

Annual Report 2020



Version History:

Version	Date	Remark	Author
0.1	14.06.21	Initial Draft	Barboff
0.5	21.06.21	Conclusions added, general edits	Editorial Board
0.8	16.07.21	Editorial review	Editorial Board
0.9	21.07.21	Final edits & review	Barboff
1.0	03.08.21	Version for Publication	Editorial Board
1.1	05.08.21	List of Abbreviations added	Barboff

Imprint

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Date: 05 August 2021

Pages: 29

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1 Management Summary

Introduction

This report covers a set of general Key Performance Indicators (KPIs) that were deemed by the Editorial Board to be comparable among the A-CDM airports Munich, Frankfurt, Düsseldorf, Berlin-Schönefeld, Stuttgart, and Hamburg.

The KPIs contained within this report serve to continuously monitor the A-CDM process and usually portray only individual parts of the overall process.

The KPIs allow a measurement of A-CDM effects and steering of the process. They are the basis for local reporting at the individual airports. The KPIs were defined using input from EUROCONTROL's A-CDM Implementation Manual, experiences of the local German Airport CDM airports, as well as local and future necessities.

The report is intended to provide a general overview of KPI trends at the A-CDM airports, as well as serve as basis for decisions regarding adjustments to or steering of the A-CDM process.

This report describes the experiences, measurements and results of the calendar year 2019. It utilises regular evaluations and measurements on a monthly basis, the conclusions that are drawn address points that were mutually agreed by *ACDM Germany* which are reflected in the KPI Concept.

Summary of Results and Tendencies

The global Covid-19 pandemic arrived in Europe in March 2020. Starting then, the resulting travel restrictions and economic uncertainty led to drastically lower traffic numbers. After the passing of the first pandemic wave, the summer months saw an increase in air traffic, though it remained on a low level. This small rebound was stopped by new travel restrictions due to the second and third pandemic waves towards autumn which caused a renewed decrease in traffic volume.

Due to the generally low traffic level, ATFM regulations within Europe became almost unnecessary over the course of the last three quarters. It also tempted process participants to lessen adherence to Airport CDM procedures. This was counteracted by measures to increase procedure adherence, as well as some acclimatisation with the new circumstances. Both led to an observable increase in procedure adherence at most airports. Throughout the year 2021, *ACDM@GER* will focus on conformity with the defined Airport CDM processes as the traffic demand increases.

2 German Harmonisation Initiative A-CDM Germany

2.1 European A-CDM Concept

Airport Collaborative Decision Making (A-CDM) is the operational approach (idea/concept/process) to achieving an optimal turnaround process at airports. A-CDM covers the period from EOBT -3 h until take-off. It is a continuous process beginning with processing of the ATC flight plan, via landing of the inbound flight, the turnaround process on the ground, to departure.

By exchanging estimated landing and take-off times between the A-CDM airports and Network Management Operations Centre (NMOC), airports can be further integrated into the European ATM Network EATMN.

A-CDM improves operational collaboration between the partners:

- Airport Operator,
- Aircraft Operators,
- Handling Agencies,
- Ground Handling Agencies,
- Air Navigation Service Provider, and
- European Air Traffic Flow Management (NMOC).

A-CDM in Germany is based upon the European A-CDM spirit, the Community Specification of A-CDM, as well as recommendations by the German Harmonisation Initiative *A-CDM Germany*.

A-CDM aims to optimise utilisation of available capacity and operational resources at airports and within European airspace through high-quality target times and efficiency increases in the individual steps of the turnaround process.

2.2 German Harmonisation Initiative for A-CDM

European A-CDM fundamentally relies on Community Specification EN 303212. However, development of A-CDM in Germany has shown a need of harmonisation to a level of detail that is beyond the Specification's scope.

The A-CDM partners recognised this need and founded the German Harmonisation Initiative *A-CDM Germany*. Collaboration within the Initiative is determined by a Letter of Intent that was signed by all partners.

Partners within *A-CDM Germany* are currently:

- Deutsche Flugsicherung GmbH (DFS)
- Munich Airport (FMG)
- Frankfurt Airport (Fraport)
- Berlin Airport (FBB)
- Düsseldorf Airport (FDG)
- Stuttgart Airport (FSG)
- Hamburg Airport (FHG)
- Leipzig/Halle Airport (FLHG)

Leipzig/Halle Airport has commenced an Airport CDM project and is therefore already a member of *A-CDM Germany*, however implementation has not been completed yet. Therefore, Leipzig/Halle is not shown in the following chapters.

A-CDM Germany's goals are, among others:

- Exchange of information and best practices between the various A-CDM airports,
- Common understanding of A-CDM in Germany and common representation towards international partners (Eurocontrol, EU, ICAO, IATA)
- Harmonisation in the interest of partners and customers ("one face to the customer")
- Best Practices developed within A-CDM Germany can be provided to other European A-CDM projects and working groups to advance harmonisation.

Creation and coordination of harmonised procedures and documentations are achieved within A-CDM Germany's working groups and regular harmonisation meetings.

3 Purpose of the Report

This document shows A-CDM KPIs that are generally comparable across A-CDM airports in Germany. KPIs fit for inclusion in this report were selected by a working group with participation of all A-CDM airports as well as DFS. The group also defined required data to be gathered and calculation rules.

This report is not intended to replace local KPIs, nor does it pre-empt local KPI reporting routines. It is designed as a baseline to which local KPI concepts and reports can add additional indicators or even measure the same KPIs using different criteria.

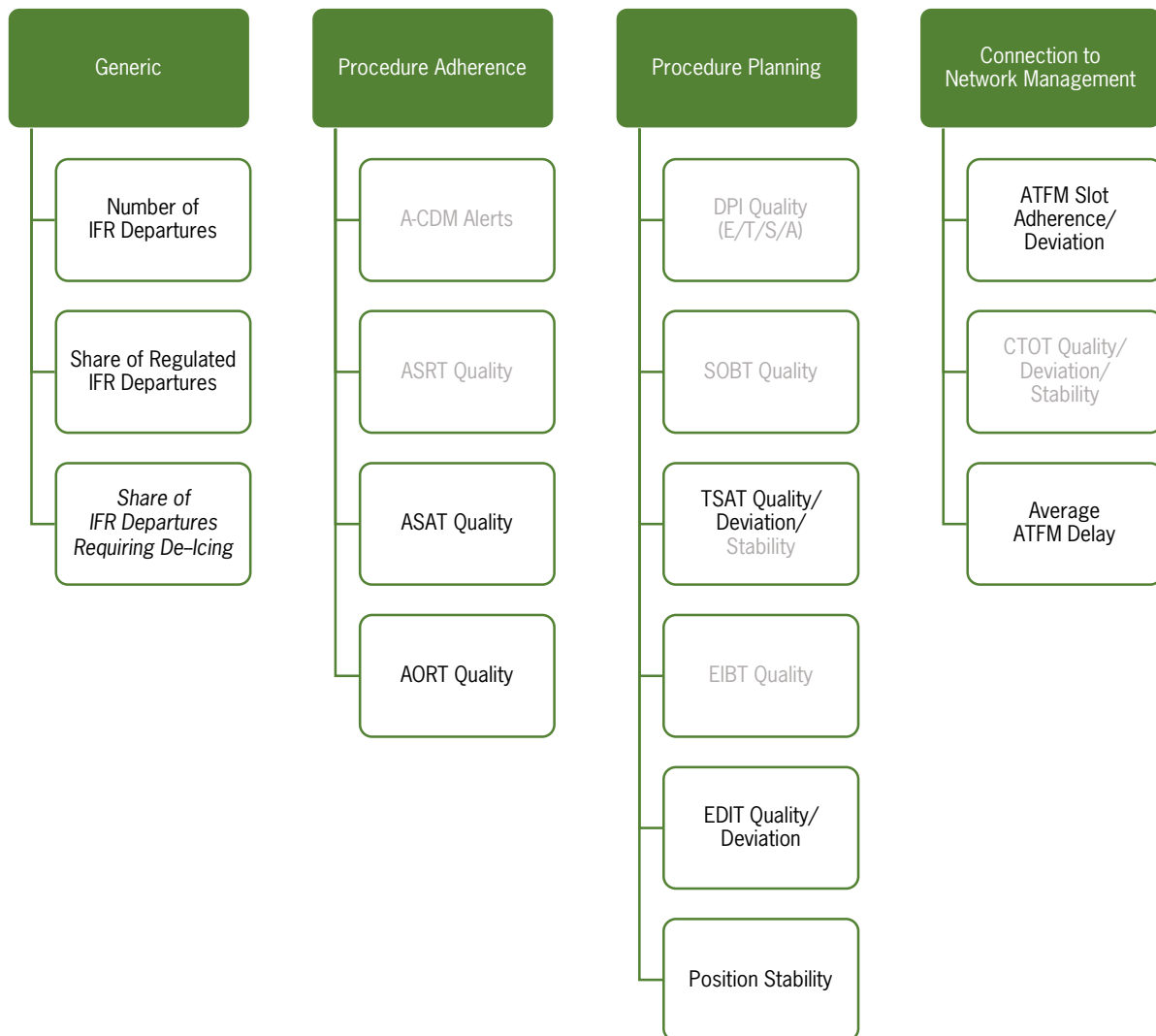
The common reporting that serves as basis for the KPIs contained within this report provide A-CDM airports with the opportunity of highlighting changes and developments, recognising potential for improvements, and developing harmonised A-CDM subprocesses.

Further details regarding the A-CDM process and its specifics at the individual airports are described within the local A-CDM procedure descriptions and publications.

4 Results

In order to achieve the local operational and network benefits associated with A-CDM, the quality of target times and process adherence are essential. For this reason, commonly available indicators from the following categories were selected:

- Generic Traffic Numbers
- Procedure Adherence of A-CDM Partners
- Procedure Planning
- Connection to Network Management



The KPIs coloured in light grey are not yet part of this report as the necessary historic data is not yet available at all German A-CDM airports. As soon as this changes, they will be included in a subsequent Annual KPI Report.

4.1 Generic

4.1.1 Number of IFR Departures

Description

Number of IFR departures within the calendar year as well as the previous calendar year

Goal

Show the amount and trend of traffic

Charts

2019 ■
2020 ■

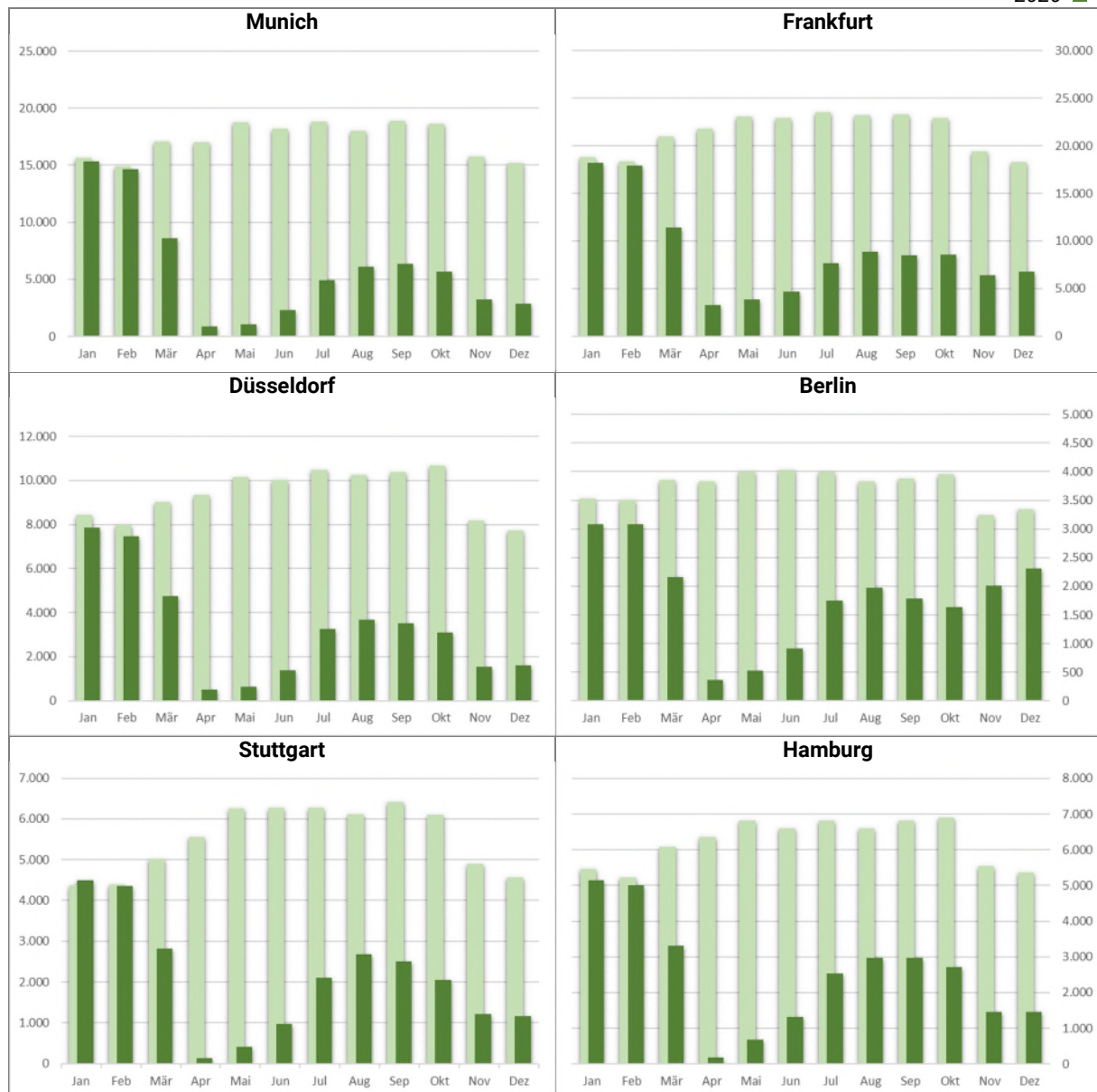


Fig. 1: Number of IFR departures 2020 (dark green) and 2019 (light green)

Conclusion

The global Covid-19 pandemic arrived in Europe in March 2020. Starting then, the resulting travel restrictions and economic uncertainty led to drastically lower traffic numbers. After the passing of the first pandemic wave, the summer months saw an increase in air traffic, though it remained on a low level. This small rebound was stopped by new travel restrictions due to the second and third pandemic waves towards autumn which caused a renewed decrease in traffic volume. Despite that, there were still significantly more flight movements than during the first collapse in April 2019 which implies a type of adjustment to conditions during the pandemic.

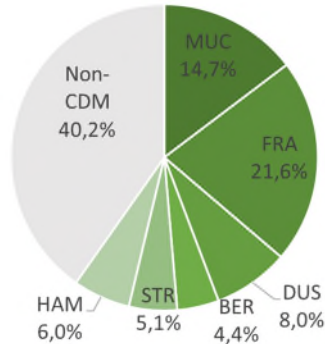


Fig. 2: Share of total departures originating from A-CDM airports in Germany 2020

The six German A-CDM airports' share of total IFR departures in the year 2020 was 59.8%, reflecting a decrease by almost seven percentage points compared to the previous year. The reduction in scheduled commercial traffic was much more prolonged than for General and Business Aviation which often operates at smaller airports.

Traffic numbers for Berlin from January to including October refer to Berlin-Schönefeld, thereafter to the new Berlin-Brandenburg airport. The relative traffic increase from November reflects the closure of Berlin-Tegel airport and the following centralisation of all Berlin traffic at Berlin-Brandenburg.

4.1.2 Share of Regulated IFR Departures

Description

Share of IFR departures with ATFM slot (CTOT), in % per airport

Goal

Illustrate the monthly share of IFR departures that were subject to an air traffic flow measure by NMOC.

Charts

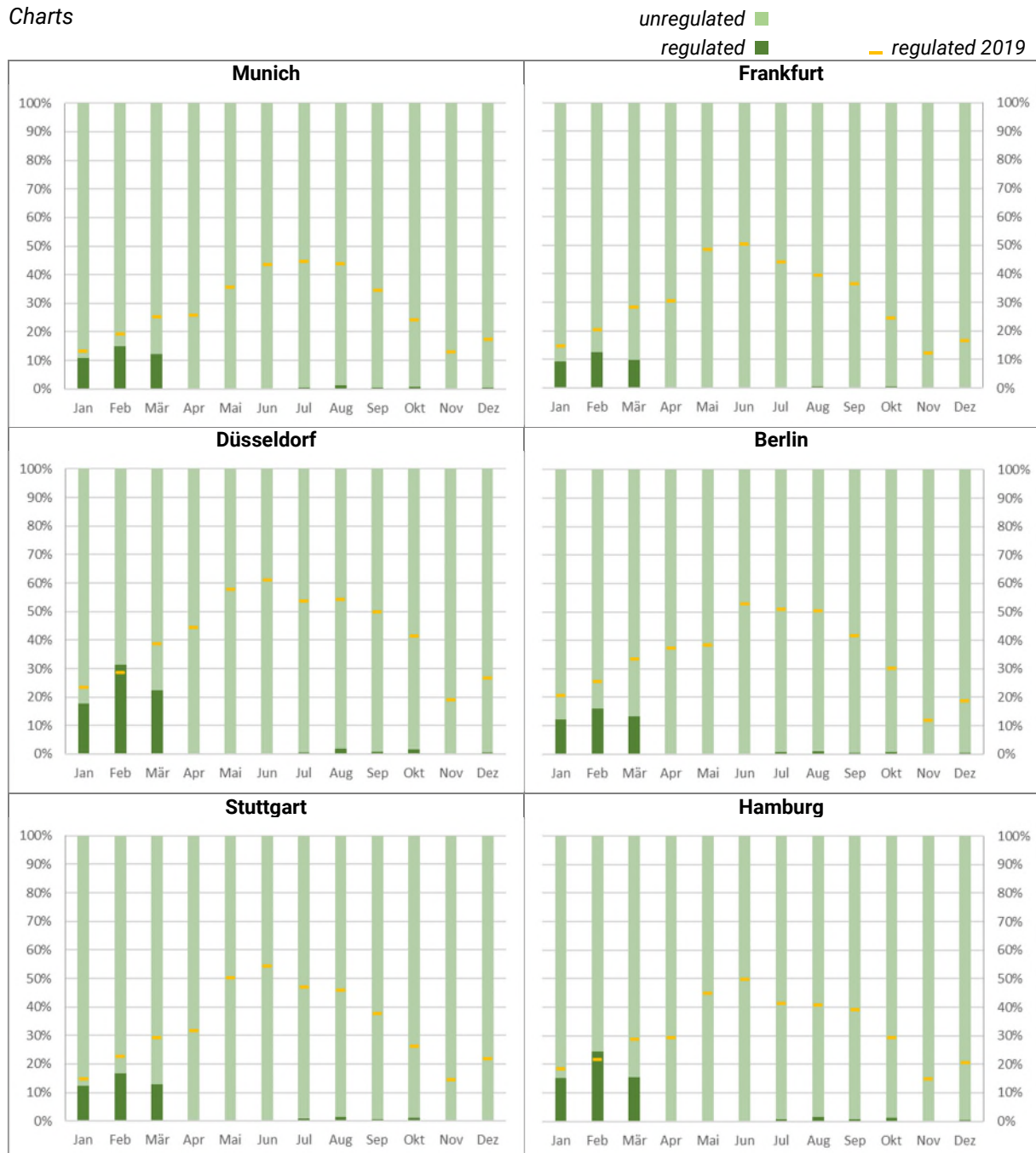


Fig. 3: Share of unregulated (light green) and regulated (dark green) IFR departures 2020, and 2019 share (yellow)

Conclusion

The strong drop in air traffic that began in March 2020 due to the Covid-19 pandemic made ATFM regulations almost unnecessary. After Air Navigation Service Providers had reduced their capacities accordingly, isolated ATFM regulations were implemented when traffic demand increased in the short term due to unexpected changes in states' travel policies, or when weather phenomena disrupted traffic flows.

4.1.3 Share of IFR Departures Requiring De-icing

Description

Share of IFR departures that required aircraft de-icing, in % per airport

Charts

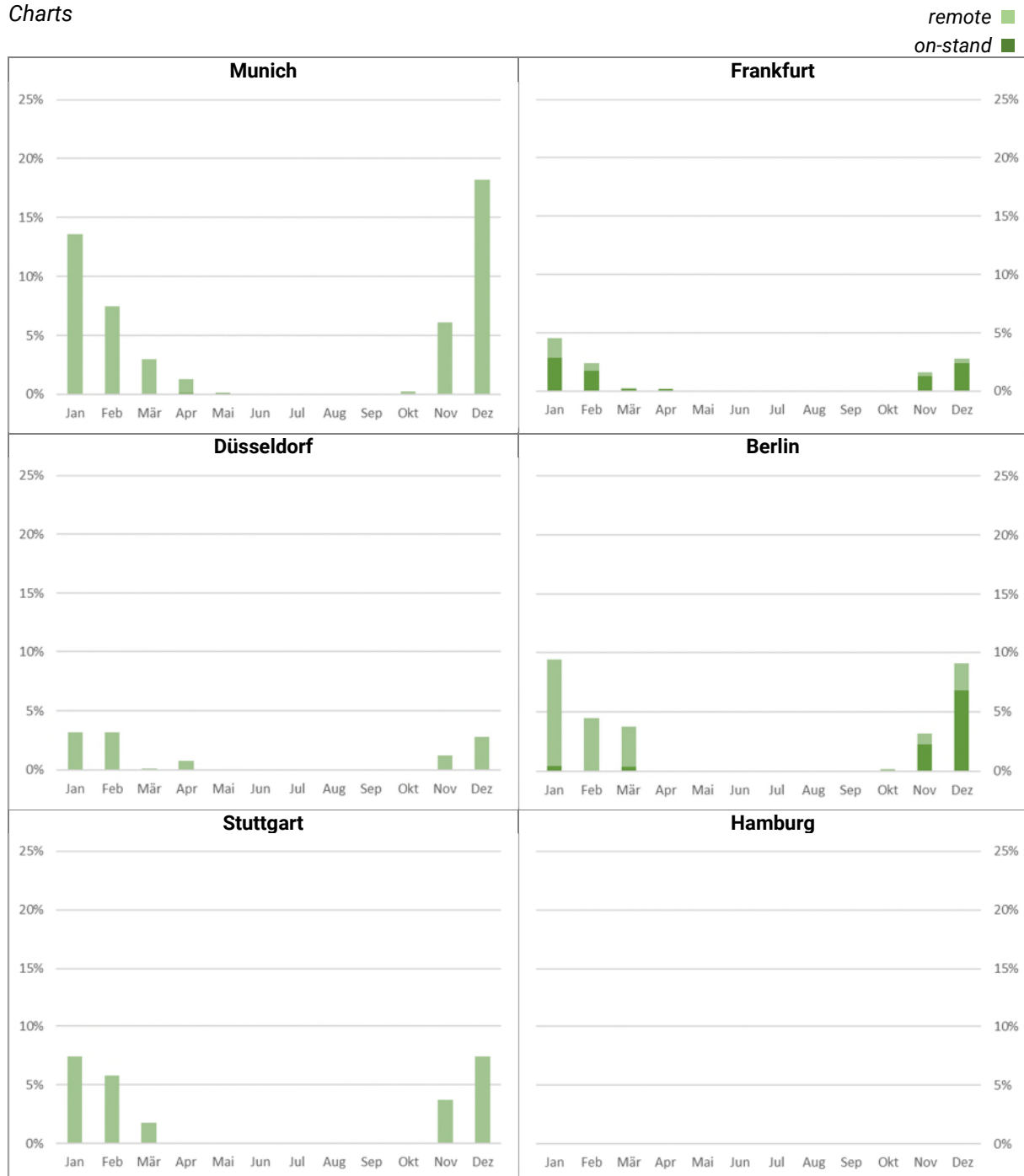


Fig. 4: Share of IFR departures 2019 requiring aircraft de-icing on stand (dark green) and remotely (light green)

This KPI provides context for further KPIs below (e.g., TSAT Quality). Most airports only do remote de-icing, i.e., on designated de-icing areas. In this case, de-icing takes place after TSAT.

In the case of on-stand de-icing the flight are de-iced on their parking stands, i.e., after TOBT, but before TSAT. Planned de-icing begin and duration are included in the TSAT calculation.

Contrary to former Berlin-Schönefeld, the new Berlin-Brandenburg airport is mostly using on-stand de-icing as can be seen in the chart.

4.2 Procedure Adherence

4.2.1 ASAT Quality

Description

Share of IFR departures that received start-up approval (ASAT) within $TSAT \pm 5$ min via radio, in % per airport

Goal

Measure procedure adherence of Air Traffic Control (Tower)

Charts

2019 ■
2020 ■

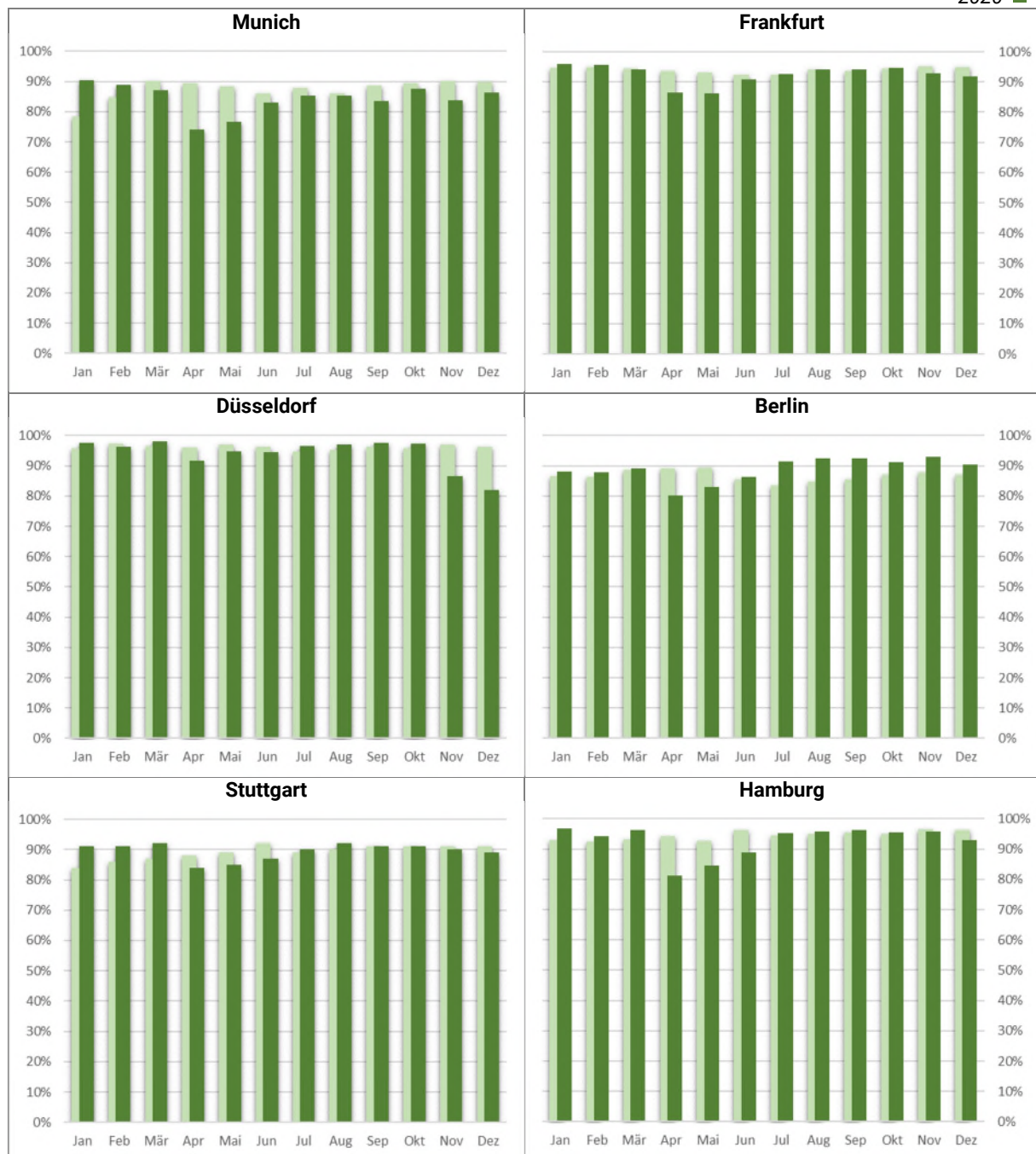


Fig. 5: Share of IFR departures that received start-up approval within $TSAT \pm 5$ min via radio in 2020 (dark green) and 2019 (light green)

Conclusion

All airports show a lower ASAT quality between April and June 2020. The very low utilisation of airport and airspace capacities during that period apparently led ATC to reduce Airport CDM procedure adherence. New turnaround procedures also put extra strain on ground handlers which led to a lower TOBT quality. Over the following months, measures to restore procedure adherence were undertaken. Together with familiarisation effects as the overall situation stabilized, the measures were able to cause an uptick in ASAT quality.

At Düsseldorf Airport, the months November and December once again showed decreasing ASAT quality. It is likely that this is an effect of the reinstated restrictions of free movement, compounded by the overall lower volume of air traffic during winter season.

4.2.2 AORT Quality

Description

Share of IFR departures that asked for their off-block clearance (AORT) within the window of ASAT + 5 min (start-up via radio) or TSAT $\pm$ 5 min (start-up via datalink), in % per airport

Goal

Measure procedure adherence of the Flight Crew

Charts

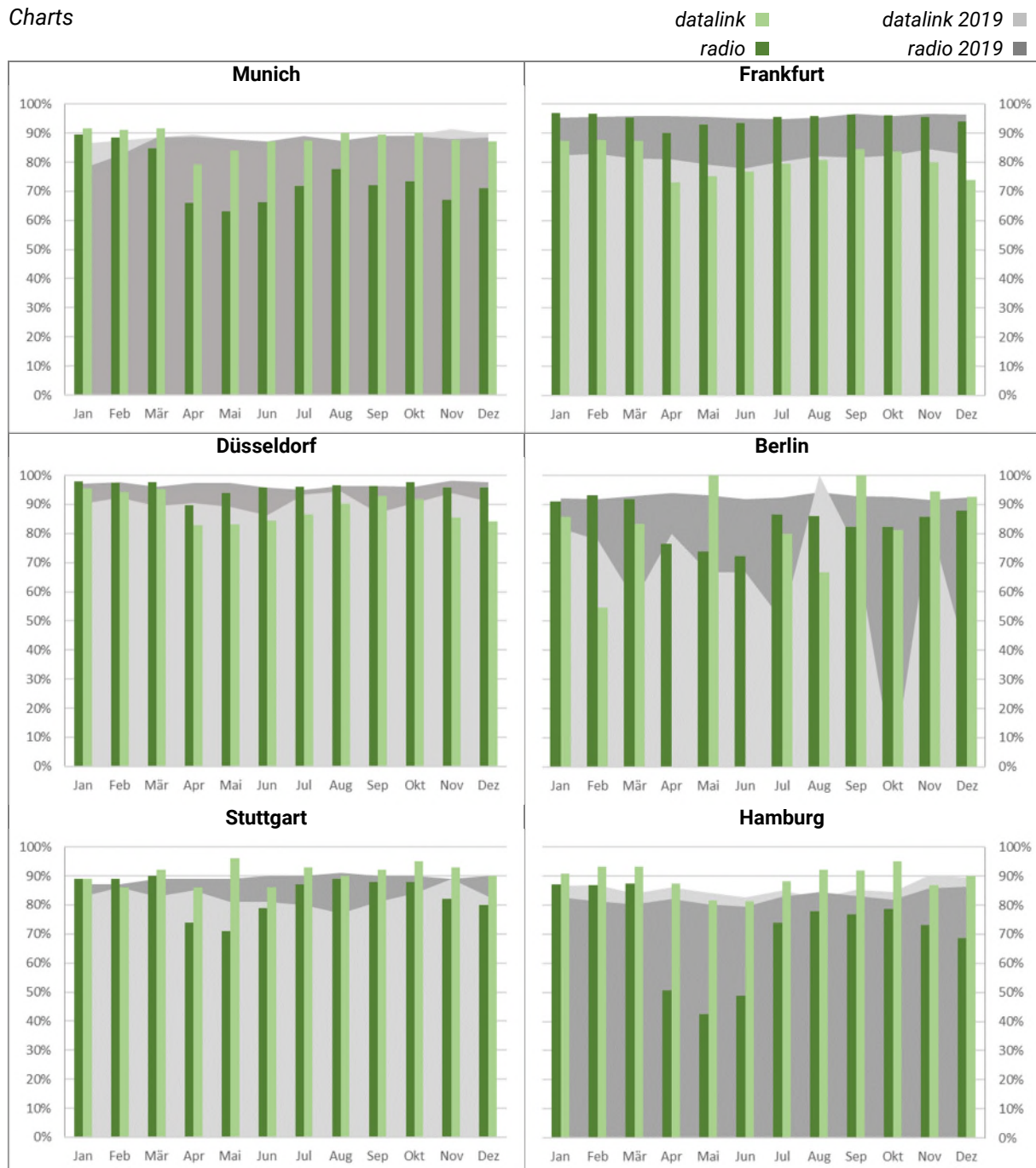


Fig. 6: Share of IFR departures 2019 with conformant AORT (green) compared to 2018 (grey)

Conclusion

Like ASAT quality, AORT quality also shows some weakness from April 2020, reflecting lower procedure adherence both by flight crews and apron control. This effect is amplified by the proportionally higher amount of non-scheduled traffic at some airports.

Over the course of the pandemic, initially a significant drop in both scheduled and non-scheduled traffic occurred, though the latter did not fall by quite as much. Especially business aviation recovered much faster than other traffic and in August 2020 had already reached its pre-crisis level in absolute flight numbers.

This market segment is traditionally very reactive due to its customer demands, which implies a relatively lower predictability and therefore lower AORT quality compared to scheduled traffic. This can now also be seen in the overall evaluation due to the higher share of non-scheduled traffic.

4.3 Procedure Planning

4.3.1 TSAT Quality and Deviation

TSAT Quality

Description

Monthly share of last TSATs that were equal to TOBT, in % per airport

Goal

Operational adherence to planning on the day of operations.

Charts



Fig. 7: Share of regulated and unregulated IFR departures 2020 (green) and 2019 (grey) where last TSAT = TOBT

TSAT Deviation

Description

Monthly mean deviation of TOBT and last TSAT, in minutes

Goal

Show mean deviation of planning on day of operations versus actual operations

Charts



Fig. 8: Mean deviation of last TSAT and TOBT in minutes for 2019 (green) and 2018 (grey)

Conclusion

For unregulated flights, a low TSAT quality shows that local capacity constraints have caused delays. For regulated flights, TSAT generally follows CTOT and therefore correlates more with ATFM delay.

All airports caused only very few, if any, local delays due to the low overall traffic demand. Network delays due to regulations were also very rare in 2020 and do not provide a sufficient basis for meaningful analysis.

4.3.2 EDIT Quality and Deviation

EDIT Quality

Description

Monthly share of IFR departures with on-stand de-icing or remote de-icing whose EDIT was within ADIT ± 3 min, in % per airport

Goal

Verify the reliability of estimated de-icing duration as input parameter for A-CDM

Charts

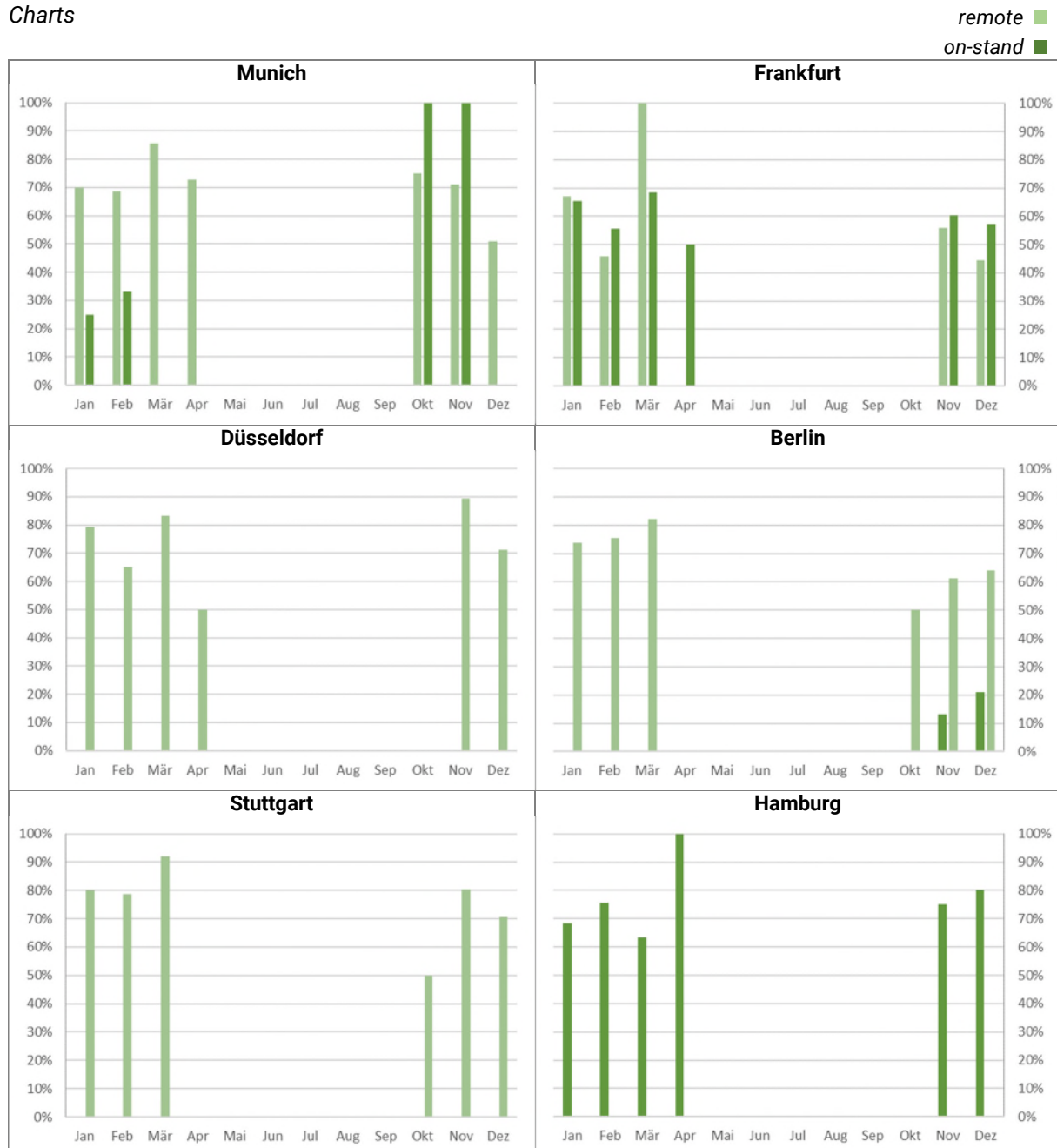


Fig. 9: Percentage of flights with remote (light green) and on-stand de-icing where EDIT = ADIT ± 3 min

EDIT Deviation

Description

Monthly mean deviation of ADIT and EDIT for IFR departures with on-stand de-icing or remote de-icing in minutes per de-iced flight and airport

Goal

Verify the accuracy of estimated de-icing duration as input parameter for A-CDM

Charts



Fig. 10: Mean deviation in minutes of EDIT and ADIT for on-stand (dark green) and remote de-icing (light green)

Conclusion

EDIT quality for remote de-icing is generally higher as the process itself is less prone to disturbances and, therefore, easier to plan. On-stand de-icing performance depends on the location of the parking stand and activities on neighbouring areas which makes accurate EDIT predictions more difficult.

4.4 Connection to Network Management

4.4.1 ATFM Slot Adherence and Deviation

ATFM Slot Adherence

Description

Share of flights adhering or not adhering to Slot Tolerance Window prescribed by NM, in % per airport

Goal

Measure procedure adherence of regulated flights, nominally ATOT should be within the Slot Tolerance Window (STW, usually CTOT -5/+10 min but may be extended in special conditions). Adjustment of the CTOT to the local TTOT within the A-CDM process improves ATFM slot adherence, pre-departure sequence and procedure adherence.

“Early” flights have an ATOT before STW begin, “late” flights have their ATOT after STW end.

Charts

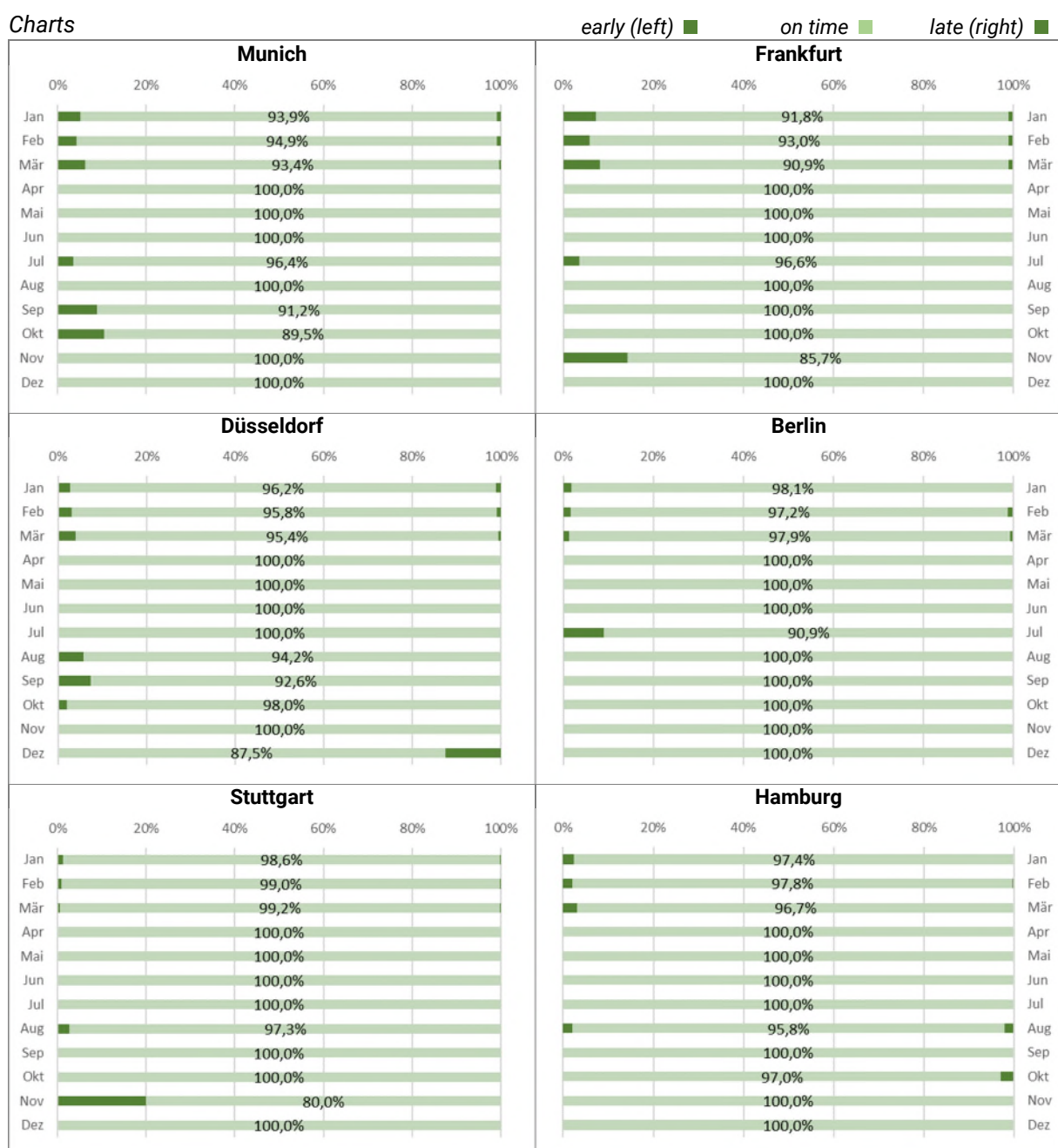


Fig. 11: Share of flights with ATOT before (dark green left), within (light green) and after (dark green right) STW

ATFM Slot Deviation

Description

Mean Deviation from the STW prescribed by NM, in minutes

Goal

Measure the level of slot deviations for regulated flights. This measurement counts only flights whose ATOT was outside of the Slot Tolerance Window and measures the time in minutes between ATOT and the nearest STW limit. "Early" flights have an ATOT before STW begin, "late" flights have their ATOT after STW end.

Charts

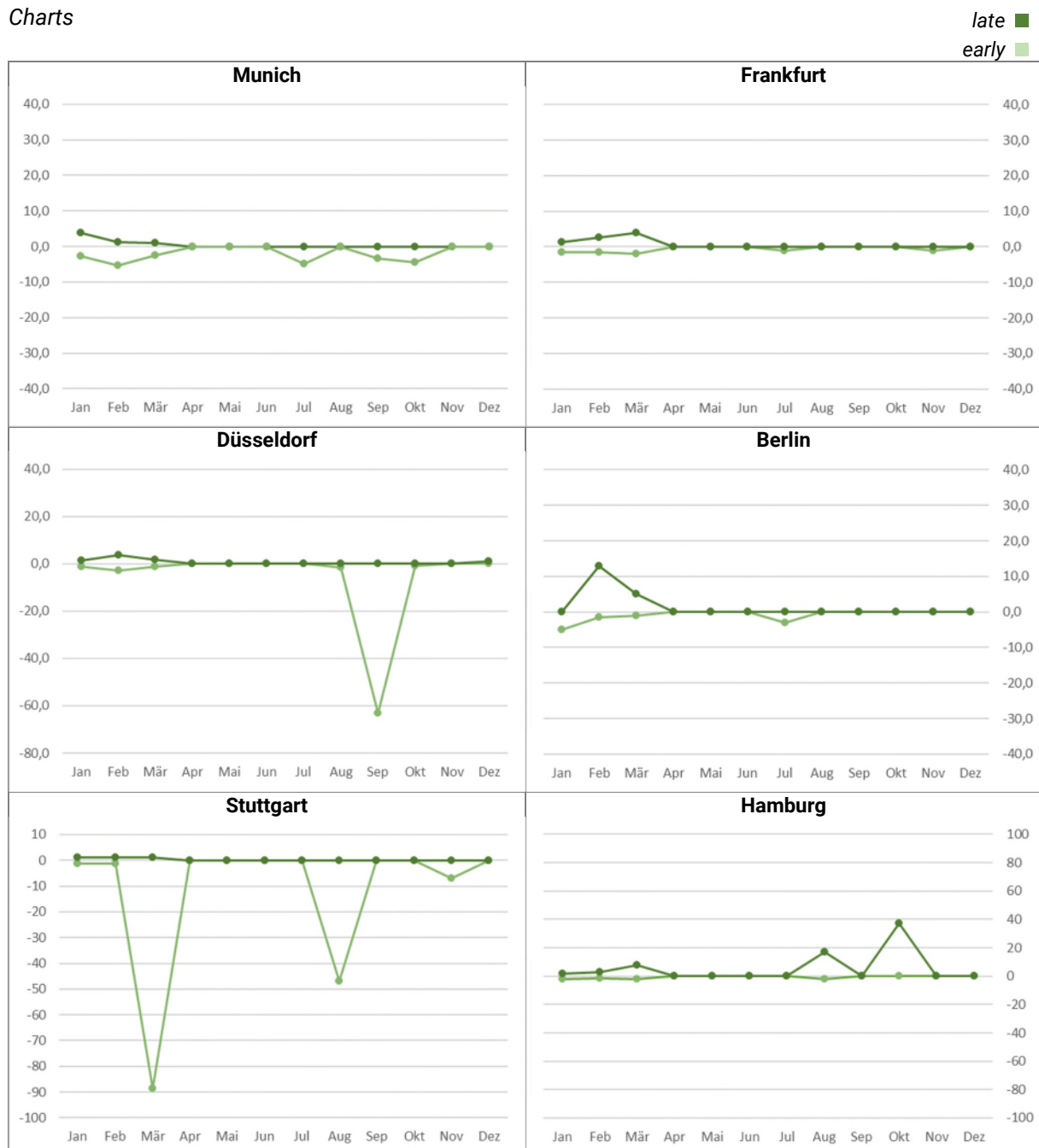


Fig. 12: Mean deviation in minutes of ATOT and STW for early (light green) and late (dark green) departures

Conclusion

The very low utilisation of airport and airspace capacities during most of 2020 apparently led ATC to reduce Airport CDM procedure adherence. As regulated flights occurred only sporadically, the visible and partly significant ATFM slot violations were investigated individually but do not indicate generally low ATFM slot adherence.

4.4.2 Average ATFM Delay

Description

Average ATFM delay per regulated departure, in minutes

Goal

Measure the average ATFM delay for regulated departures

Chart

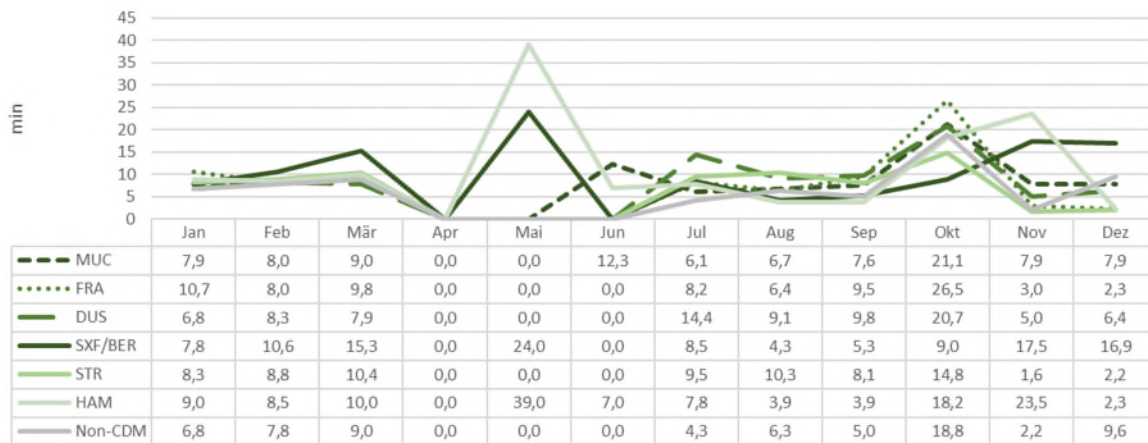


Fig. 13: Average ATFM delay per airport

Conclusion

As regulated flights occurred only sporadically, the visible upticks in ATFM delay concern only individual flights and therefore do not allow a broad analysis.

5 Outlook

The strong drop in traffic numbers during 2020 also brought down procedure adherence in some subprocesses. For this reason, the ACDM@GER partners will continuously monitor procedure adherence during the expected recovery in traffic in 2021. This is intended to ensure a high Airport CDM procedure quality to go along with higher demand.

At the start of the Covid-19 pandemic in Europe, it was feared that changed turnaround processes might result in increased average turnaround times. This fear could not be substantiated over the course of the year, which presumably relates to the lower passenger volume for the flights that were actually conducted.

For the Annual KPI Report 2021 it is intended to once again use the year 2019 as baseline. The editorial board believes this comparison will be more representative than with indicators from the strongly Covid-19-affected year 2020. For the number of IFR departures, both years 2019 and 2020 will be shown for comparison.

List of Abbreviations

	DESCRIPTION
ADIT	Actual De-Icing Time
AORT	Actual Off-Block Request Time
ASAT	Actual Start-Up Approval Time
ASRT	Actual Start-Up Request Time
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATOT	Actual Take-Off Time
CTOT	Calculated Take-Off Time
DCL	Datalink Clearance
EDIT	Estimated De-Icing Time
IFR	Instrument Flight Rules
NM	Network Manager
NMOC	Network Manager Operations Centre
SOBT	Scheduled Off-Block Time
STW	Slot Tolerance Window
TOBT	Target Off-Block Time
TSAT	Target Start-Up Approval Time

List of Sources

CHAPTER	KPI	SOURCE
4.1.1	Number of IFR Departures	NM ATFCM Monthly Summary per Airport
	Share A-CDM	DFS
4.1.2	Share of Regulated IFR Departures	NM ATFCM Monthly Summary per Airport
4.1.3	Share of IFR Departures Requiring De-Icing	Airports
4.2.1	ASAT Quality	Airports
4.2.2	AORT Quality	Airports
4.3.1	TSAT Quality and Deviation	Airports
4.3.2	EDIT Quality and Deviation	Airports
4.4.1	ATFM Slot Adherence and Deviation	NM ATFCM Monthly Slot Adherence
4.4.2	CTOT Stability	Airports
4.4.3	Average ATFM Delay	NM ATFCM Monthly Summary per Airport