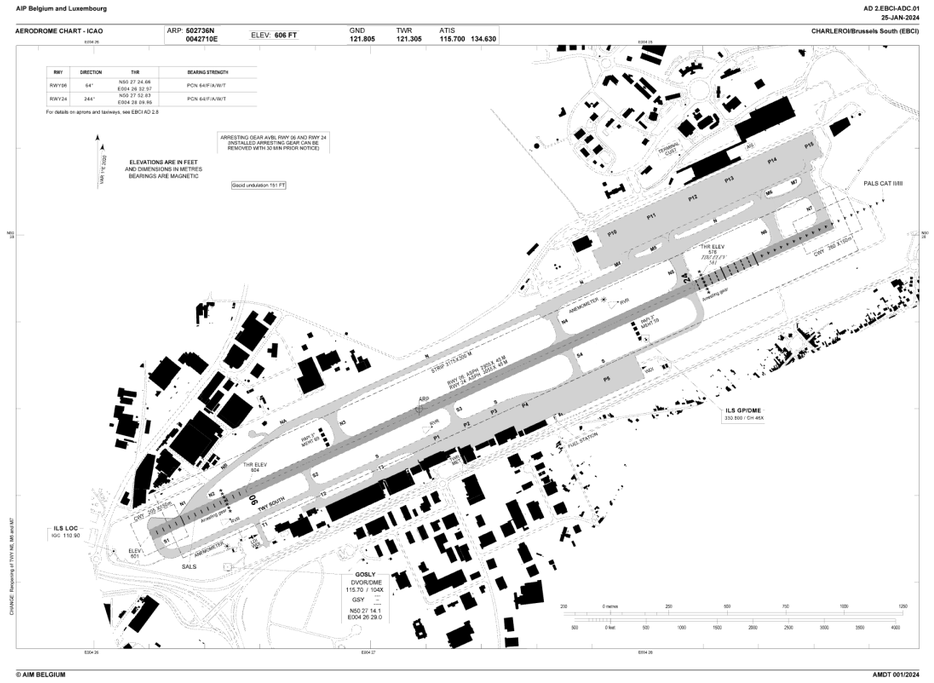


Figure 1.9 shows the runway used in Brussels South Charleroi Airport since 2019. In 2023, runway 24 was used for 69,801 take-offs and landings. Since 2021 there has been an increase of North-East winds over the years, generating a lower use of runway 24 since then.

Figure 1.10 below shows the runway use per month of 2023. While runway 24 is the most used runway overall, the period April, May and June, show a higher use of runway 06. This can be explained, as shown in the wind roses below the graph, by more North-East winds. The increased North-East winds in this period of the year is a yearly phenomenon that is seen in Brussels South Charleroi Airport and in other Belgian airports. More details about winds can be found in ***Figure 4.14*** and ***Figure 4.14*** in the fourth chapter of this report. Apart from the already mentioned usual North-East winds during April, May and June, there were also less severe North-East winds in January and February, that therefore generated a smaller impact and for which runway 24 was used an 80%.

Figure 1.9: *Runway usage per year in movements with yearly wind roses*

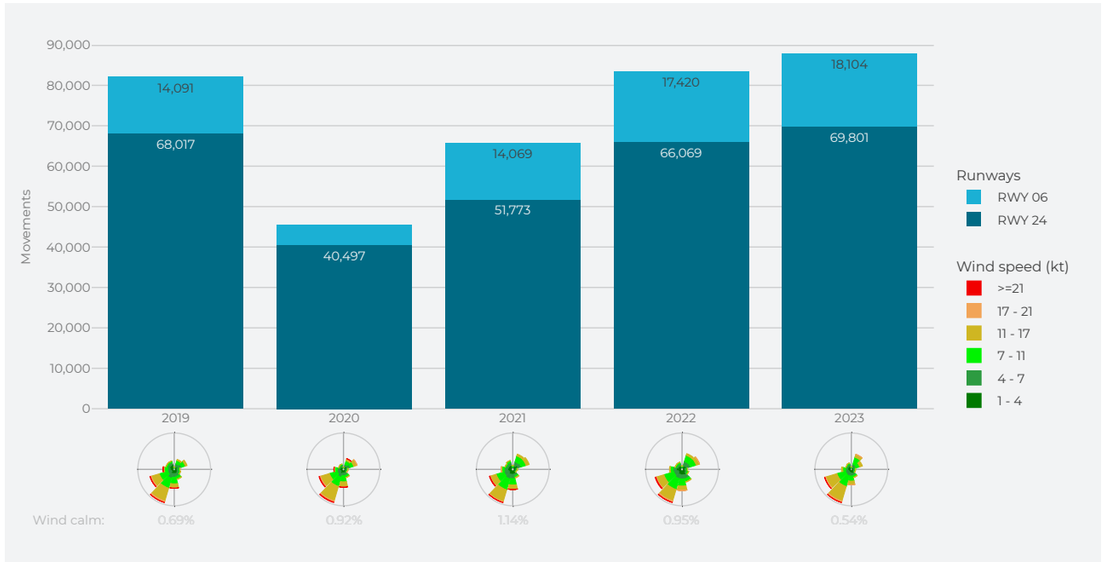
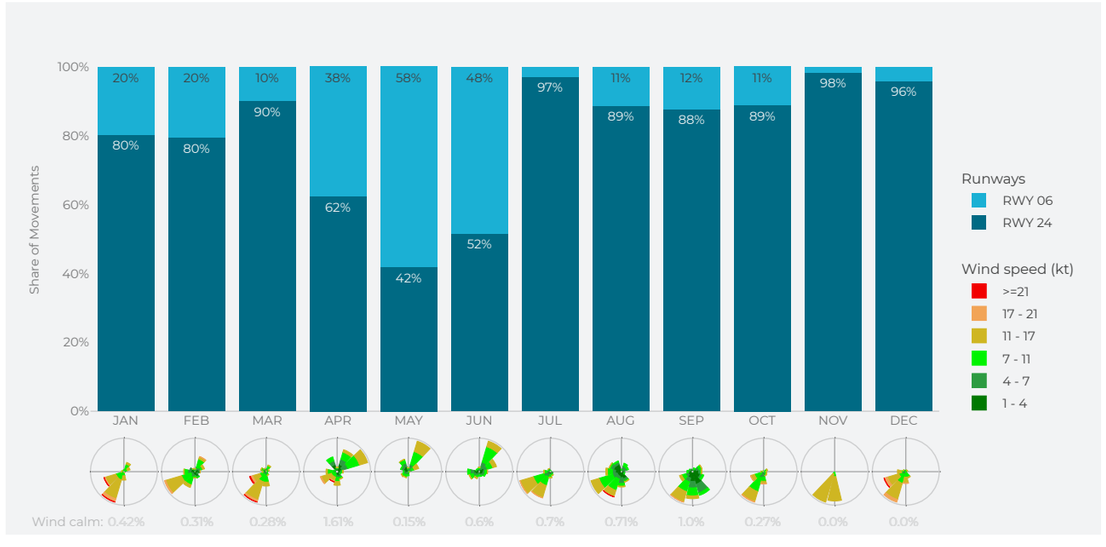


Figure 1.10: *Runway usage per month in 2023 in share of movements with monthly wind roses*



Drone Activities

The emerging activities of unmanned aircraft systems (UAS) and the variety of their operations is one of the challenges driving the future of Air Navigation Service Providers (ANSP). To enable a reliable and efficient UAS integration, a framework is designed at EU level: U-space. U-space is a set of specific services and procedures designed to ensure safe and efficient access to airspace for a large number of drones. Implementing U-space airspace requires states to define and designate U-space airspaces with mandatory service provision. For the provision of these mandatory services, the deployment of U-space will entail the integration of two new service providers into the system: the common information service provider (CISP) and the U-space service provider (USSP). The CISP will be in charge of making available the common information required to enable the operation and provision of U-space services in U-space airspaces wherever it has been designated.[2]

skeyes is playing a central role in the development of the U-space as manager of UAS geographical zones in Belgium and by actively participating in the BURDI Project. The BURDI project which stands for Belgium-Netherlands U-space Reference Design Implementation, is dedicated to implementing a U-space airspace concept to ensure a reliable and efficient UAS integration.[3] Additionally, since 2023, skeyes has been working on obtaining the certification to become the CISP in Belgium.

The controlled airspace above and around an airport is a UAS geographical zones, also called "GeoZone". UAS geographical zone are zones that are only accessible to drones complying with technical and operational criteria called access conditions, and that can have restrictions with regard to the use of drones. skeyes is the GeoZone manager for controlled airspace above and around the airports of Antwerp, Brussels, Charleroi, Liege, Ostend and the Radio Mandatory Zone of Kortrijk.[4] [5]

skeydrone, created in 2020 as subsidiary of skeyes, envisages to play a central role in the implementation of U-space as USSP by offering a wide variety of services that enable safe and efficient drone operations in all types of airspace. This is how in 2022, skeydrone, in collaboration with the local development company, facilitated the implementation of the first marine GeoZone at an offshore test platform in the North Sea. Following that success, a project, implicating skeydrone, the port of Ostend and other European partners, was launched. Its aim is to develop offshore logistics solutions to support the transition from fossil fuels to renewable energy sources in the North Sea. In this context, skeydrone's contributions include implementing U-space drone corridors between land and offshore renewable energy platforms and managing offshore drone traffic as a USSP[6].

One of the other services proposed by skeydrone is a web application: the Drone Service Application (DSA) to facilitate planning, coordination and information flow between drone operators and Air Traffic Control, especially in controlled airspace. The figures in this report related to UAS are provided by the DSA tool.

Table 1.3 below shows the authorized drone activities at and around Brussels South Charleroi Airport, as registered by the DSA tool. It also indicates the categories of risk involved in the operations. These categories are defined by the risk the drone activity forms for manned aviation in very low-level zones. They are categorised as:

high risk — runway and surroundings

moderate risk — departure/approach track, visual circuits and rest of the control zone above 400 ft above aerodrome elevation (AAE), excluding the high-risk zone.

low risk — on the edge of the control zone below 400 ft AAE, outside the moderate and high-risk zone

Table 1.3: *Authorized drone activities in 2023 per VLL zone risk level*

	Low	Moderate	High	Total
2021	688	4	2	**694**
2022	874	13	11	**898**
2023	1,029	17	0	**1,046**
2023 *vs* 2021	+50%	+325%	-100%	+51%
2023 *vs* 2022	+18%	+31%	-100%	+16%

2. https://www.ecac-ceac.org/activities/unmanned-aircraft-systems/uas-bulletin/22-uas-bulletin/504-uas-bulletin-2-what-is-u-space (URL retrieved on 16/02/2024)
3. https://www.sesarju.eu/projects/BURDI (URL retrieved 16/02/2024)
4. UAS geographical zone statuses can be seen at https://map.droneguide.be (URL retrieved on 21/04/2024).
5. skeyes, "skeyes drone service application, https://www.skeyes.be/en/services/drone-home-page/you-and-your-drone/drone-service-application/ (URL retrieved on 21/04/2024).
6. https://www.unmannedairspace.info/uncategorized/west-flanders-drone-ecosystem-expands-with-skydrone-support/ (URL retrieved on 21/02/2024)

In Brussels South Charleroi Airport area, there were 1,046 drone activities recorded in 2023. Those activities can also be classified into a different scheme, taking into account the complexity of the operation. There are three such categories, which are described as follows (as per EASA definition):

OPEN — Presents low risk to third parties. An authorisation from the Civil Aviation Authority (CAA) is not required.

SPECIFIC — More complex operations or aspects of the operation fall outside the boundaries of the Open Category. Authorisation is required from the CAA.

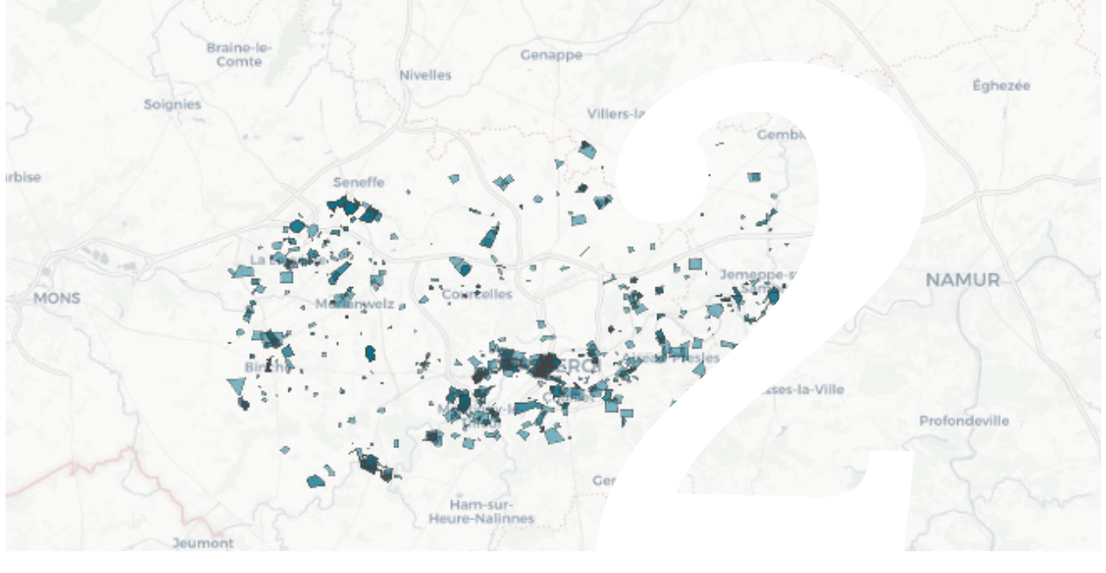
FORMER CLASS 1 — Very complex operations, presenting an equivalent risk to that of manned aviation.

Table 1.4 shows the drone operations recorded in Charleroi Airport following the EASA risk category. In Brussels South Charleroi Airport, almost two-thirds of the drone activities operated under the 'Open' category (663 authorized operations). 383 (37%) were registered as 'Specific', and none were flown as 'Certified'. It can be observed that drone activities continue to grow (+51% compared to 2021 and +16% compared to 2022).

Table 1.4: *Authorized drone activities in 2023 per EASA risk category*

	Open	Specific	Former Class 1	Total
2021	455	222	17	**694**
2022	574	324	0	**898**
2023	663	383	0	**1,046**
2023 *vs* 2021	+46%	+73%	-100%	+51%
2023 *vs* 2022	+16%	+18%	-	+16%

Figure 1.11: *Reserved airspaces of authorized drone activities in 2023*



In ***Figure 1.11*** the reserved airspace polygons are shown, which were authorized for drone operations in Charleroi Airport's CTR in 2023. There is a focus of operations over the city of Charleroi, but also along the river. The missions of these activities are oftentimes related to photo- and videography, but also serve maintenance and inspection missions (mainly power line pylon inspection), photogrammetry (art, science, and technology of obtaining reliable information about physical objects and the environment through processes of recording, measuring, and interpreting photographic images and patterns of recorded radiant electromagnetic energy and other phenomena), surveying and mapping activities, etc.

SAFETY

This chapter is divided into four topics: missed approaches, runway incursions, other RWY/TWY events and improvements and recommendations.

The missed approaches covered in the following chapter are based on internal logging. As such the quality and accuracy of the available information is commensurate with the level of reporting. These logs of missed approaches are not considered as safety occurrences. They are an operational solution allowing to maintain safety margins when the approach cannot be continued for a safe landing. At the same time, particularly during peak hours at busy airports, they also increase the traffic complexity and the residual safety risk. It could be argued that missed approaches are a hybrid leading indicator, and that by analysing the reasons leading to this type of procedure, it is possible to examine if there are any systemic deficiencies in a technical equipment, in a procedure or in manner in which Air Traffic Control Officers (ATCOs) and/or pilots apply these procedures.

The runway incursions are a lagging runway safety indicator. The runway incursions and occurrences discussed in other RWY/TWY events are safety occurrences. These are subject to a risk classification using the Risk Analysis Tool (RAT) methodology to assess the contribution that skeyes had in the chain of events (in accordance with EU Reg 376/2014 and EU Reg 2019/317). The following chapters indicate the severity classification that was derived from the calculated RAT risk for the safety occurrences. The following definitions apply for the severity classification (in accordance with EASA AMC). The following definitions apply for the severity classification (as per EASA Acceptable Means of Compliance (AMC)). This classification scheme is applicable for the later mentioned operational occurrences.

Table 2.1: *Severity classification*

Severity Classification	Description
A – Serious incident	An incident involving circumstances indicating that an accident nearly occurred.
B – Major incident	An incident associated with the operation of an aircraft, in which the safety of the aircraft may have been compromised, having led to a near collision between aircraft, with ground or obstacles (i.e. safety margins were not respected; in this case, not as a result of an ATC instruction).
C – Significant incident	An incident involving circumstances indicating that an accident, or a serious or major incident could have occurred if the risk had not been managed within the safety margins, or if another aircraft had been in the vicinity.
D – Not determined	Insufficient information was available to determine the severity, or inconclusive or conflicting evidence precluded such determination (RAT RF < 70 %).
E – No safety effect	An incident which has no safety effect.
N – No ATM ground contribution	No system, procedure or person involved in the provision of ATC services initiated or contributed to the incident.

Missed Approaches

Missed approaches are performed according to published procedures, under the instructions of the air traffic controller or they are initiated by the pilot, when, for any reason, the approach cannot be continued for a safe landing. Besides the discomfort for passengers and crew, the missed approaches increase the air traffic management complexity. The number of missed approaches and particularly their cause can therefore indicate which measures are to be taken to improve the safety of air navigation service provision. All missed approaches are recorded by cause of event, and the internal reporting is done by the ATCOs.

The number of missed approaches at Brussels South Charleroi Airport are monitored on a weekly basis. Missed approaches are closely followed by skeyes' safety unit, trends are analysed and when relevant, investigations are conducted to identify root causes and implement improvement measures.

The number of missed approaches in Brussels South Charleroi Airport increased a 51% in 2023 compared to the previous year. This increase is higher than the increase in number of arrivals (5%). ***Figure 2.1*** allows a comparison between the years, from 2019 to 2023, by showing the number of missed approaches per 1,000 arrivals. The number of arrivals is provided by the AMS under the BCAA's aerodrome movement definition. It can be observed that 2023 has the highest rate in the last years, just below 2020, a year that had an exceptionally high number of missed approaches largely due to strong south-westerly winds caused by storms Ciara and Dennis in February 2020.

All missed approaches are recorded by cause of event and the reporting is done by the ATCOs. ***Figure 2.2*** shows the missed approaches per cause in 2023, ordered from the most to the least frequent. A total of 80 missed approaches were reported in 2023. Unstable approach is the top reason for missed approaches (accounting for 39% of the occurrences), followed by reasons related to meteorological conditions with thunderstorm-windshear accounting for 19%, and poor visibility accounting for 14%. Oftentimes, unstable approaches occur due to tailwind at higher altitudes or when the aircraft takes a very direct route and is therefore unable to reduce its speed/altitude sufficiently.

Figure 2.1: *Rate of missed approaches per 1,000 arrivals per runway per year*

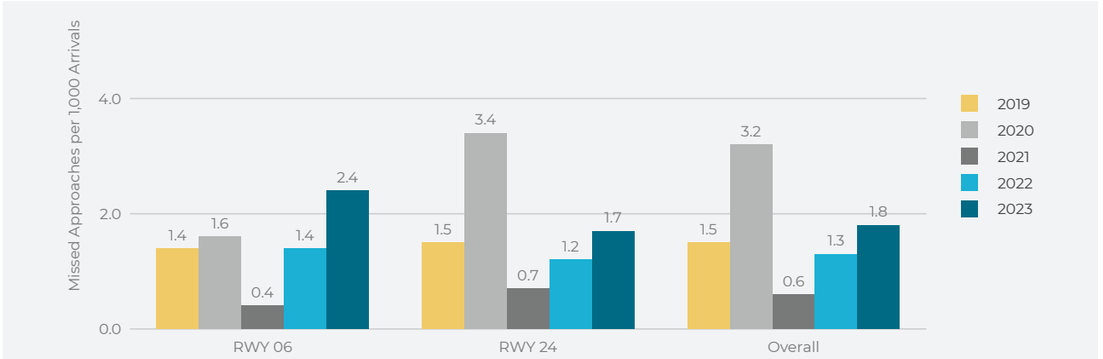
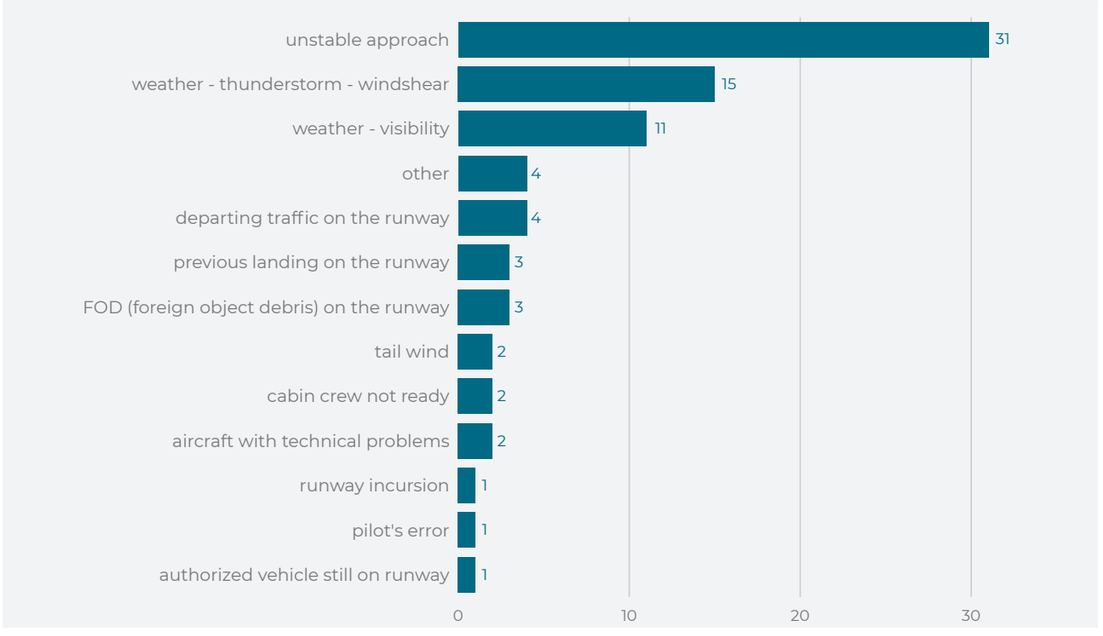


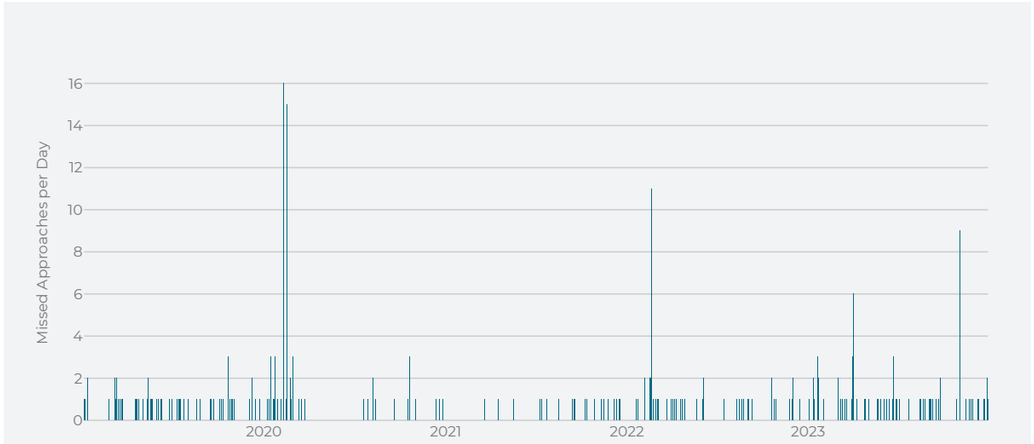
Figure 2.2*: Missed approaches per cause in 2023*



It is worth noting that unstable approach and thunderstorm-windshear have consistently been the main causes of missed approaches in previous years. In 2022, these factors accounted for 72% of all missed approaches, or a combined total of 38 instances. In 2021, unstable approach and thunderstorm-windshear accounted for 40% of missed approaches. In 2020, they accounted for 85% of missed approaches, while in 2019 they accounted for 68%.

Figure 2.3 shows the number of missed approaches per day since 2019. The peaks in February 2020 were caused by the already mentioned Ciara and Dennis storms. In 2023 there was a peak of 9 occurrences on the 2nd of November all due to weather (thunderstorm-windshear). A second peak occurred the 2nd of April, with 6 missed approaches, 5 of them due to weather (visibility) and one due to unstable approach.

Figure 2.3: *Missed approaches per day*



Further details can be found in the ***annex***, which shows the main causes for missed approaches for each runway in ***Table A.1.*** Each table shows the number of missed approaches per year and cause. Most missed approaches were registered on runway 24 (56 missed approaches), being the most used runway. The main reason for a missed approach on this runway was unstable approach (with 22 occurrences) followed by weather- thunderstorm-windshear (with 15 occurrences)

Runway Incursions

According to ICAO Doc 4444 – PANS–ATM, a Runway Incursion (RI) is defined as "Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft.

AMC 3 of EU Reg 2019/317 defines the "incorrect presence" as "the unsafe, unauthorised, or undesirable presence, or movement of an aircraft, vehicle, or pedestrian, irrespective of the main contributor (e.g., ATC, pilot, driver, technical system)".

Figure 2.4 gives an overview of runway incursions and their severity, along with the number of movements per year. It is the second consecutive year with only indirect contribution on the Runway Incursions in Charleroi Airport .

For more details, ***Figure 2.5*** gives a monthly overview of the runway incursions in 2023. Brussels South Charleroi Airport experienced six instances of runway incursions in 2023, with three being categorized as E-severity incidents and the other three as N-severity incidents. The E-severity occurrence from February was a situation where an aircraft landed on the runway without clearance from the controller. The one in June was an aircraft which was instructed to line up for departure after an arrival but lined up on the runway after the previous departure, generating a missed approach. The last E occurrence took place in October and resulted from an aircraft crossing a red stop-bar without ATC clearance. Two of the runway incursions were linked to the phraseology to holding point NB and remedial action is ongoing .

Figure 2.4: *Runway incursions per severity category and year*

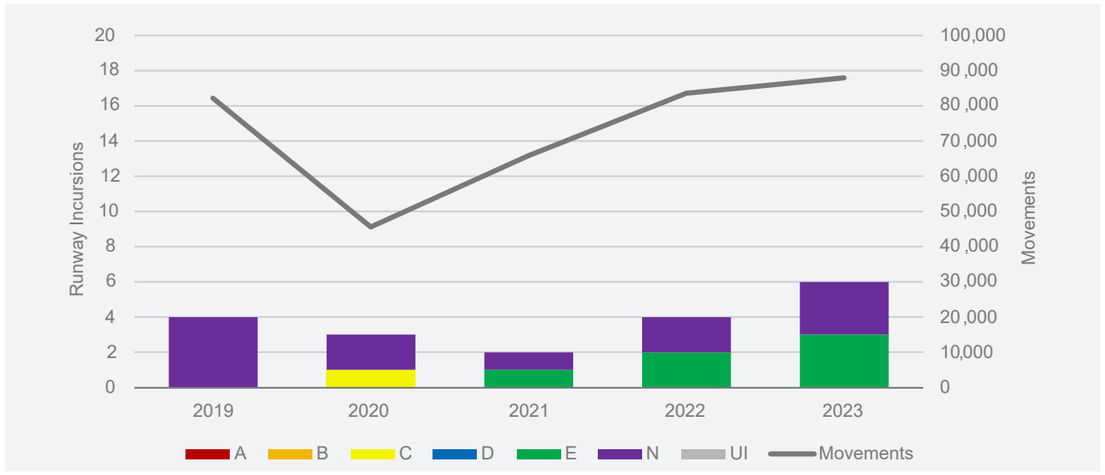


Figure 2.6 allows to put the numbers above in perspective, by comparing the ratio of runway incursions per 100,000 flights, per year. The total ratio of runway incursions for 2023 is higher than in 2019 and 2022, with almost seven runway incursions per 100,000 movements. The ratio of runway incursion with ATM contribution increases to 3.4 runway incursions per 100,000 movements compared to 2.4 in 2022, 1.5 in 2021, 2.2 in 2020 and 0 in 2019. There can be several factors explaining this increase. A better reporting culture or the implementation of the A-SMGCS can be a factor increasing the number of reports.

Figure 2.5: *Runway incursions per severity category and month in 2023*

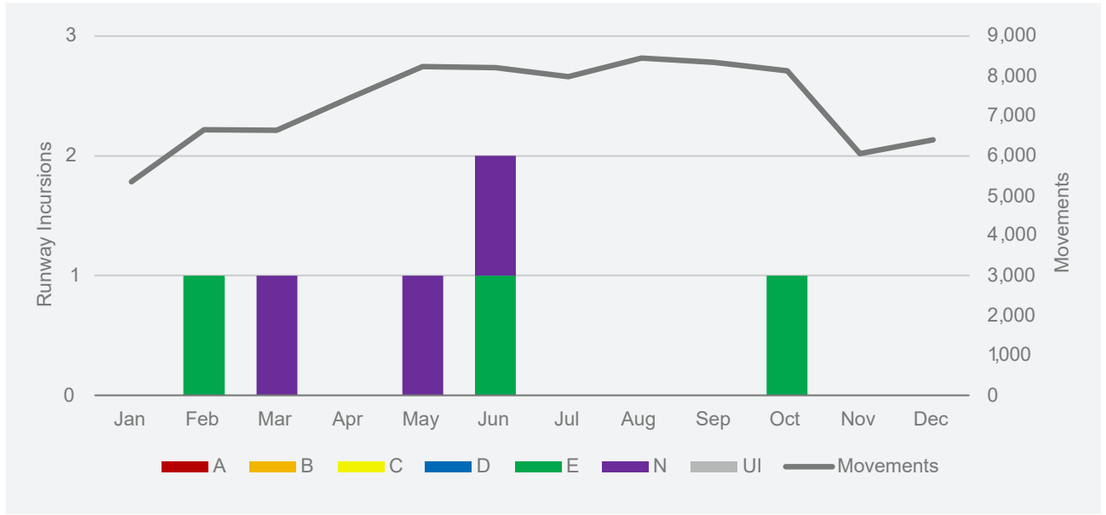
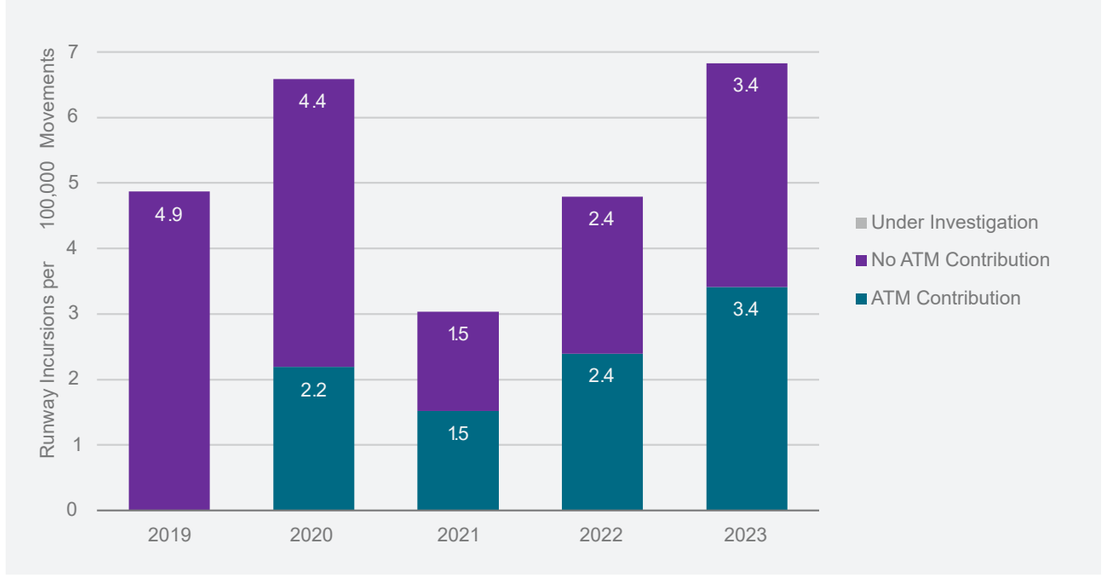


Figure 2.6: *Ratio of runway incursions per 100,000 movements per year*

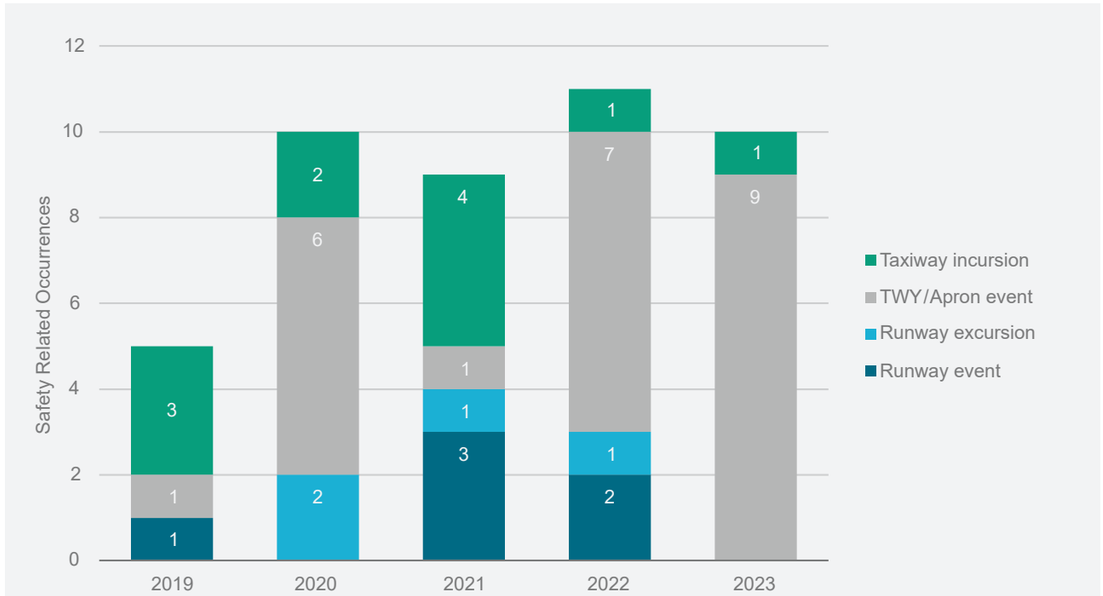


Other Noteworthy Incidents

Other safety occurrences are discussed in this section. In addition to runway incursions, other runway incidents can happen and must be reported, such as runway events, runway excursions, taxiway/apron events, taxiway excursions and taxiway incursions. ***Figure 2.7*** gives a summary of those incidents in Brussels South Charleroi Airport, per year.

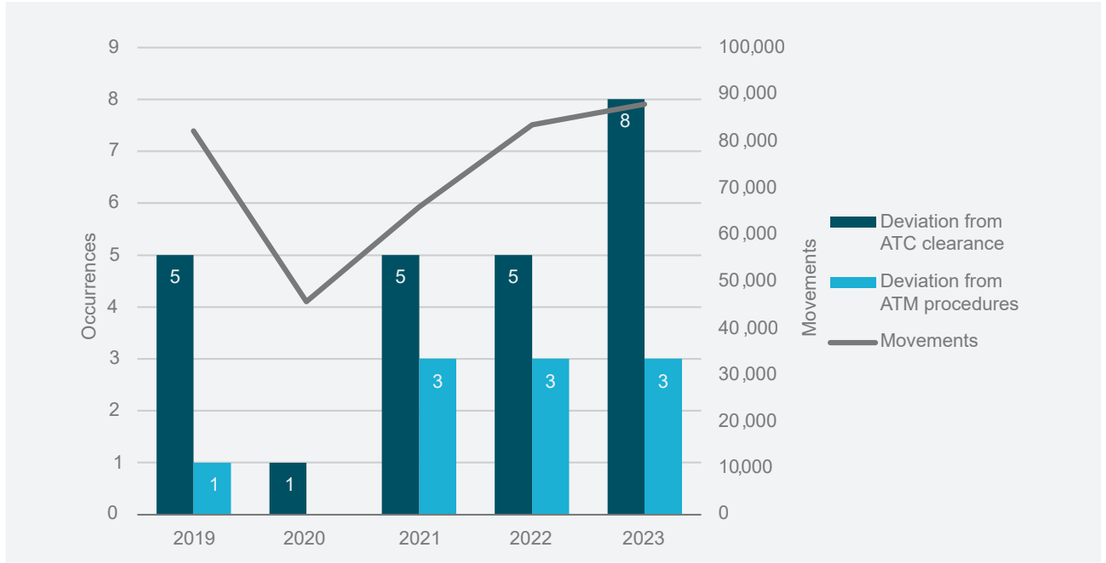
In 2023, there were ten events: nine taxiway/apron events and one taxiway incursion. The taxiway incursion, classified as N (no ATM ground contribution), concerned a vehicle entering the taxiway without clearance. Six of the taxiway/apron events were also classified as N (no ATM ground contribution), and three were classified as E (no safety effect). Two were considered to have direct skeyes contribution and one with indirect contribution. The increase on TWY/Apron events can be due to two factors: a growing reporting culture at skeyes and safety exchange with Ryanair, and the need to clarify ATS Guidance on apron.

Figure 2.7: *Incidents per type and year*



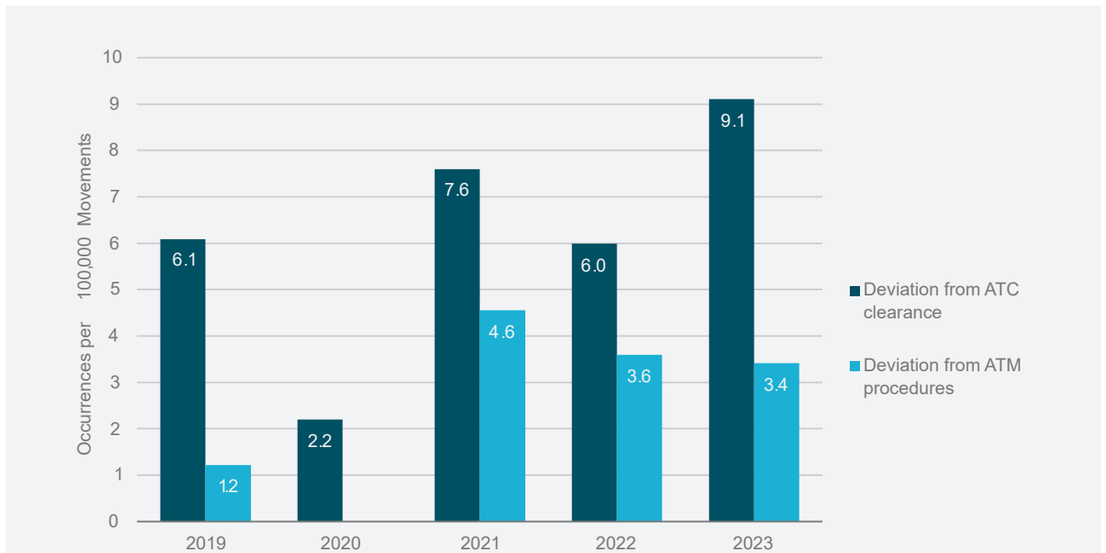
In 2023, there has been an increase of deviations from Air Traffic Control (ATC) clearance but a decrease of the rate of deviation from Air Traffic Management (ATM) procedures, see ***Figure 2.8*** and ***Figure 2.9***. Three of the deviations from ATC clearance were related to push-back clearance, three to deviations from ATC done by aircraft in Charleroi CTR and another two related to paradrop activities. The agreement with the paradrop site was updated, making it less complex, but there are still several coordination required and therefore errors are still possible.

Figure 2.8: *Deviations from ATM procedures and ATC clearance at Charleroi Airport per year*



With the traffic increase, the rate of reports concerning deviations from ATM procedures decreased compared to 2022 and 2021. On the other hand, the rate of reports concerning deviations from ATC clearance increased in 2023 compared to the previous years.

Figure 2.9: *Ratio of deviations from ATC clearance or ATM procedures*



Recommendations and Awareness

The Local Runway Safety Team (LRST), which meets every four months , is committed to increasing Runway Safety, and is composed of pilots, air traffic controllers and safety departments of skeyes and the airport. The main objective is to reduce the number of Runway Incursions based on EUROCONTROL's European Action Plan for The Prevention of Runway Incursions.

That is the moment where safety issues are discussed between partners. Also, outcomes of the safety investigations are shared among all the partners so that all parties may benefit from the lessons learned. When recommendations are made in an investigations report, these are also discussed with other stakeholders. If a recommendation from skeyes concerns the airport for instance, it will be discussed and agreed upon during an LRST meeting. For example, the two taxiway incursions that occurred in 2020 led to the development of new towing procedures. In 2023, the investigation reports proposed recommendations regarding the phraseology used for multiple line-ups and taxi.

skeyes designed a PBN (Performance Based Navigation) implementation and transition plan describing the way ahead to 2030. The purpose of the transition and implementation plan 2024/2030 is the establishment of a full PBN environment within the Belgian part of the Brussels FIR and at the aerodromes of Antwerp, Brussels, Charleroi, Kortrijk, Liège and Oostende. Once the full PBN environment is realized, an optimization of this PBN environment will be initiated. This comprises the redesign of airspace as well as the routes which can then be redesigned independently from the ground-based infrastructure and placed at the most strategically beneficial location. For Charleroi Airport, skeyes is currently implementing PBN procedures for all the runways and more specifically Required Navigation Performance (RNP) approach transitions to the ILSs. Such approach procedures fit in the on-going transition towards a PBN Environment (EU regulation), and greatly improve predictability and therefore situational awareness can be improved.

The Advanced-Surface Movements Guidance and Control System (A-SMGCS) at Charleroi Airport became operational in 2022 and the operational validation for its safety nets started in 2023. This radar monitoring tool provides air traffic controllers with the means to guide and control aircraft and ground vehicles, particularly in poor visibility conditions. It optimizes capacities while ensuring a high level of safety, which is expected to reduce runway incursions. The A-SMGCS acts as a safety net, enhancing the controllers' situational awareness by monitoring every target on the movement surface.

In addition, in 2023, skeyes implemented a common transition layer in all Belgian airspace to ensure 1,000 ft separation between traffic below and above this layer (the transition layer separates traffic which vertical position is defined based on local altitude and traffic which vertical altitude is defined based on Average Sea Level). This is in line with ICAO DOC 7030 EUR and Commission Implementing Regulation (EU) 2020/469 of 14 February 2020.

Airport Capacity

Punctuality

CAPACITY & PUNCTUALITY

This chapter addresses the airport capacity and punctuality. In a first section, the declared capacities for different runway configurations are given along with a view on the effective utilisation of this capacity.

In the second section, the punctuality at Brussels South Charleroi Airport is studied. The arrival delay, delay due to regulations placed by Brussels South Charleroi Airport on the arrivals, is analysed and the ATFM delay from the airport's point of view is given, i.e., the impact on traffic to or from Brussels South Charleroi Airport caused by regulations not only at Brussels South Charleroi Airport, but also in the Belgian en-route airspace and by other Air Navigation Service Providers (ANSPs).

Airport Capacity

The capacity of an aerodrome, i.e., how many operations can be handled in a certain amount of time, is influenced by several factors including the airport layout, the fleet mix of the arriving and departing traffic, ATC procedures, weather conditions and technological aids.

For optimal conditions, a theoretical measure of the capacity is calculated per runway configuration of the airport: This **Theoretical Capacity Throughput**, which determines the average number of movements (arrivals and/or departures) that can be performed on the runway system within one hour, is calculated considering certain assumptions of optimal conditions:

- *There is a continuous supply of arrivals and/or departures.*
- *Simultaneous Runway Occupancy (SRO) is prohibited (air traffic control rule).*
- *The Safe Wake Vortex Separation distance between two flights has to respected at all times (air traffic control rule).*
- *The fleet mix is static (i.e., types of aircraft do not change).*
- *Approach and departure procedures do not change.*
- *Conditions of flying and service provision are optimal (weather, staffing, etc.).*

For the calculation of the Theoretical Capacity Throughput, on top of the above-mentioned assumptions, the following parameters have been considered:

- *The fleet mix of the busiest month in 2018 is taken as reference.*
- *A nominal radar separation of 3NM.*
- *A loss factor of 15% is considered for inter arrival times, which accounts for the fact that controllers rather want to err on the right side when separating aircraft.*
- *The average Runway Occupancy Time for Arrivals (ROTA) is based on assumptions.*
- *The average approach speed is 136 knots (based on measurements).*
- *The average headwind differs per runway and is subtracted from the average approach speed.*
- *The inter-departure-time is a function of the between take-off-clearance delivery and the aircraft reaching a given altitude.*

Since the safe wake vortex separation distance between two flights, which is one of the inputs of the theoretical model, is only declared for IFR flights, the Theoretical Capacity Throughput also just indicates to the maximum number of IFR movements that an aerodrome can handle per hour with a specific runway configuration under optimal conditions.

In practice, such optimal conditions are rarely reached. Therefore, the declared capacity is set at 90% of the optimum. As it only represents the capacity of IFR flights it is also referred to as "**Declared IFR Capacity**". ***Table 3.1*** shows the declared capacity at Brussels Airport for most of the used runway configurations. Note that this is only a theoretical calculation and currently not used for schedule coordination purposes.

Table 3.1: *Declared IFR capacity*

Runway Configuration		Declared IFR Capacity (movements/hour)		
Departures	Arrivals	Only Departures	Only Arrivals	Mixed Fleet
06	06	27	30	42
24	24	29	33	42

Figure 3.1 and ***Figure 3.2*** provide an easy way to visually inspect if the declared capacity has ever been exceeded. In these plots, each dot represents a rolling hour throughout the year of 2023 (with a roll step of one minute), during which the runway configuration was active for at least an hour within the default opening times of the aerodrome and during which there was at least one movement . The position of the dot indicates the number of arrivals (y-axis) and the number of departures (x-axis). The opacity of the dot indicates if there were many or few hours with this number of arrivals and departures, with more translucency indicating less hours. The histograms on the sides show the distributions of arrivals and departures. The declared capacity is shown by a diagonal red line: At any point on this line, the x-axis value (departures) and y-axis value (arrivals) will add up to the threshold number (total movements). Any dot above this line indicates an hour exceeding the declared capacity. Note that this capacity is usually only declared for IFR movements, yet this plot considers both IFR and VFR movements. This is because only considering IFR flights would give a distorted view on the number of hourly movements – especially for airports with high VFR shares. Helicopter movements are not included, as they don't land on the runways of the configurations, but missed approaches are. The notation for the runway configurations in this report always mentions the departure runways first and the arrival runways, separated by a hyphen, afterwards.

If the maximum number of movements within an hour exceeds the declared capacity, this can be due to several reasons. For instance, a high share of VFR traffic could be the cause: Since the separation minima do not apply strictly to these flights, more movements can be performed within an hour. Other possible explanations include that the declared capacity was exceeded because of an exceptional deviation from safety margins, that there were many missed approaches (they count as two movements in little time), among other possibilities.

Figure 3.1 shows the hourly movements for runway configuration 24 – 24 in 2023. The maximum movements registered during an hour were 55, whereas the declared capacity is 42 movements per hour. As explained before, this declared capacity is calculated for IFR flights, but VFR are also considered in the visual.

Figure 3.1: *Hourly movements and declared capacity for runway configuration 24- 24 in 2023.*

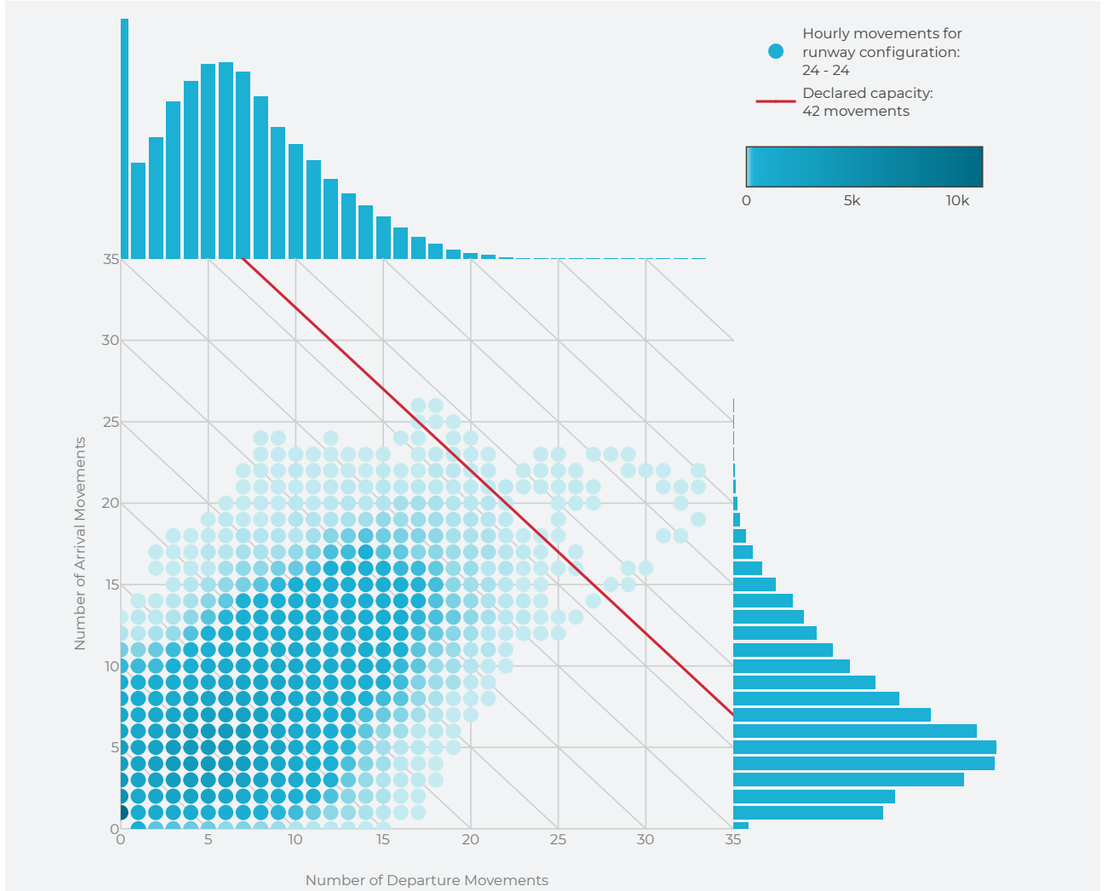
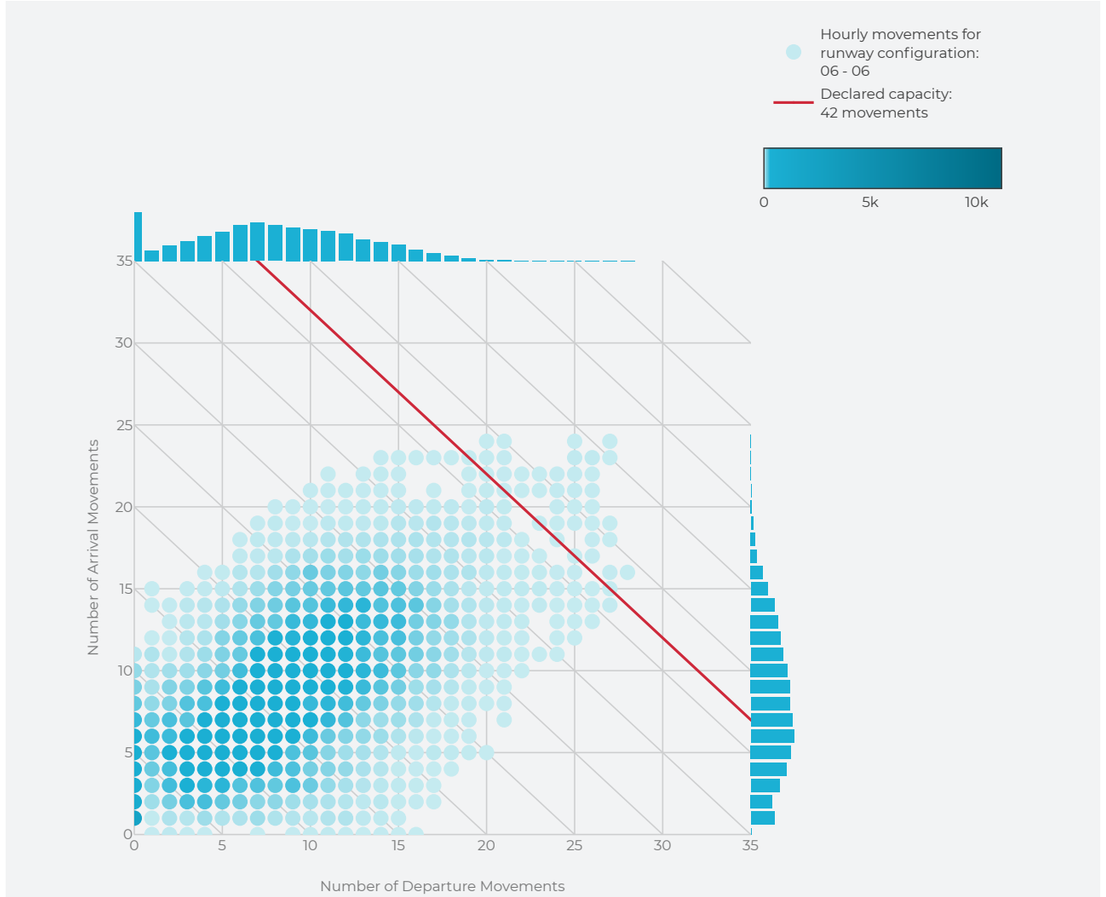


Figure 3.2: *Hourly movements and declared capacity for runway configuration 06- 06 in 2023.*



In Figure 3.2 the same exercise is done for runway configuration 06-06. ***Figure 3.2*** shows that with mixed (IFR and VFR) traffic, the maximum movements in an hour reached in 2023 was 51 movements, exceeding the declared capacity (42 movements/hour).

As seen in the figures above, there were some hours in 2023 when the declared capacity was exceeded. ***Table 3.2*** includes a list of every day where capacity has been exceeded at least once during the year, along with the extreme values (minimum/maximum) over capacity. It should be noted that during the hours where the declared capacity was exceeded, there was a high percentage of VFR movements (a minimum of 70% of the traffic was VFR during these periods), which do not require IFR separation rules, allowing for a higher throughput of traffic to be achieved. The mix of traffic (arrivals and departures) was balanced during these periods over capacity (always between 40% and 60% ARR-DEP distribution).

Table 3.2: *Days with hours exceeding the capacity per runway configuration in 2023*

Runway Configuration		Date	Extra Movements		% IFR		% Departures	
Departures	Arrivals	2023	min	max	min	max	min	max
06	06	Mar. 1	1	9	14%	20%	48%	57%
		May. 19	1	5	9%	23%	45%	64%
24	24	Feb. 13	1	13	7%	30%	47%	66%
		Mar. 4	1	6	16%	26%	49%	60%
		Mar. 17	1	1	12%	14%	49%	51%
		Apr. 25	1	6	19%	25%	47%	57%
		Nov. 23	1	3	13%	16%	49%	51%
		Nov. 29	1	2	16%	21%	40%	45%

Punctuality

Punctuality can be seen as a service quality indicator from a passenger perspective. This section observes one of the factors that influences punctuality: Air Traffic Flow Management (ATFM) delay. ATFM delay is defined as the time difference between estimated take-off time and calculated take-off time of the Network Manager (EUROCONTROL) and is due to ATFM measures that are classified according to the causes listed below:

A - Accident
C – ATC Capacity
D - De-icing
E - Equipment (non-ATC)
G – Aerodrome Capacity
I - Industrial Action (ATC)
M - Airspace Management
N - Industrial Action (non-ATC)
P - Special Event
R – ATC Routeing
S – ATC Staffing
T - Equipment (ATC)
V – Environmental Issues
W - Weather
NA - Not Specified
Other

The ATFM measures with Air Navigation Service Provider (ANSP) contribution are listed according to the Functional Airspace Block Europe Central (FABEC) performance plan:

C – ATC Capacity
R – ATC Routeing
S – ATC Staffing
T - Equipment (ATC)
M - Airspace Management
P - Special Event

In the remainder of the report, all causes with ANSP contribution are referred to as CRSTMP. Additionally, the measures due to W – Weather are split in a separate category, resulting in three aggregated categories: CRSTMP, Weather and Other categories.
The discussion in this section starts with the key performance indicator: arrival delay. The Airport Arrival ATFM Delay is an indicator of ATFM delays on ground for a flight due to a regulation placed by the airport of arrival. In addition, this section gives an overview of the influence of ATFM measures on traffic arriving to or departing from Brussels South Charleroi Airport.

Airport arrival ATFM delay

As of January 1st, 2015, skeyes is subject to an annual target with regard to ATFM arrival delay. ATFM arrival delay is the delay of a flight attributable to terminal and airport air navigation services and caused by restrictions on landing capacity (regulations) at the destination airport. The average minutes of arrival ATFM delay per flight is a performance indicator in accordance with the European Performance Regulation (EU) no 317/2019, Annex 1, section 1, §3.1(b). This indicator is the average time, expressed in minutes, of arrival ATFM delay per inbound IFR flight and is calculated for the whole calendar year. The indicator includes all IFR flights with an activated flight plan submitted to the Network Manager landing at the destination airport and covers all ATFM delay causes excluding exceptional events.[7]

Targets are set on a national level and on an airport level, where the national target is the aggregation of the airport targets. For reference period 2, 2016-2019, the national target was 0.10 minutes/flight, and Brussels Airport and Liège Airport were considered as contributing airport. For reference period 3 (RP3), 2020-2024, the national target was initially 1.82 minutes/flight for all causes and 0.17 minutes/flight for CRSTMP causes with Brussels Airport the only contributing airport. However, due to the unexpected impact of COVID-19 on the air traffic, the European Commission requested a revision of Union-wide performance targets for RP3. The current proposal only includes arrival delay targets for Belgium as of 2022 (1.08 minutes/flight all causes and 0.12 minutes per flight for CRSTMP causes), and the only contributing airport remains Brussels Airport.

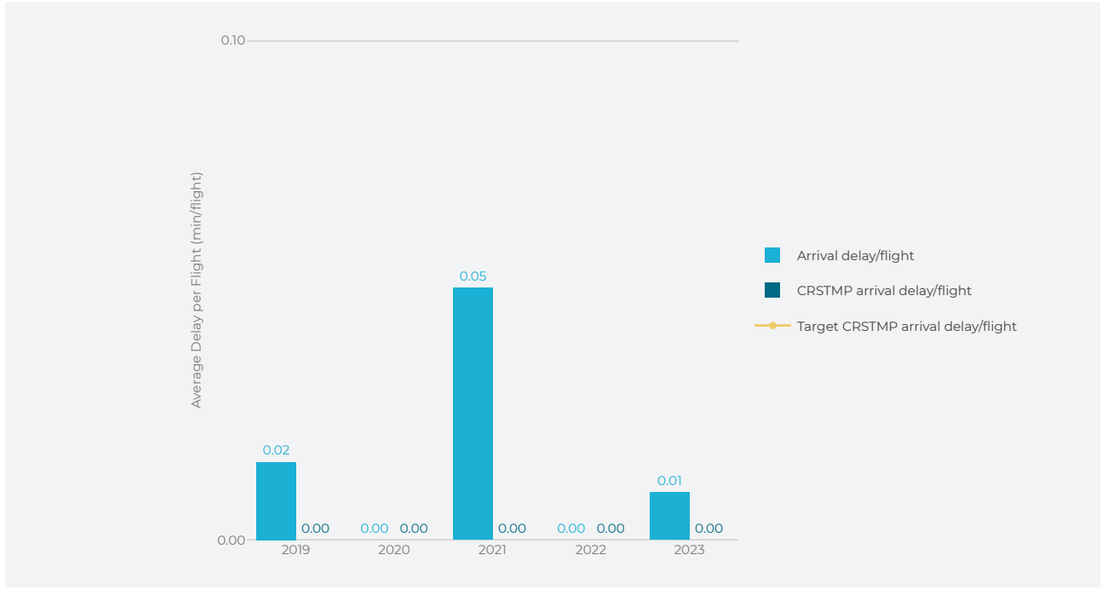
Despite not having its own target, skeyes registers the arrival delays for Brussels South Charleroi Airport as part of a continuous monitoring of the ANSP's performance and internal performance indicator. This indicator is the average time, expressed in minutes, of arrival ATFM delay per inbound IFR flight and is calculated for the whole calendar year. The indicator includes all IFR flights with an activated flight plan submitted to the Network Manager landing at the destination airport and covers all ATFM delay causes excluding exceptional events[8] .
The number of arrivals and the arrival delay for the performance indicator for the years 2019 to 2023 are given in ***Table 3.3***. The average arrival delay per flight is calculated by dividing the sum of arrival delay with ANSP contribution by the number of total flights calculated by the Network Manager (EUROCONTROL). Both the arrival delay and the included flights are provided by the Performance Review Unit (EUROCONTROL)[9] This performance indicator is given in ***Figure 3.3*** below.

7. EUROCONTROL, SES Performance Scheme Reference Period 3 (2020-2024), 2022, https://www.eurocontrol.int/prudata/dashboard/metadata/rp3/ (URL retrieved on 07/02/2024)
8. European Commission, "Regulations," Official Journal of the European Union, p. 67, 2019
9. Note that in chapter 1, movements are defined by the AMS and the BCAA criteria. In this chapter, the Network Manager (EUROCONTROL) is taken as source for traffic numbers and only accounts for flights with a registered flight plan.

Table 3.3: *Number of IFR arrivals and minutes of arrival ATFM delay per reason and per year (considering IFR arrivals with an activated flight plan submitted to the Network Manager)*

	Minutes of ATFM Arrival Delay				IFR Arrivals
Year	CRSTMP	Weather	Other categories	Total	(with flight plan)
2019	0	0	426	**426**	27,347
2020	0	0	0	**0**	12,397
2021	0	0	836	**836**	16,561
2022	0	0	0	**0**	28,734
2023	0	0	285	**285**	30,129

Figure 3.3: *Yearly arrival delay KPI (rate of ATFM delay per IFR arrival) target and actual*



In 2023, 285 minutes of delay were registered by the Network Manager at Brussels South Charleroi Airport due to 'G-Aerodrome Capacity' (airport electrical issues) and 'A-Accident/Incident' (security issue in the terminal due to a bomb threat). This is an average of 0.01 minutes per flight. In 2022 there were zero minutes of arrival delay, but in 2021, a total of 836 minutes of delay at the airport due to 'N-Industrial Action' (non-ATC).

All ATFM impact on traffic at Brussels Airport

In this section of the report, the ATFM delay for all departing and arriving traffic in Brussels South Charleroi Airport is analysed. The impact of ATFM measures go beyond the restrictions placed by the airport of destination. Flights departing from and arriving at an airport can be delayed by ATFM measures in any of the sectors they cross on their route. The impact of all these regulations gives the total ATFM delay of the airport.

Figure 3.4 and ***Figure 3.5*** show the total ATFM impact for all traffic arriving and departing (respectively) in Brussels South Charleroi Airport for the years 2019 to 2023. In 2023, a total of 113,698 minutes of delay was generated on arrivals, thereof, 4% (4,569 minutes) is attributable to skeyes, while 96% (109,129 minutes) is attributable to other ANSPs. For departing traffic, a total of 120,130 minutes of delay was generated, of which, 2% (2,025 minutes) is attributable to skeyes, while 98% (118,105 minutes) is attributable to other ANSPs. This is 4% less total delay on arrivals and 5% less total delay on departures than in 2022 (having 5% more arrivals and departures in 2023).

The impact of all these regulations gives the total ATFM delay of traffic at Brussels South Charleroi Airport. Traffic at Charleroi Airport was mainly impacted by ATC disruptions due to weather related reasons, capacity and industrial actions (ATC) in France during the summer. Other events that impacted the punctuality in Charleroi Airport were the trials for the implementation of 4-Flight in France (4-Flight is the new ATM system that will be implemented by the French ANSP for their traffic management) or the implementation of iCAS (also a new ATM system) in Germany. Some regulations were put in place to protect the different French airspaces, but also the neighbouring countries. The low numbers in 2020 and 2021 can be explained by the large traffic decrease worldwide caused by the COVID-19 pandemic. The air traffic network had many bottlenecks, which were not suited for the traffic volumes of the previous years and, therefore, causing much delay. With the removal of these bottlenecks due to the low traffic, local factors, such as weather at the airport, became the most dominant factors in terms of delay. Hence, the very low amount of delay perceived in 2020 and 2021.

Figure 3.4: *ATFM delay for IFR arrivals per year and delay origin*

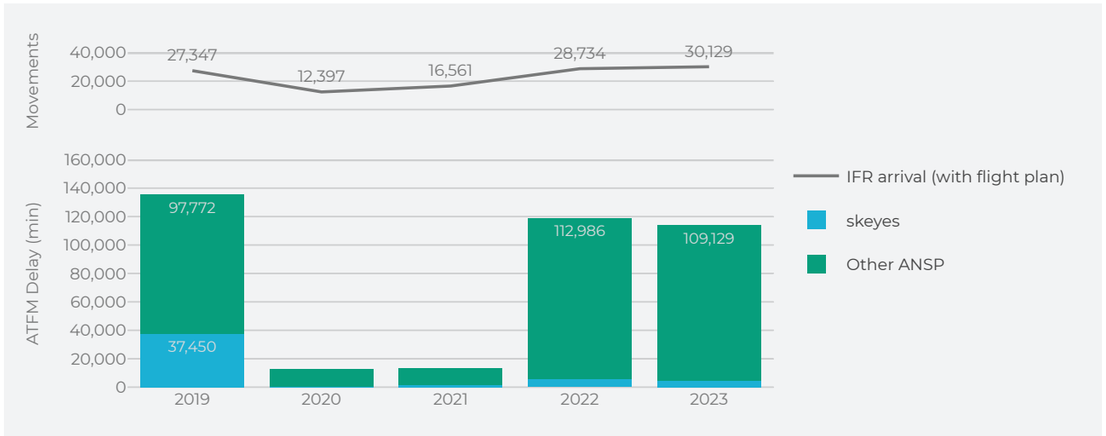
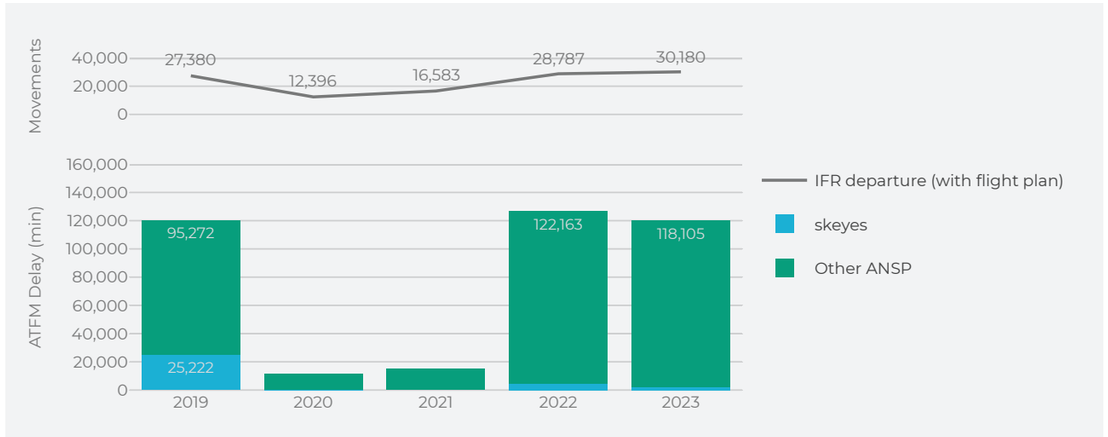


Figure 3.5: *ATFM delay for IFR departures per year and delay origin*



In total, in 2023, 6,795 arrivals and 6,911 departures were impacted by ATFM delay. These can be categorised by severity, based on the duration of the delay. There are four categories:

- *Between 1 and 15 minutes*
- *Between 16 and 30 minutes*
- *Between 31 and 60 minutes*
- *More than 60 minutes.*

The figures below (***Figure 3.6*** and ***Figure 3.7***) show that 57% of the delayed arrivals and 52% of the delayed departures were delayed for a maximum of 15 minutes. 3% of the delayed departure and arrival flights had a delay above one hour.

Figure 3.6: *Delayed IFR departures per category of delayed time in 2023*

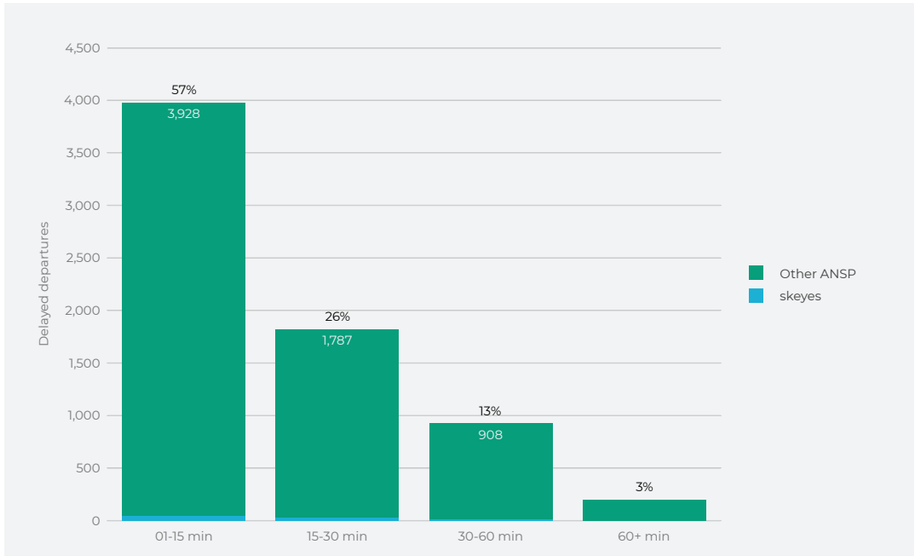
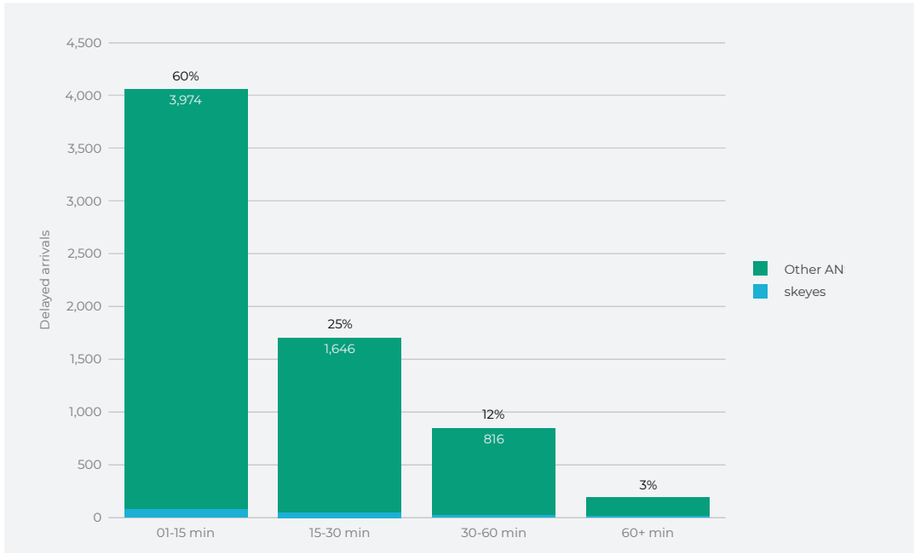


Figure 3.7: *Delayed IFR arrivals per category of delayed time in 2023*



Preferential Runway System (PRS)

Continuous Descent Operations (CDO)

Night Movements

Wind Pattern

Considerations and Improvements

ENVIRONMENT

The first part of this chapter is dedicated to the runway configuration scheme in use at Brussels South Charleroi Airport. The airport is geographically located near populated areas, it is therefore all the more important to consider noise and its reduction, as far as possible, in the vicinity of the airport. For that purpose, a monthly and yearly overview of the use of the Preferential Runway System (PRS) is included in this chapter. Considering that wind is a predominant factor in the choice of runway use, wind data is provided in this section.

The second part focuses on Continuous Descent Operations (CDO). The objective of CDOs is to reduce aircraft noise, fuel burn and emissions by means of a continuous descent, to fly the approach glide path at an appropriate altitude for the distance to touchdown. skeyes put in place indicators to monitor the use of CDOs, in collaboration with the other members of FABEC.

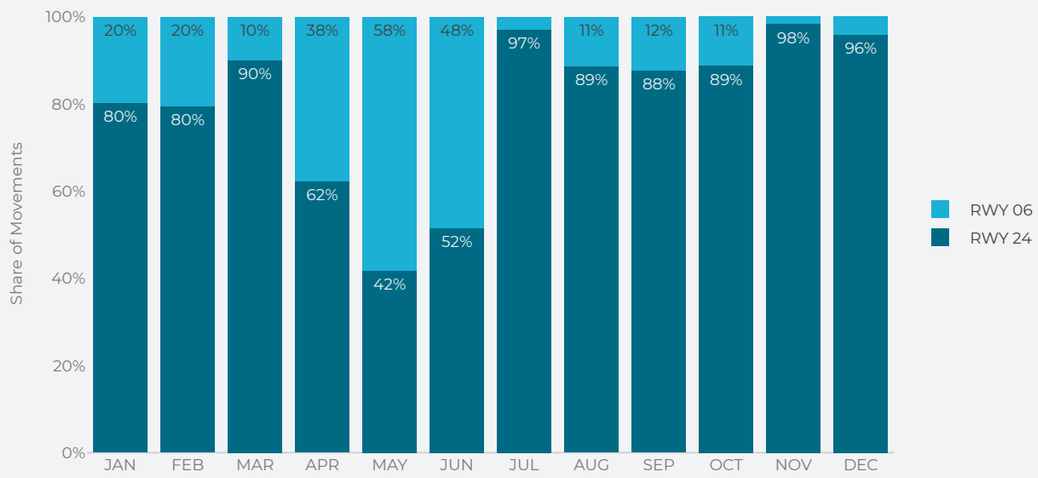
Night movements are also part of this chapter.

Preferential Runway System (PRS)

According to the Aeronautical Information Publication (AIP) for Brussels South Charleroi Airport, runway 24 shall be used as preferred runway for take-off and landing in case it is dry and the cross or tailwind components do not exceed ten and eight knots, respectively. When the runway is wet, the maximum tailwind threshold is five knots. For safety reasons, if one of the above-mentioned criteria is not met, the Preferential Runway System (PRS) will not be followed and the most suitable runway in the given case will be used.

The runway use was already discussed in ***Chapter 1.Traffic***, in ***Figure 1.9*** and ***Figure 1.10.*** They show the runway usage per year for the period from 2019 until 2023 and the runway use per month in 2023. These fractions are based on the number of movements on each runway. In 2023, 79% of the movements used the preferential runway.

Figure 4.1: *Runway use (based on % of movements)*

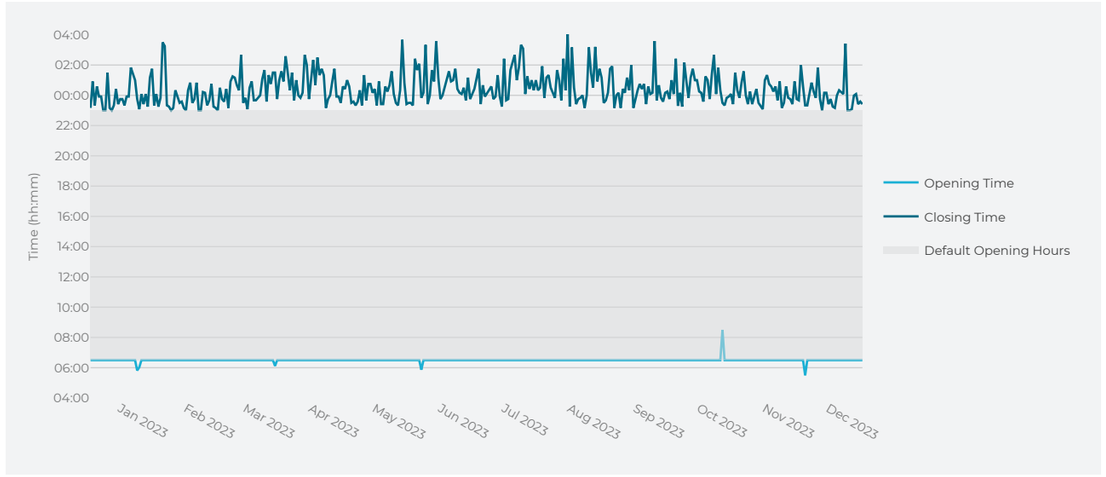


Opening times and night movements

The usual operational opening hours of Brussels South Charleroi Airport are from 06:30 until 23:00 local time. Several reasons can lead to adapted opening and/or closing times, as for example works at or in the vicinity of the airport, or aircraft arriving outside those defined hours. In the latter case, air traffic services operational hours are extended until the last flight has landed.

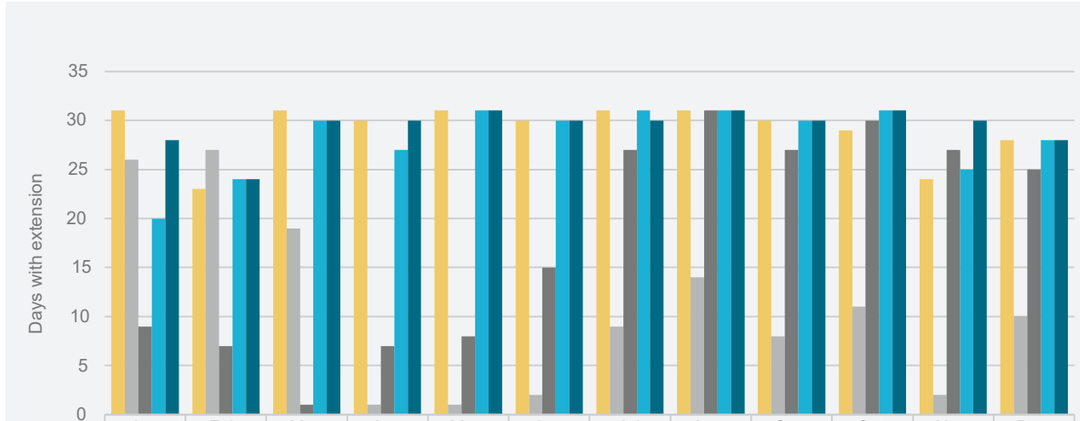
A visualisation of the opening hours is given in ***Figure 4.2*** below. It can be seen that there are often extensions of the opening hours in Charleroi Airport. Around Easter and between the months of May to October, the airport's closing time is frequently delayed to 00:00 or later, mainly due to late arrivals of Ryanair flights.

Figure 4.2: *Opening and closing times of Charleroi Airport in 2022*



In 2023, there were in total 353 days where the operational hours of the airport were extended. ***Figure 4.3*** shows the number of days with an extension of the opening times per month, for the years 2019 until 2023. The number of days with extension is close to 2022 levels with 338 days of extensions and 2019 with 349 days of extensions.

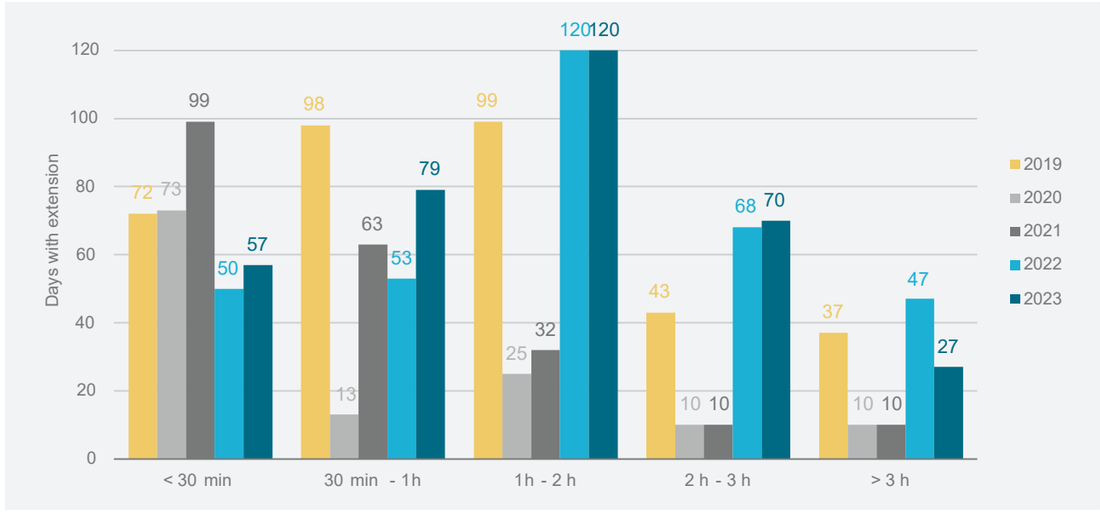
Figure 4.3: *Days with extension of operational hours in Charleroi Airport per year*



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2019	31	23	31	30	31	30	31	31	30	29	24	28
2020	26	27	19	1	1	2	9	14	8	11	2	10
2021	9	7	1	7	8	15	27	31	27	30	27	25
2022	20	24	30	27	31	30	31	31	30	31	25	28
2023	28	24	30	30	31	30	30	31	30	31	30	28

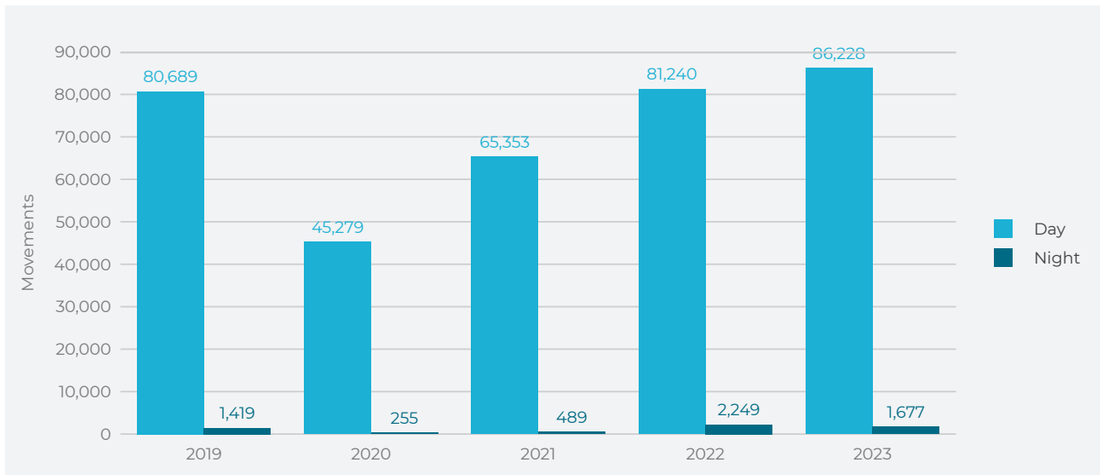
Figure 4.4 depicts the duration of those extensions, per category of time: <30 min, 30 – 60 min, 1 – 2 h, 2 - 3 h and >3 h . In 2023, most of the extensions, 120 occurrences representing 34% of the total, lasted between one and two hours. On 27 occasions (8% of the total) the opening times were extended by more than three hours.

Figure 4.4: *Duration of opening hours extensions in Charleroi Airport per year*



There is a strong correlation between the opening times and possible extensions and the number of night movements. The nighttime is defined as from 23:00 to 06:00 local time. ***Figure 4.5*** shows the number of movements separated between day movements and night movements for the years 2019 to 2023. During the night's hours, the movements are only traffic stationed in Charleroi Airport, as that is the agreement for requesting the extensions. Despite the increase on days with extensions, the night traffic in 2023 decreased by 25% compared to 2022 but remained higher than in 2019 by 18%.

Figure 4.5: *Yearly day and night movements*



The following graph and table show the distribution of hourly movements through the night (***Figure 4.6*** and ***Table 4.1***). It can be seen that night traffic has reduced compared to the previous year, especially at 23:00 (1,304 movements in 2023, a 22% less than in 2022). On the other hand, night traffic remains higher than in 2019, being the movements at 23:00 in 2023 a 13% higher than in 2019. Skeyes has been in coordination with airlines to provide better schedule adherence and therefore fewer night movements.

Figure 4.6: *Yearly night movements per hour (the hour indicates the start of the hour)*

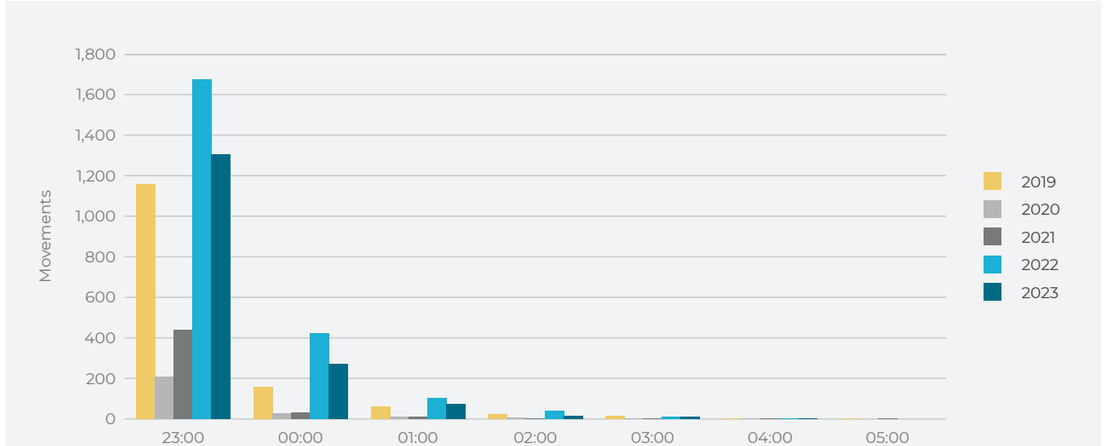


Table 4.1: *Yearly night movements per hour (the hour indicates the start of the hour in local time)*

Year	23:00	00:00	01:00	02:00	03:00	04:00	05:00
2019	1,158	159	61	24	13	2	2
2020	208	29	9	6	2	1	0
2021	439	33	10	3	1	2	1
2022	1,673	421	102	39	11	3	0
2023	1,304	270	74	16	12	1	0

Continuous Descent Operations (CDO)

A continuous descent operation (CDO) is an aircraft operating technique enabled by airspace design, instrument procedure design and facilitated by air traffic control to allow aircraft to follow an optimum flight path that delivers environmental and economic benefits (reduced fuel burn, gaseous emissions, noise and fuel costs) without any adverse effect on safety. A CDO allows arriving aircraft to descend continuously from an optimal position with minimum thrust. By doing so, the intermediate level-offs are reduced and more time is spent at more fuel-efficient higher cruising levels, hence reducing fuel burn (i.e., lowering emissions and fuel costs) and producing less noise[10].

A descent is considered as a CDO if no level off lasting more than 30 seconds is detected. A level off is considered as a segment during which the aircraft has a rate of descent of less than 300 ft/minute. Based on the recommendations made by EUROCONTROL, two CDO performance indicators were developed in 2016:

- *CDO Fuel: binary indicator (yes/no) indicating if a CDO was flown from FL100 to 3000 ft.*
- *CDO Noise: binary indicator (yes/no) indicating if a CDO was flown from FL60 to 3000 ft.*

For CDO statistics, a new 'CDO flag' has been incorporated, in order to consider only 'CDO-relevant' flights. The following criteria have been defined to flag a movement as CDO relevant:

- *It is an IFR arrival.*
- *The aircraft is not categorized as "light", meaning its maximum take-off weight (MTOW) is above 7000 kg.*
- *It is not a helicopter.*
- *It is not a military flight.*
- *It is not a Touch-and-Go, i.e. the flight does not involve landing briefly and taking off again.*
- *The observed altitude during the flight must be at or above FL 60 (6,000 ft or 1.8 km).*

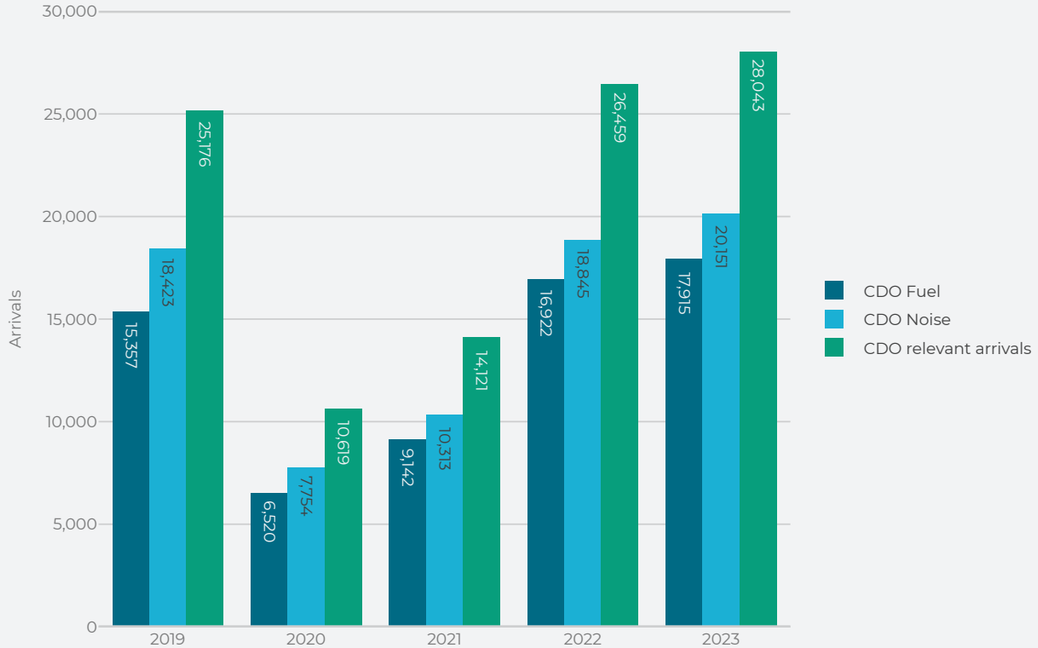
The total of CDO-relevant arrivals is therefore different than the number of arrivals provided in Chapter 1.

To increase the data consistency, historical CDO data is being updated on an annual basis. This measure ensures that all the CDO data, displayed in RWY Performance Report, has been calculated with the same CDO algorithm, providing more fairness & transparency in the historical evolution of CDO performance.

As shown in ***Figure 4.7***, in 2023 there were a total of 28,043 'CDO relevant flights. In total numbers, the number of CDO fuel and noise has increased compared to previous years, along with the CDO relevant arrivals which are higher in 2023 than in 2022 and 2019.

10. EUROCONTROL, "Continuous climb and descent operations," [Online]. Available: eurocontrol.int/concept/continuous-climb-and-descent-operations

Figure 4.7: *Yearly Comparison CDO Indicators*



In order to be able to compare the evolution of the use of CDOs over the years, ***Figure 4.8*** provides the rate of CDO fuel and CDO noise per year for runway 24 and runway 06. The overall CDO rates remain stable over the last years, despite the increase on traffic during the past two years . An increase of CDO relevant arrivals and mix with other type of traffic (VFR or light traffic) can have an impact on the arriving performance, including CDOs. For Charleroi airport, the addition of the CDO flag has generated a better picture of the CDO performance, as there is a big share of VFR traffic operating at the airport.

Figure 4.8: *Yearly CDO Noise Per Runway*

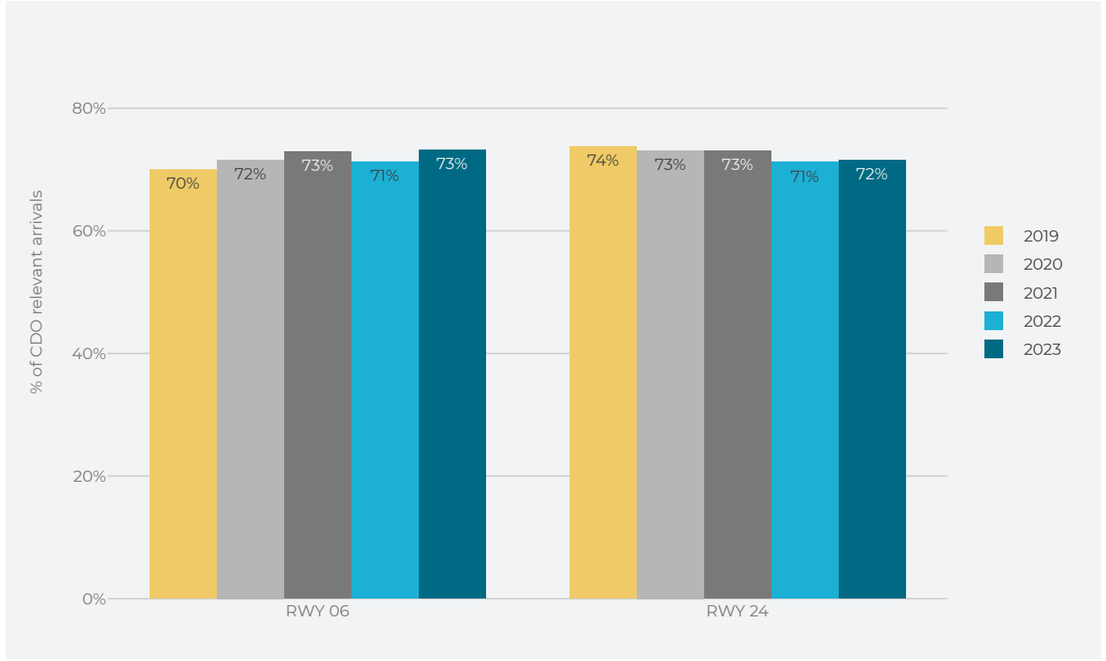


Figure 4.9: *Yearly CDO Fuel Per Runway*

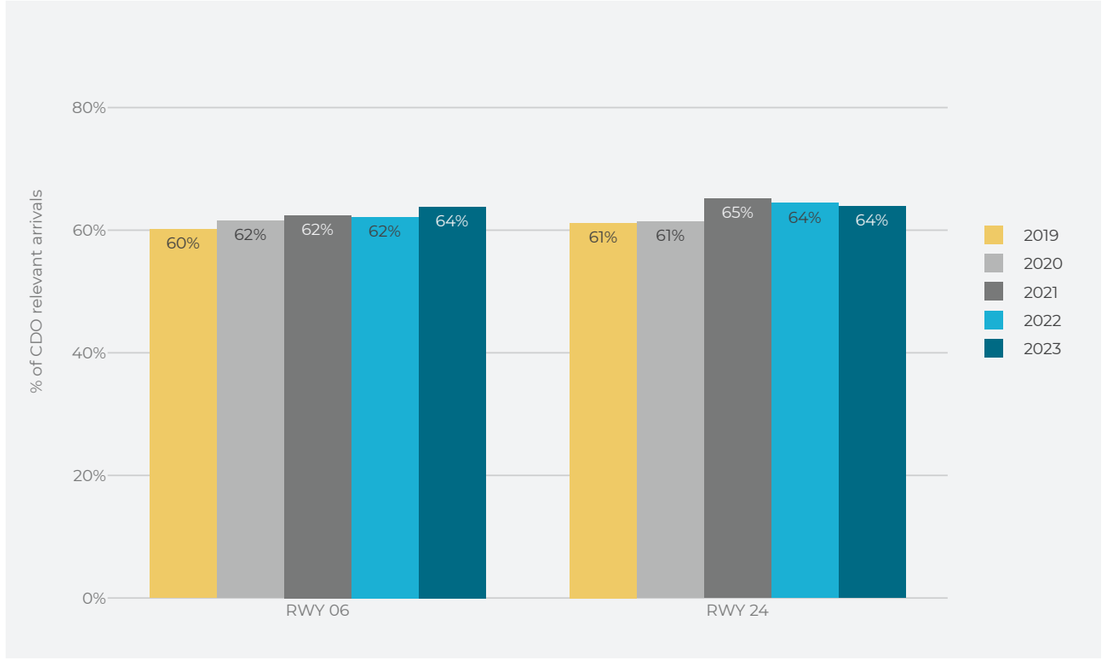
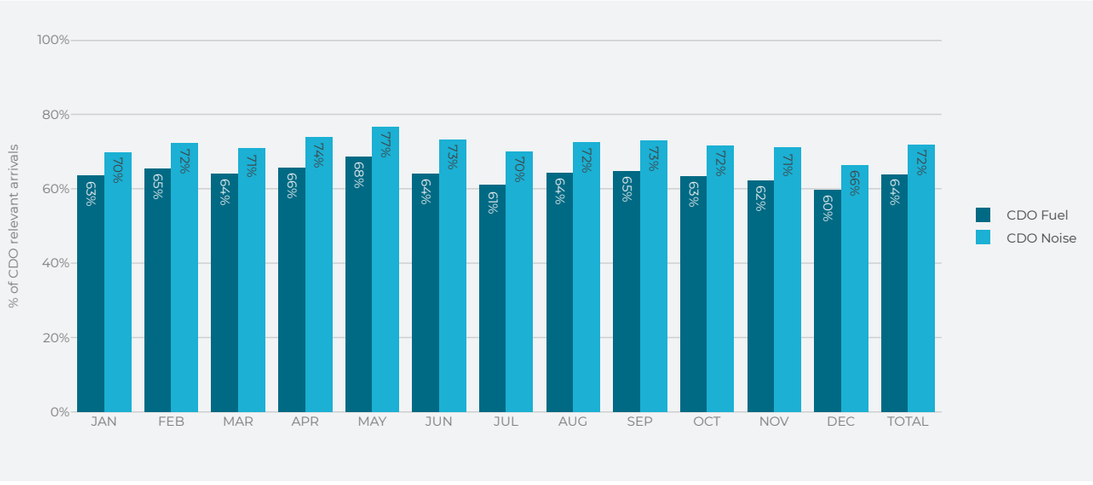


Figure 4.10 shows a view per month of CDO Fuel and Noise respectively. The lowest number of CDO rates in 2023 were in the months of December and July. A multitude of external factors influence CDO statistics, such as:

- *Pilots' CDO flying experience*
- *Pilots' experience with the airport*
- *ATC experience*
- *Equipment of the runway*
- *Aircraft type and equipment*
- *Military airspace being open or closed*
- *Traffic flows and traffic streams that can have an impact on the arriving traffic*

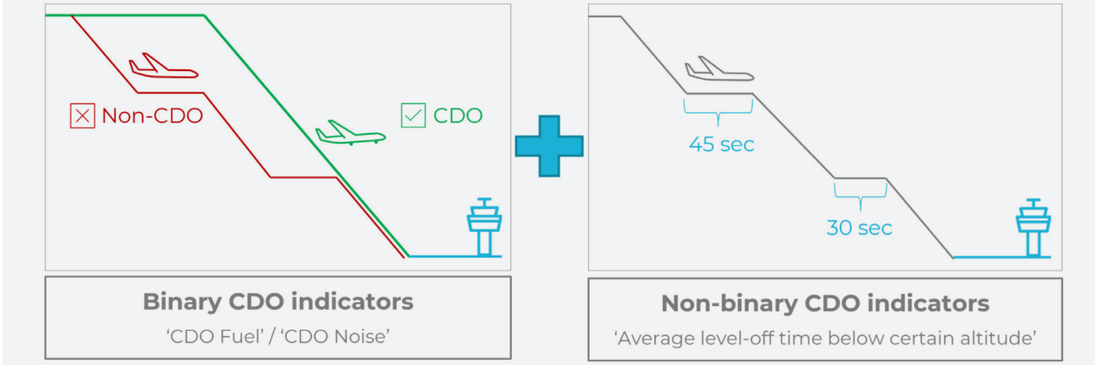
As a result, it is difficult to identify a single cause for an increase or decrease of the CDO statistics over a period.

Figure 4.10: *Monthly CDO indicators*



Runway Performance Report 2023 introduces a new CDO indicator known as **'Average level-off time below certain altitude'**. While 'CDO Fuel' and 'CDO Noise' categorize arrivals in a binary way (as CDO yes/no), the new indicator considers CDO performance in a non-binary means, delving into the duration during which an aircraft operates in level-off segment(s). The characteristics of binary and non-binary method of CDO measuring is also illustrated in the following figure:

Figure 4.11: *Binary/non-binary CDO indicator illustration*



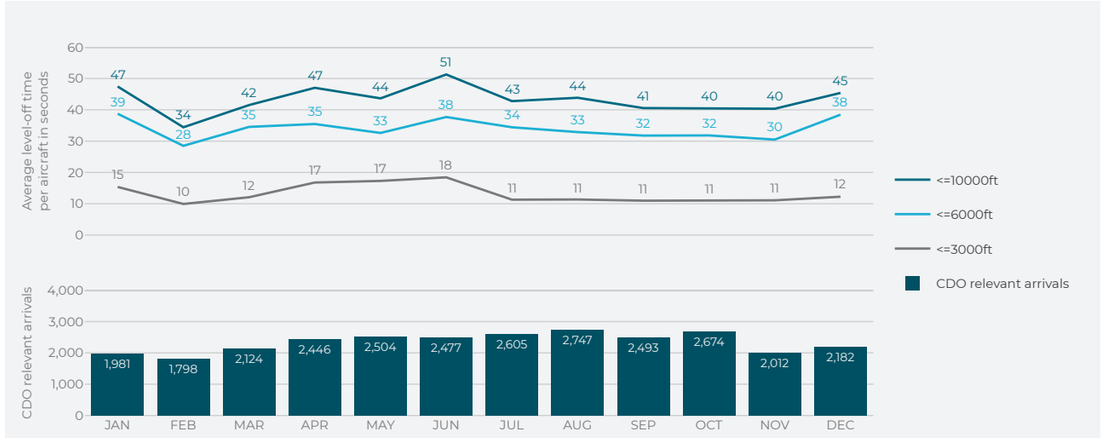
The **'Average level-off time below certain altitude'** indicator provides a value representing the average time a descending aircraft spends flying level-off within specific altitude ranges. In particular, three distinct altitude ranges are monitored:

- **10,000 ft to Ground (GND)**
  The upper boundary aligns with the altitude ceiling of 'CDO Fuel'
- **6,000 ft to GND**
  The upper boundary aligns with the altitude ceiling of 'CDO Noise'
- **3,000 ft to GND**
  This altitude range focuses on level-off segments in low altitudes, which are excluded from 'CDO Fuel' and 'CDO Noise'.

The development of the 'Average level-off time below certain altitude' indicator is based on recommendations from the European CCO/CDO Action Plan and EUROCONTROL ENV Transparency Working Group, emphasizing its alignment with industry best practices and standards.

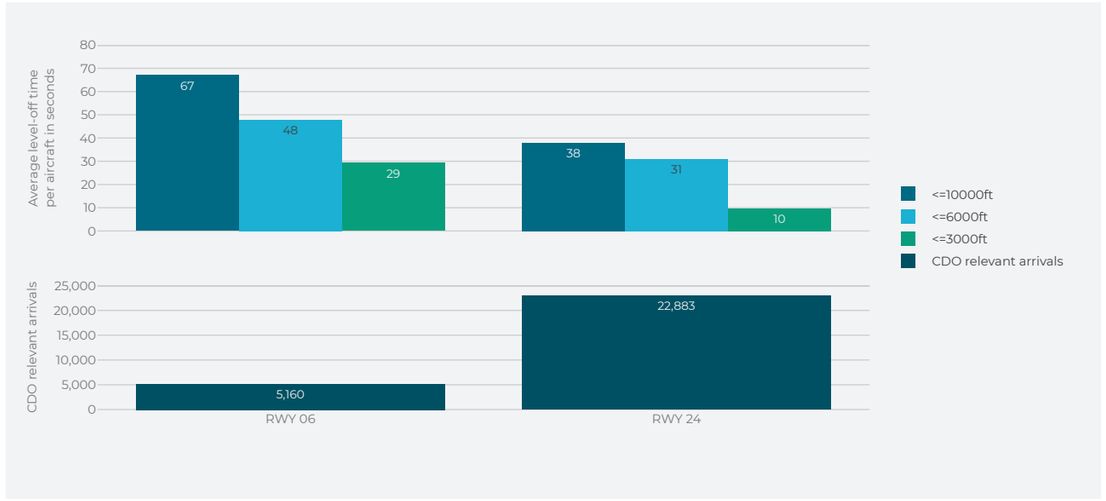
Figure 4.12 shows the monthly evolution of average level-off time in 2023, below the three monitored altitudes at Charleroi Airport. The chart is accompanied by the count of CDO relevant arrivals, considered for the calculation of the average values. A notable variation can be observed in the average level-off time at low altitudes (≤ 3,000 ft) between April and June 2023. During this period, there was an increased utilization of RWY 06 due to North-Easterly winds (***Chapter 1: Traffic***).

Figure 4.12: *Monthly average level-off time in 2023*



In ***Figure 4.13***, the distribution of average level-off time across runways (RWYs) in 2023 is depicted, along with the number of considered CDO relevant arrivals. It shows an almost threefold higher average level-off time at ≤ 3,000 ft for RWY 06 compared to RWY 24. However, on a broader scale, the overall usage of RWY 06 in 2023 was significantly smaller compared to RWY 24. Arrivals on RWY 24 demonstrated notably better performance in terms of the average time spent flying level-off across all monitored altitudes.

Figure 4.13: *Average level-off time per Runway*



To promote and facilitate the number of CDOs flown to Brussels South Charleroi Airport, different measures are investigated or have already been implemented:

- *skeyes monitors and adapts, where feasible, operations to enhance flight efficiency. As mentioned in the Recommendations and awareness section, skeyes designed a PBN implementation and transition plan describing the way ahead to 2030. The purpose of the transition and implementation plan 2024/2030 is the establishment of a full PBN environment within the Belgian part of the Brussels FIR and at the aerodromes of Antwerp, Brussels, Charleroi, Kortrijk, Liège and Oostende. Once the full PBN environment is realized, an optimization of this PBN environment will be initiated. This comprises the redesign of airspace as well as the routes which can then be redesigned independently from the ground-based infrastructure and placed at the most strategically beneficial location. For Charleroi Airport, since January 2023, the RNP approach on RWY 06 has been actively promoted via ATIS as the primary approach type. skeyes has been analysing its CDO performance, in comparison with other non-RNP approach types, and communicated the on-going results with Charleroi airport and the airlines to continuously improve the environment performance.*
- *Skeyes obtained the GreenATM level 3 accreditation in 2023. CANSO GreenATM is an environmental accreditation programme to provide air navigation service providers (ANSPs) with an independent, industry-endorsed, accreditation of their environmental efforts.*
- *skeyes is in contact with airlines presenting CDO statistics and communicating the phraseology, and is increasing awareness amongst ATCOs through courses, and by informing them of the current statistics and performance.*
- *As a member of FABEC, skeyes actively participates in workshops and initiatives to improve – amongst others – CDO performance.*
- *Additionally, the agreement on 'collaborative environmental management' (CEM) at Brussels South Charleroi Airport, continues to show benefits.*

Wind Pattern

One of the factors that play a main role in the selection of the runway is the wind direction and speed. This is also confirmed in ***Chapter 1.Traffic*** in the Runway Use section, where the relation between wind and runway use can be appreciated. According to the wind rose diagram in ***Figure 4.14***, which shows the wind roses for the previous five years, south-westerly winds are frequent at Charleroi Airport, resulting in a high share of the use of runway 24. Additionally, since 2021, there has been a slight increase of north-easterly winds compared to 2020 or 2019, which led to an overall higher use of runway 06.

The wind roses of each month in 2023 are pictured in ***Figure 4.15*** In most months, the main wind direction was south-westerly. There are a few exceptions however, April, May and June, where there were mainly winds from the north-east. This explains the higher use of runway 06 on those months.

Figure 4.14: *Yearly wind roses*

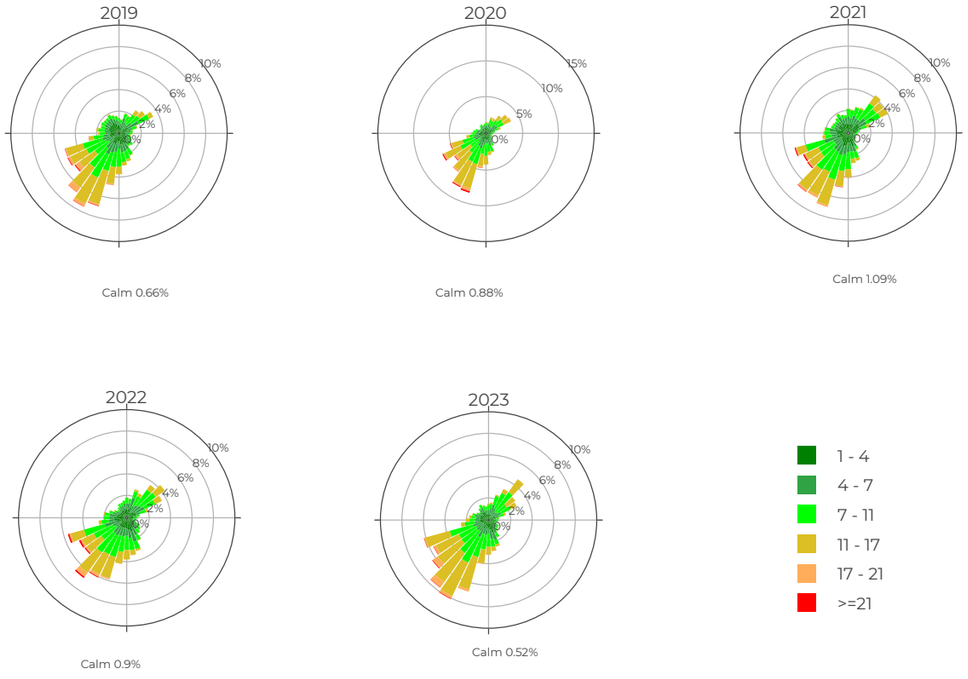
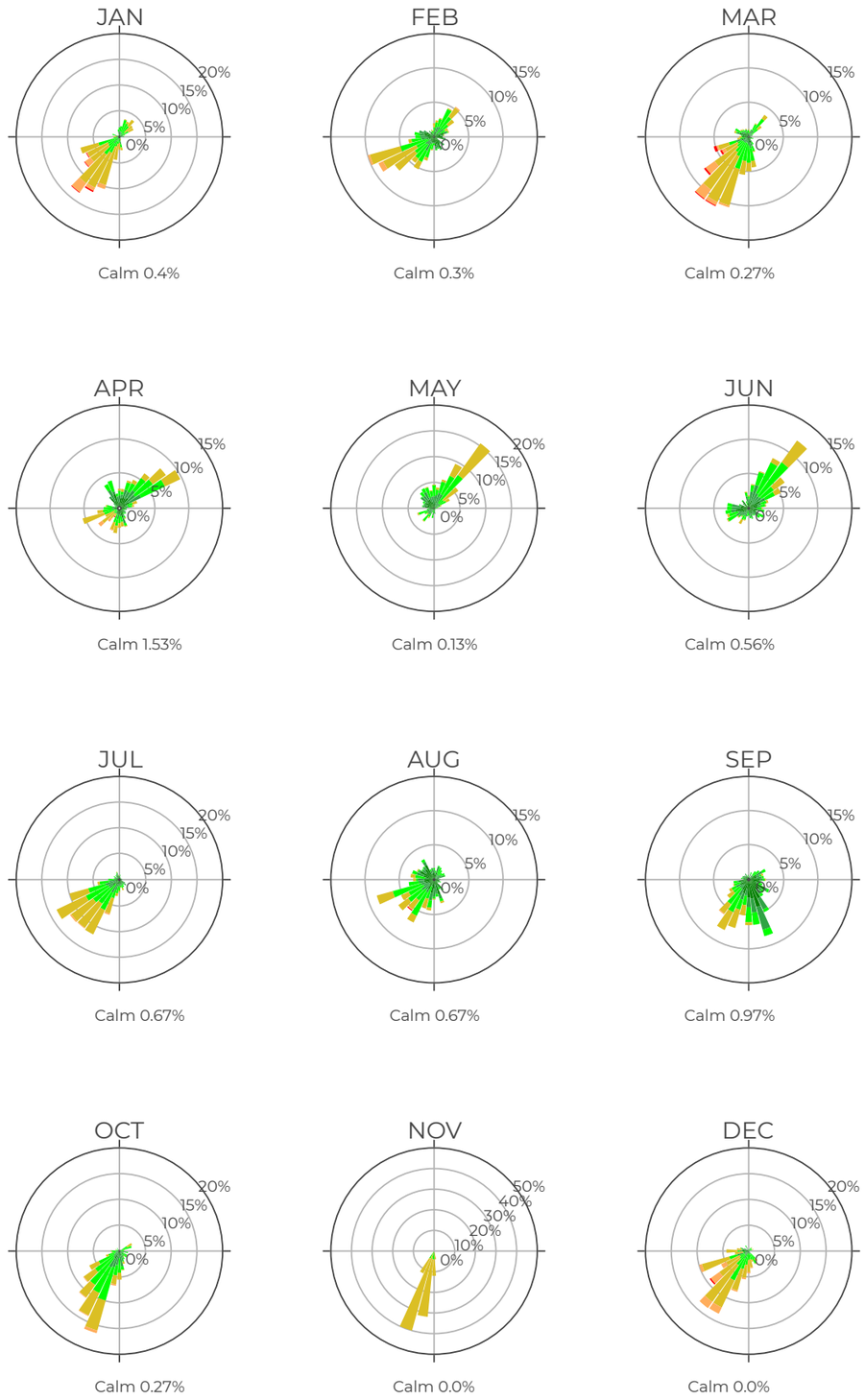


Figure 4.15: *Monthly wind roses in 2023*



ANNEX Fact sheet

TRAFFIC

Yearly Evolution

- *5% increase in movements compared to 2022.*

Movements	2019	2020	2021	2022	2023	2023 vs 2022	2023 vs 2019
IFR	54,948	25,070	33,585	57,674	60,364	+5%	+10%
VFR	27,160	20,464	32,257	25,815	27,541	+7%	+1%
Total	82,108	45,534	65,842	83,489	87,905	+5%	+7%

Quarterly comparison

- *Largest increase in Q1 compared to 2019, in Q4 compared to 2022.*

Movements	2019	2020	2021	2022	2023	2023 vs 2022	2023 vs 2019
Q1	17,147	14,865	12,573	18,385	18,645	+1%	+9%
Q2	22,606	4,454	15,598	22,560	23,900	+6%	+6%
Q3	23,075	16,913	21,101	23,366	24,774	+6%	+7%
Q3	19,280	9,302	16,570	19,178	20,586	+7%	+7%

CAPACITY & PUNCTUALITY

Capacity

- Capacity exceeded on 6 days for 24-24 and on 2 days for 06-06 only due to majority VFR traffic.
- IFR capacity was never exceeded.

Runway configuration	Declared IFR Capacity	Maximum Movements/Hour in 2023
24-24	42 movements/hour	55 movements/hour
06-06	42 movements/hour	51 movements/hour

Punctuality

Arrival delay:

- Arrival Delay: 285 min/flight due to G-Aerodrome Capacity and A-Accident/Incident
- CRSTMP delay: 0 min/flight

ATFM impact:

- Departures 120,130 minutes ATFM delay, 2% (2,025 min) due to skeyes' regulations
- Arrivals: 113,698 minutes ATFM delay, 4% (4,569 min) due to skeyes' regulations

SAFETY

Missed Approaches

80 missed approaches in 2023 (+33% vs. 2019)

TOP 3 causes in 2022:

1. Unstable approach (31)
2. I: Wx - thunderstorm - Windshear (15)
3. H: Wx - visibility (11)

Safety Occurrences

- 6 runway incursions, 3 with ATM contribution (severity E)
- 9 TWY/Apron event, an increase compared to 7 in 2022, and 1 in 2021 and in 2019.

ENVIRONMENT

PRS

79% of the movements used the PRS.

Extensions of operational times

- 353 days with extension of operational times, with 217 extensions > 1 hour
- 1,677 night movements, with 1,304 before 00:00

CDO

- Increase of CDO numbers in comparison with 2022, due to increase in total movements, but similar CDO rates (percentage of arrivals) as in the previous years.
- New CDO indicator Average level-off time below certain altitude shows an increase of level-offs during the months with more North-Easterly winds.

Annex: Missed Approaches

Table A.1: *Causes for missed approaches per runway per year.*

	Reasons	2019	2020	2021	2022	2023
RWY 07R	FOD (foreign object debris) on the runway	-	-	-	-	-
	aircraft with technical problems	-	-	-	-	-
	authorized vehicle still on runway	-	-	-	-	-
	cabin crew not ready	-	-	-	-	-
	departing traffic on the runway	-	-	-	-	-
	no radio contact	1	-	-	-	-
	other	-	-	-	-	-
	pilot's error	-	-	-	-	-
	previous landing on the runway	4	-	1	2	-
	runway condition	-	-	-	-	-
	runway incursion	-	-	-	-	-
	tail wind	-	-	-	-	-
	taken out of sequence	-	-	-	-	-
	technical problems of ground equipment	-	-	-	-	-
	too close behind preceding	2	-	-	-	-
	training flight	-	-	-	-	-
	unstable approach	1	-	-	1	2
	weather - thunderstorm - windshear	1	-	-	-	-
	weather - visibility	-	2	-	-	-
RWY 25L	FOD (foreign object debris) on the runway	2	1	2	3	-
	aircraft with technical problems	5	1	1	2	5
	authorized vehicle still on runway	2	-	-	-	-
	cabin crew not ready	2	1	-	-	1
	departing traffic on the runway	1	1	-	-	-
	no radio contact	2	-	-	-	1
	other	-	1	-	5	10
	pilot's error	3	1	-	-	-
	previous landing on the runway	1	1	1	1	2
	runway condition	-	-	-	-	2
	runway incursion	-	-	1	-	1
	tail wind	8	1	3	1	3
	taken out of sequence	1	-	2	4	4
	technical problems of ground equipment	1	-	-	-	-
	too close behind preceding	15	-	5	5	10
	training flight	2	-	-	-	-
	unstable approach	49	13	18	41	46
	weather - thunderstorm - windshear	18	13	3	19	10
	weather - visibility	11	8	4	9	3

skeyes nice to guide you

Runway Performance Report **2023**

skeyes / tervuursesteenweg 303 / b-1820 Steenokkerzeel

T +32 2 206 21 11 / F +32 2 206 22 88

Member of FABEC

www.skeyes.be