PRB | Performance review body of the single european sky

Performance Review Body Monitoring Report

Germany - 2020

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1 OVERVIEW

1.1 Contextual information

National performance plan adopted following Commission Decision (EU) 2023/177 of 14 December 2022

List of ACCs 4
Bremen ACC
Langen ACC
Karlsruhe UAC
Munich ACC

No of airports in the scope of the performance plan:
- **≥80'K** 8
- **<80'K** 8

Exchange rate (1 EUR=)
2017: 1 EUR
2020: 1 EUR

Share of Union-wide:
- **traffic (TSUs) 2020** 12.9%
- **en route costs 2020** 15.4%

Share en route / terminal costs 2020 77% / 23%

En route charging zone(s)
Germany

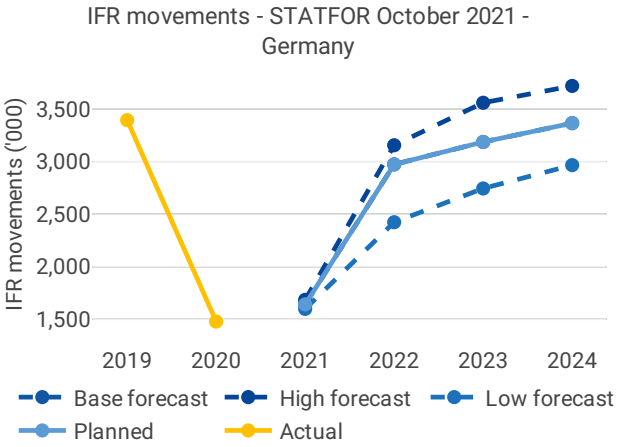
Terminal charging zone(s)
Germany

Main ANSP
- DFS

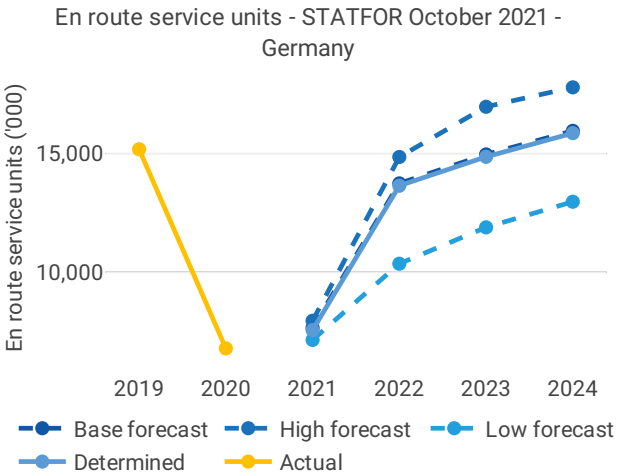
Other ANSPs
- MUAC

MET Providers
- Deutscher Wetterdienst (DWD)

1.2 Traffic (En route traffic zone)

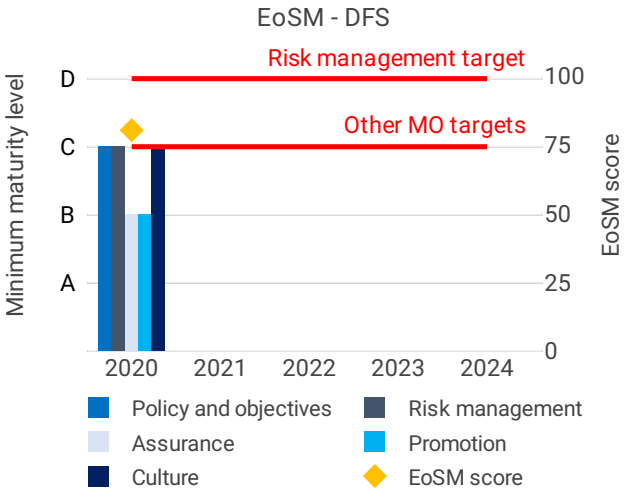


- Germany recorded 1,479K actual IFR movements in 2020, -56% compared to 2019 (3,394K).
- Germany IFR movements reduced less than the average reduction at Union-wide level (-57%).



- Germany recorded 6,792K actual en route service units in 2020, -55% compared to 2019 (15,180K).
- Germany service units reduced less than the average reduction at Union-wide level (-57%).

1.3 Safety (Main ANSP)



• DFS achieved the RP3 EoSM targets in two out of five management objectives. DFS still needs to improve safety risk management, safety assurance and safety promotion.

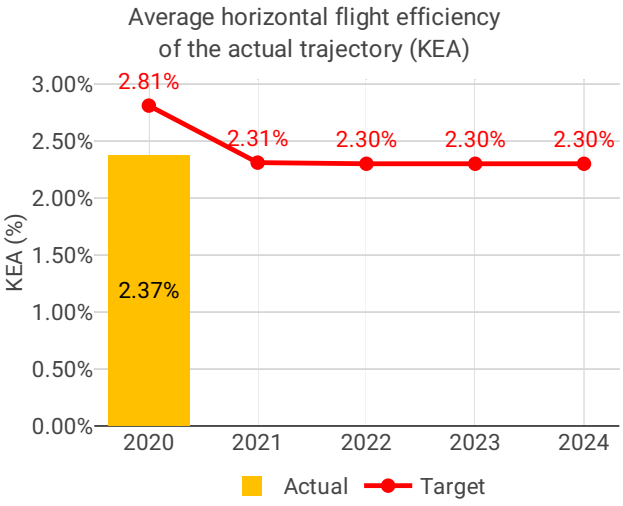
• The EoSM performance is lower than expected based on the maturity achieved at the end of RP2 when DFS exceeded the target on most management objectives. This may reflect a conservative approach used by DFS when assessing maturity using the new EoSM definition in RP3.

• Since DFS needs to improve maturity by one level on five EoSM questions (out of 28) to achieve the RP3 targets, the PRB considers this feasible. However, the NSA did not provide any actions or correcting measures that are being considered/ implemented to improve the EoSM performance. The PRB encourages the NSA to establish these as soon as possible.

• Germany recorded lower rates of both SMIs and RIs in 2020 compared with 2019.

• DFS should improve its SMS by implementing automated safety data recording systems.

1.4 Environment (Member State)



• FABEC stated that half of the Union-wide RAD simplifications applied in 2020 were within FABEC airspace and that eNM measures were not needed. This helped improve the shortest constrained routes within FABEC, but was not sufficient in helping to reach the FAB-level KEA reference value (2.90%) in 2020.

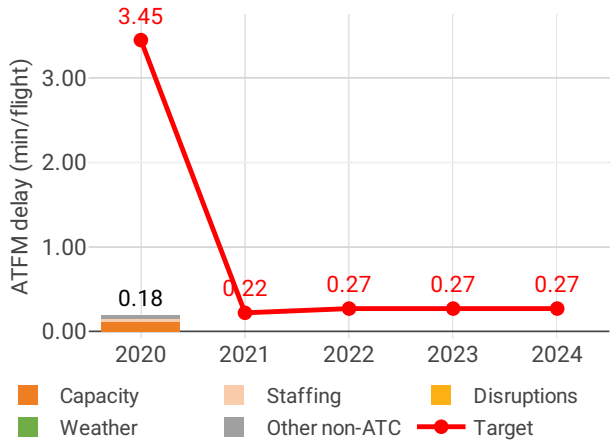
• At a national level, Germany achieved a KEA performance of 2.37% and the FABEC reference value is 2.90% in 2020.

• Karlsruhe Upper Area Control Centre and MUAC, in cooperation with other German ACCs, seized the opportunity of the significant fall in traffic to shorten routes and improve flight profiles in Europe's busiest airspace. This had a distinct impact that led to shorter constrained routes and improved performance relative to 2019.

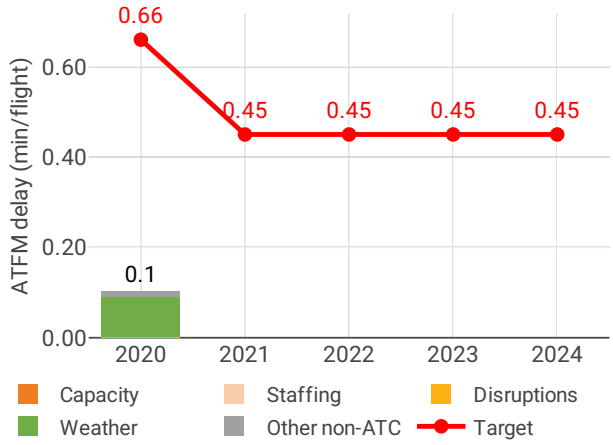
• The share of flights operating CCO/CDO at German airports improved in 2020 compared to 2019. The additional time airspace users spent taxiing or holding in terminal airspace reduced by 36% compared to 2019.

1.5 Capacity (Member State)

Average en route ATFM delay per flight by delay groups



Average arrival ATFM delay per flight by delay groups



• DFS recorded 0.18 minutes of en route ATFM delay per flight in 2020 and performed better than its local breakdown value of 0.52.

• Delays must be considered in the context of the traffic evolution: IFR movements in 2020 were 56% below the 2019 levels in Germany. When analysing the first two months of 2020, there were slightly less IFR movements than in 2019 (-2%) but delays reduced more notably (-41%).

• Germany reported some capacity issues in the early months of 2020 due to the lack of qualified ATCOs. Germany reported a decrease in the number of ATCO FTEs by 4%, 1%, 1% and 2% in Bremen, Karlsruhe, Langen and Münich ACCs respectively.

• Based on the analysis of previous capacity profiles, the PRB estimates Germany will face a capacity gap once IFR movementsrise above 80% of 2019 levels. The PRB recommends that capacity improvement measures should be implemented.

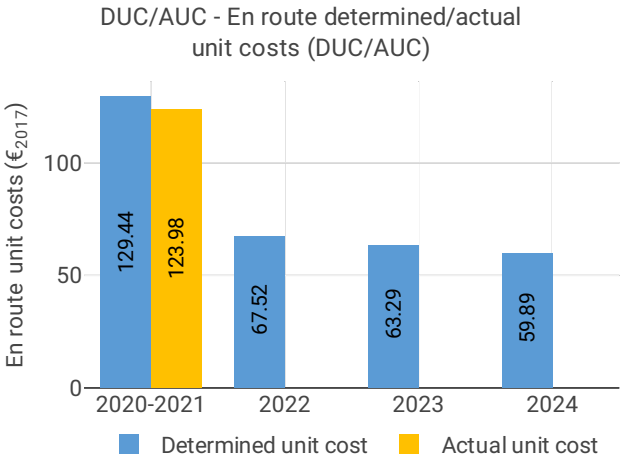
• Delays were mostly related to ATC capacity and staffing.

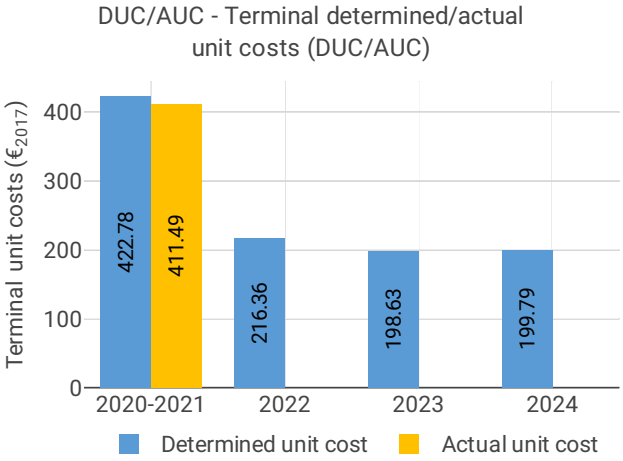
• The share of delayed flights with delays longer than 15 minutes in Germany decreased by 15.91 p.p. compared to 2019.

• The yearly total of sector opening hours in Langen ACC was 118,454, showing a 10.5% decrease compared to 2019. The yearly total of sector opening hours in Munich ACC was 70,385, showing a 27.6% decrease compared to 2019. The yearly total of sector opening hours in Karlsruhe ACC was 88,037, showing a 39.2% decrease compared to 2019. The yearly total of sector opening hours in Bremen ACC was 76,975, showing a 25.9% decrease compared to 2019.

• Langen ACC registered 5.12 IFR movements per one sector opening hour in 2020, being 49.3% below 2019 levels. Munich ACC registered 7.1 IFR movements per one sector opening hour in 2020, being 42.6% below 2019 levels. Karlsruhe ACC registered 9.82 IFR movements per one sector opening hour in 2020, being 22.3% below 2019 levels. Bremen ACC registered 3.63 IFR movements per one sector opening hour in 2020, being 42.6% below 2019 levels.

1.6 Cost-efficiency (En route/Terminal charging zone(s))





• The 2020 actual service units (6,792K) were 55% lower than the actual service units in 2019 (15,155K).

• Germany reduced total costs in 2020 by only 21 M€2017 (-2%) compared to 2019 actual costs. The reduction was mainly driven by a 33 M€2017 lower cost of capital (-58%), resulting from a lower WACC due to a change in capital structure.

• Germany increased other operating costs by 18 M€2017 (+15%) due to "many unspecified individual measures".

• DFS spent 87 M€2017 in 2020 related to costs of investments, 3% less than planned in the 2019 draft performance plan (90 M€2017).The reduction is mainly driven by a decrease in costs related to existing investments. Moreover, most of new major investments (which were planned for later years of the reference period) have been either postponed or the planning has been revised in order to achieve long term costs savings in response to COVID-19.

2 SAFETY - GERMANY

2.1 PRB monitoring

• DFS achieved the RP3 EoSM targets in two out of five management objectives. DFS still needs to improve safety risk management, safety assurance and safety promotion.

• The EoSM performance is lower than expected based on the maturity achieved at the end of RP2 when DFS exceeded the target on most management objectives. This may reflect a conservative approach used by DFS when assessing maturity using the new EoSM definition in RP3.

• Since DFS needs to improve maturity by one level on five EoSM questions (out of 28) to achieve the RP3 targets, the PRB considers this feasible. However, the NSA did not provide any actions or correcting measures that are being considered/ implemented to improve the EoSM performance. The PRB encourages the NSA to establish these as soon as possible.

• Germany recorded lower rates of both SMIs and RIs in 2020 compared with 2019.

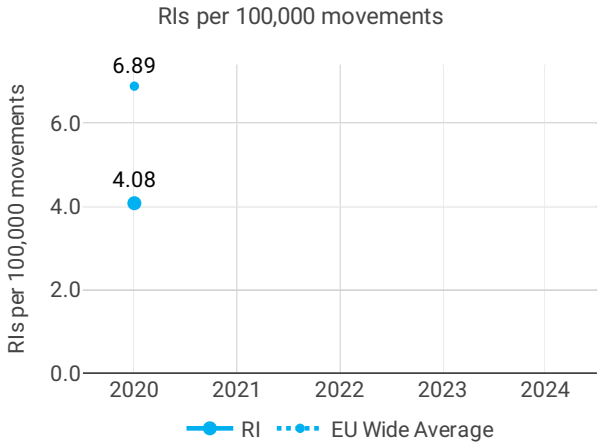
• DFS should improve its SMS by implementing automated safety data recording systems.

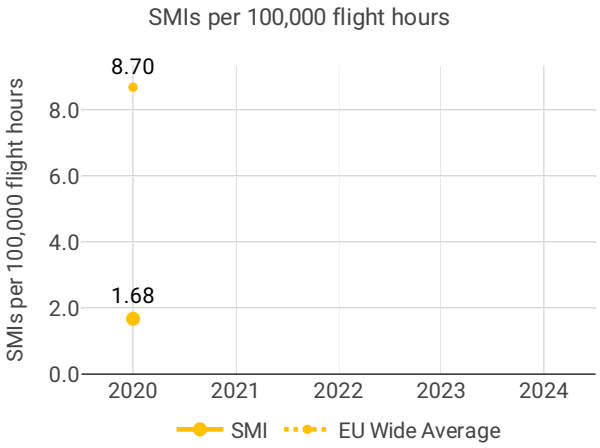
2.2 Effectiveness of Safety Management (EoSM) (KPI#1)

Focus on EoSM

Two out of five EoSM components of the ANSP meet the 2024 target level. Three components, namely "Safety Risk Management", "Safety Assurance" and "Safety Promotion" are below 2024 target levels and are expected to improve in the next years of RP3.

2.3 Occurrences - Rate of runway incursions (RIs) (PI#1) & Rate of separation minima infringements (SMIs) (PI#2)





3 ENVIRONMENT - GERMANY

3.1 PRB monitoring

• FABEC stated that half of the Union-wide RAD simplifications applied in 2020 were within FABEC airspace and that eNM measures were not needed. This helped improve the shortest constrained routes within FABEC, but was not sufficient in helping to reach the FAB-level KEA reference value (2.90%) in 2020.

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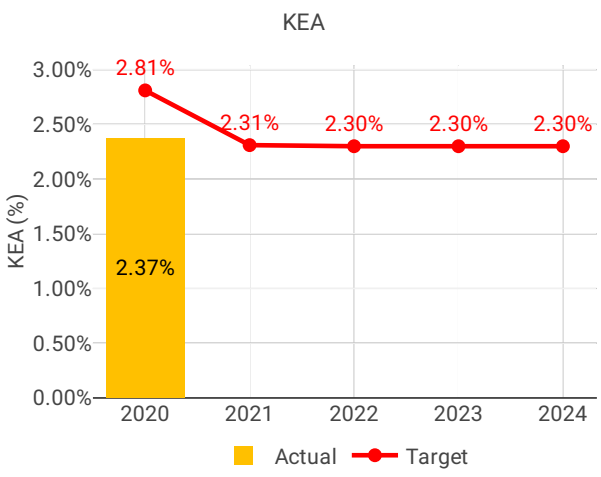
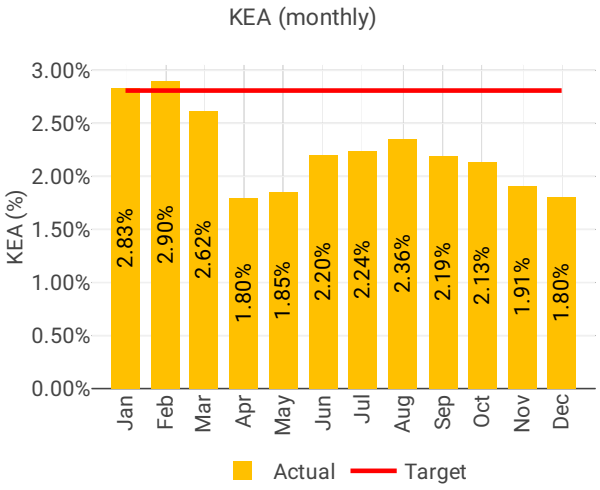
airspace. This had a distinct impact that led to shorter constrained routes and improved performance relative to 2019.

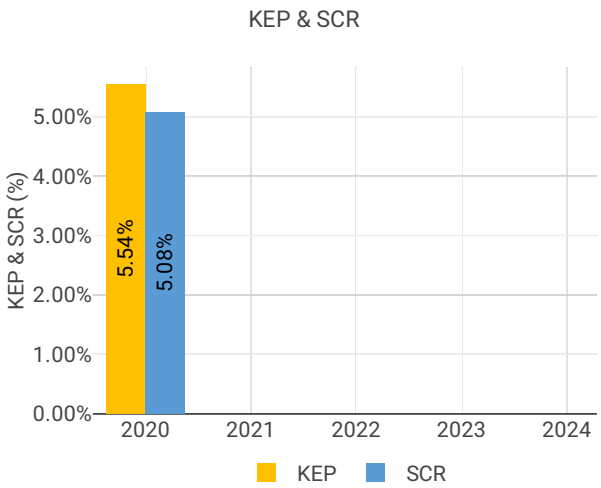
• The share of flights operating CCO/CDO at German airports improved in 2020 compared to 2019. The additional time airspace users spent taxiing or holding in terminal airspace reduced by 36% compared to 2019.

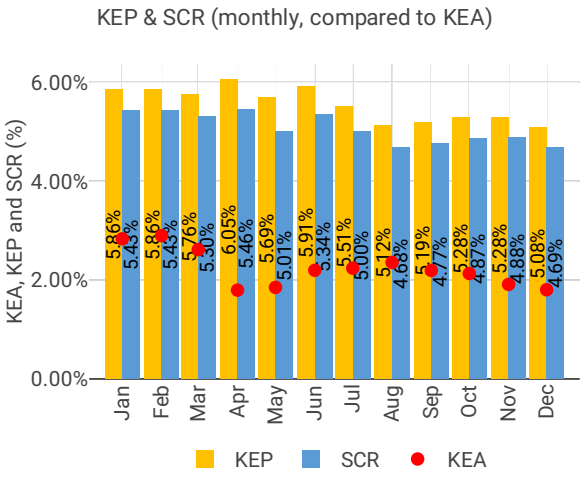
3.2 En route performance

3.2.1 Horizontal flight efficiency of the actual trajectory (KEA) (KPI#1), of the last filed flight plan (KEP) (PI#1) & shortest constrained route (SCR) (PI#2)



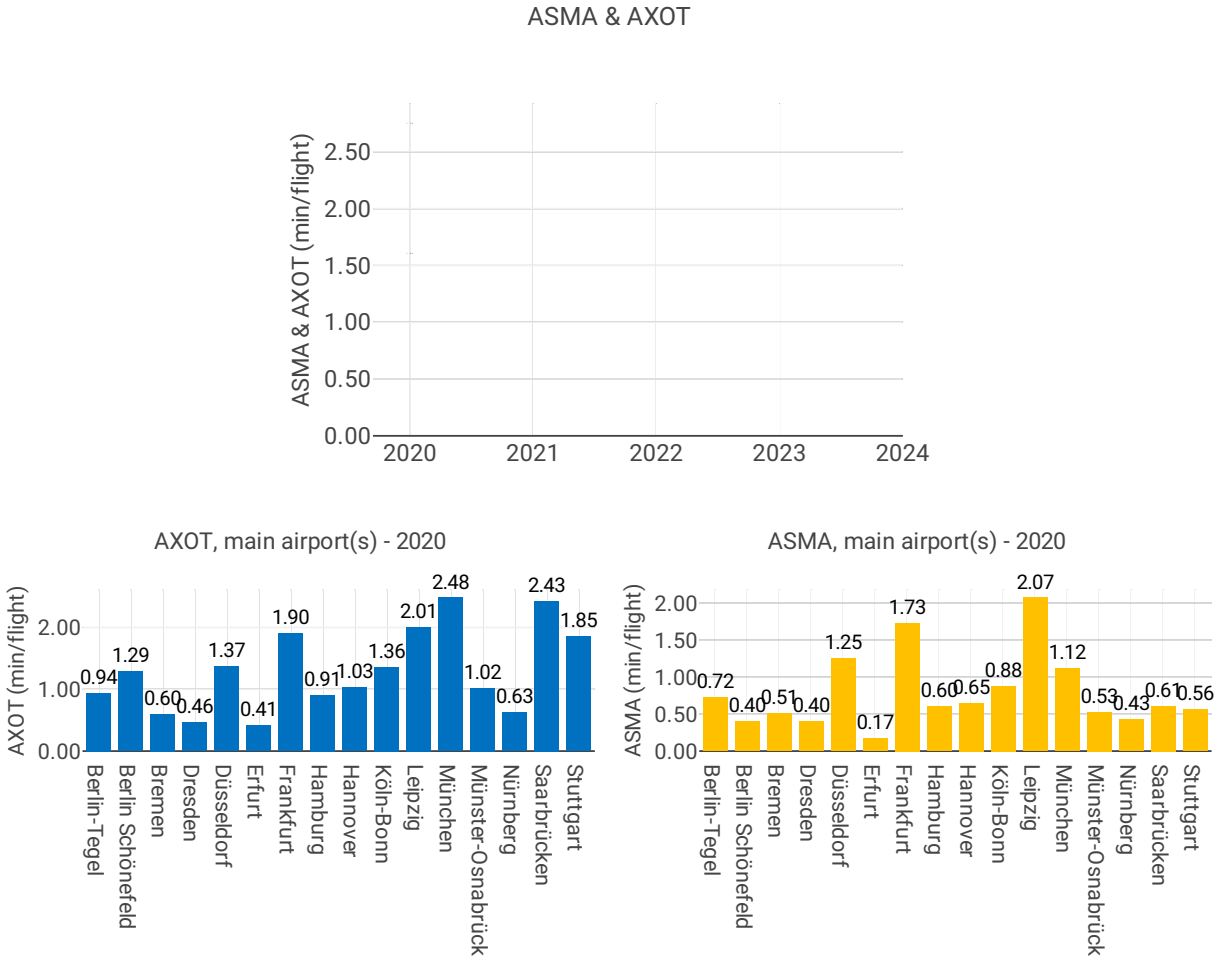






3.3 Terminal performance

3.3.1 Additional taxi-out time (AXOT) (PI#3) & Arrival Sequencing and Metering Area (ASMA) time (PI#4)



Focus on ASMA & AXOT

AXOT

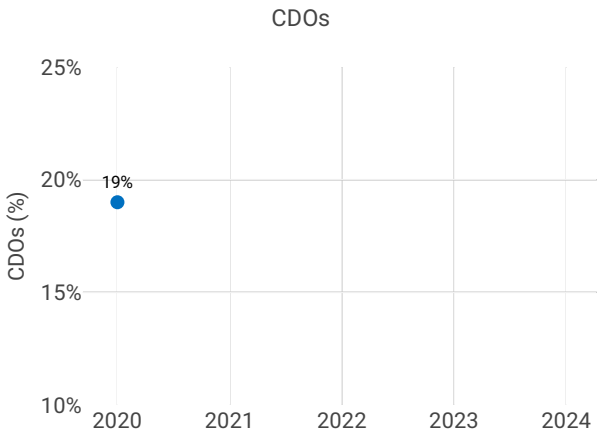
The additional taxi-out times in 2020 at German airports were strongly impacted by the reduction of traffic, dropping below 1 min/dep. at many of these airports between April and October.
Stuttgart (EDDS) and Cologne-Bonn (EDDK) showed a lower improvement with reductions below a 30% and their additional taxi-out times remained above 1 min/dep. throughout the year (except in April at Stuttgart, when they averaged 0.46 min/dep).
Additional times at Frankfurt were the highest in Germany in 2019 and dropped by 51% in 2020 (EDDF; 2019: 3.85 min/dep; 2020: 1.90 min/dep.)
Munich (EDDM; 2019: 3.82 min/dep; 2020: 2.48 min/dep.) seems to be very influenced by de-icing procedures, and showed very high additional taxi-times in the winter months, including December 2020, when this indicator averaged 3.58 min/dep. despite the low traffic.

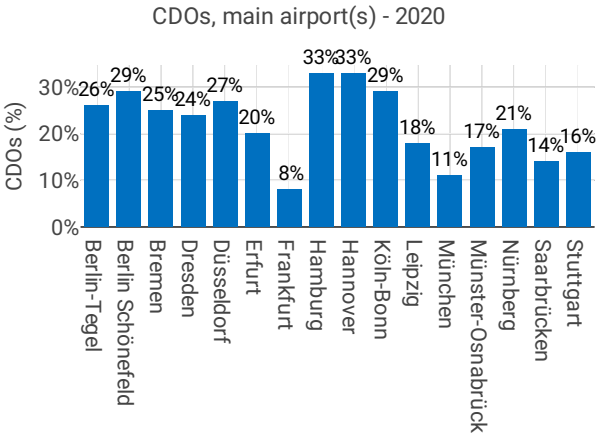
ASMA

All German airports except for Berlin Brandenburg show a decrease in the annual additional times in the terminal airspace between 20% and 51% lower than in 2019. Berlin Brandenburg (EDDB; 2019: 0.28 min/arr.; 2020: 0.40 min/arr.) slightly increased its additional ASMA times, but its performance was still the best in the group of German airports under monitoring.
The month of February was clearly the worst in terms of times in the terminal airspace, probably affected by the storms in central and north-western Europe.
The most impressive reduction of additional ASMA times was observed at Munich (EDDM; 2019: 2.07 min/arr.; 2020: 1.12 min/arr.) where this indicator was zero or nearly zero since April until the end of the

year.
Frankfurt on the other side showed the lowest reduction (20%) with respect to 2019 (EDDF; 2019: 2.17 min/arr.; 2020: 1.73 min/arr.) and was the airport with the highest additional ASMA times in the monitored SES airports in 2020.

3.3.2 Share of arrivals applying continuous descent operations (CDOs) (PI#5)





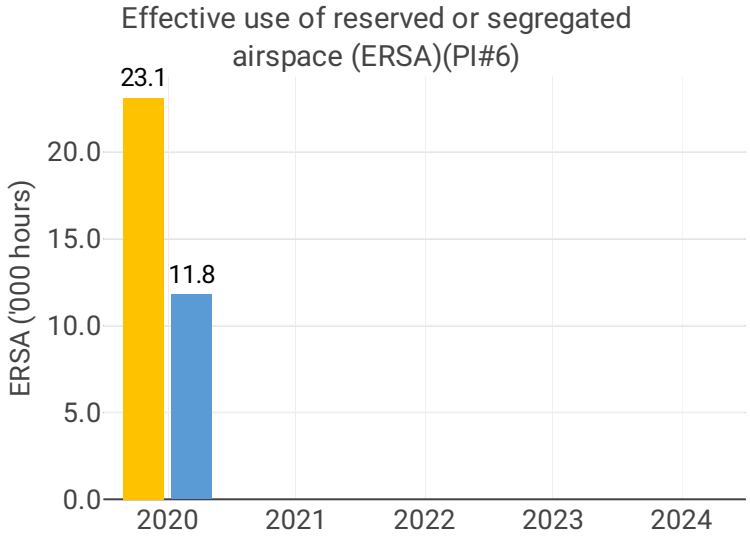
Focus CDOs

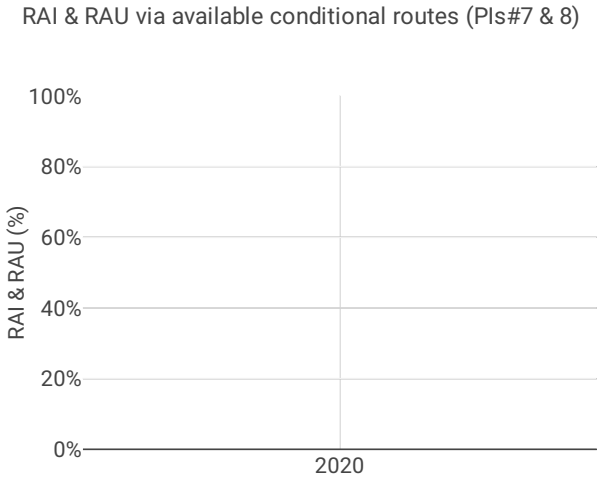
For only 2 out of the 16 airports (Hamburg - EDDH and Hanover - EDDV), the share of CDO flights was above the RP3 overall value in 2020 (32.5%).
The two airports with the highest traffic numbers, Frankfurt (EDDF) and Munich (EDDM), have a rather low share of CDO flights.

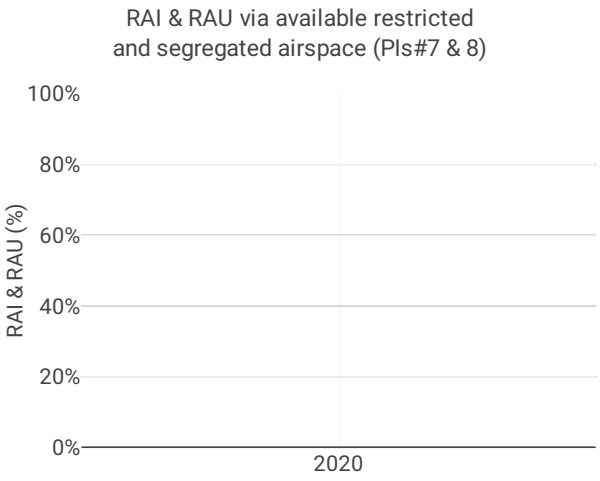
Airport level

	Additional taxi-out time (PI#3)					Additional ASMA time (PI#4)					Share of arrivals applying CDO (PI#5)				
Airport Name	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024	2020	2021	2022	2023	2024
Berlin Schönefeld	1.29	NA	NA	NA	NA	0.40	NA	NA	NA	NA	29%	NA	NA	NA	NA
Berlin-Tegel	0.94	NA	NA	NA	NA	0.72	NA	NA	NA	NA	26%	NA	NA	NA	NA
Bremen	0.60	NA	NA	NA	NA	0.51	NA	NA	NA	NA	25%	NA	NA	NA	NA
Köln-Bonn	1.36	NA	NA	NA	NA	0.88	NA	NA	NA	NA	29%	NA	NA	NA	NA
Dresden	0.46	NA	NA	NA	NA	0.40	NA	NA	NA	NA	24%	NA	NA	NA	NA
Düsseldorf	1.37	NA	NA	NA	NA	1.25	NA	NA	NA	NA	27%	NA	NA	NA	NA
Erfurt	0.41	NA	NA	NA	NA	0.17	NA	NA	NA	NA	20%	NA	NA	NA	NA
Frankfurt	1.90	NA	NA	NA	NA	1.73	NA	NA	NA	NA	8%	NA	NA	NA	NA
Hamburg	0.91	NA	NA	NA	NA	0.60	NA	NA	NA	NA	33%	NA	NA	NA	NA
Hannover	1.03	NA	NA	NA	NA	0.65	NA	NA	NA	NA	33%	NA	NA	NA	NA
Leipzig	2.01	NA	NA	NA	NA	2.07	NA	NA	NA	NA	18%	NA	NA	NA	NA
Münster-Osnabrück	1.02	NA	NA	NA	NA	0.53	NA	NA	NA	NA	17%	NA	NA	NA	NA
München	2.48	NA	NA	NA	NA	1.12	NA	NA	NA	NA	11%	NA	NA	NA	NA
Nürnberg	0.63	NA	NA	NA	NA	0.43	NA	NA	NA	NA	21%	NA	NA	NA	NA
Saarbrücken	2.43	NA	NA	NA	NA	0.61	NA	NA	NA	NA	14%	NA	NA	NA	NA
Stuttgart	1.85	NA	NA	NA	NA	0.56	NA	NA	NA	NA	16%	NA	NA	NA	NA

3.4 Civil-Military dimension







Focus on Civil-Military dimension

Update on Military dimension of the plan

No data available

Military - related measures implemented or planned to improve environment and capacity

No data available

Initiatives implemented or planned to improve PI#6

No data available

Initiatives implemented or planned to improve PI#7

No data available

Initiatives implemented or planned to improve PI#8

No data available

4 CAPACITY - GERMANY

4.1 PRB monitoring

• DFS recorded 0.18 minutes of en route ATFM delay per flight in 2020 and performed better than its local breakdown value of 0.52.

• Delays must be considered in the context of the traffic evolution: IFR movements in 2020 were 56% below the 2019 levels in Germany. When analysing the first two months of 2020, there were slightly less IFR movements than in 2019 (-2%) but delays reduced more notably (-41%).

• Germany reported some capacity issues in the early months of 2020 due to the lack of qualified ATCOs. Germany reported a decrease in the number of ATCO FTEs by 4%, 1%, 1% and 2% in Bremen, Karlsruhe, Langen and Münich ACCs respectively.

• Based on the analysis of previous capacity profiles, the PRB estimates Germany will face a capacity gap once IFR movementsrise above 80% of 2019 levels. The PRB recommends that capacity improvement measures should be implemented.

• Delays were mostly related to ATC capacity and staffing.

• The share of delayed flights with delays longer than 15 minutes in Germany decreased by 15.91 p.p. compared to 2019.

• The yearly total of sector opening hours in Langen ACC was 118,454, showing a 10.5% decrease compared to 2019. The yearly total of sector opening hours in Munich ACC was 70,385, showing a 27.6% decrease compared to 2019. The yearly total of sector opening hours in Karlsruhe ACC was 88,037, showing a 39.2% decrease compared to 2019. The yearly total of sector opening hours in Bremen ACC was 76,975, showing a 25.9% decrease compared to 2019.

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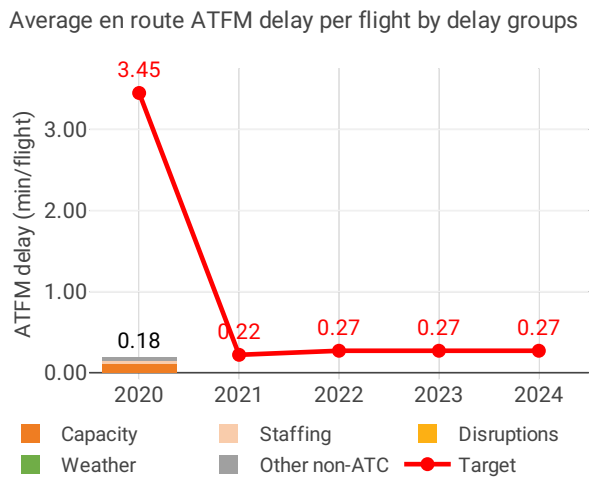
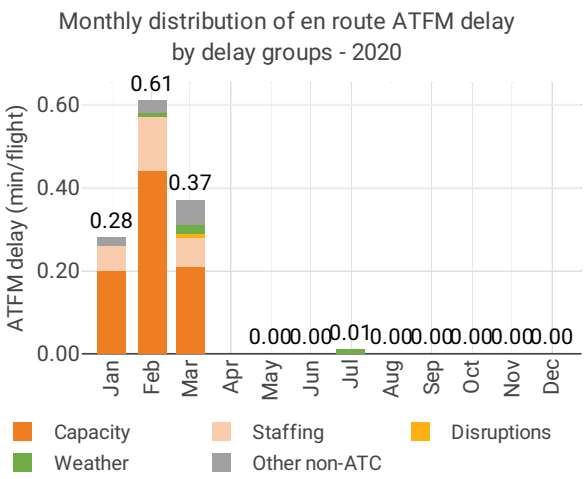
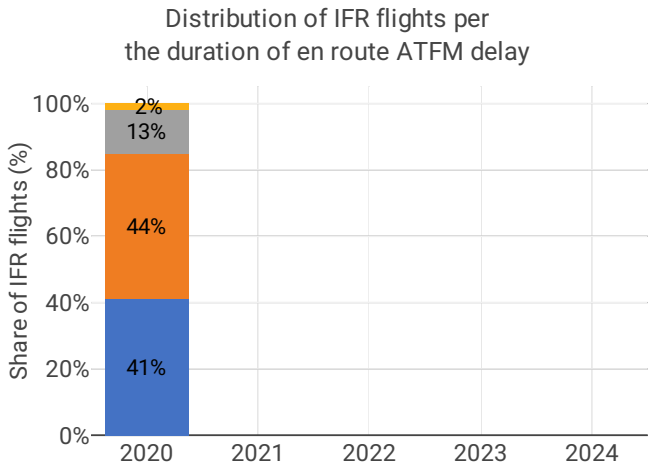
4.2 En route performance

4.2.1 En route ATFM delay (KPI#1)







Focus on en route ATFM delay

Summary of capacity performance

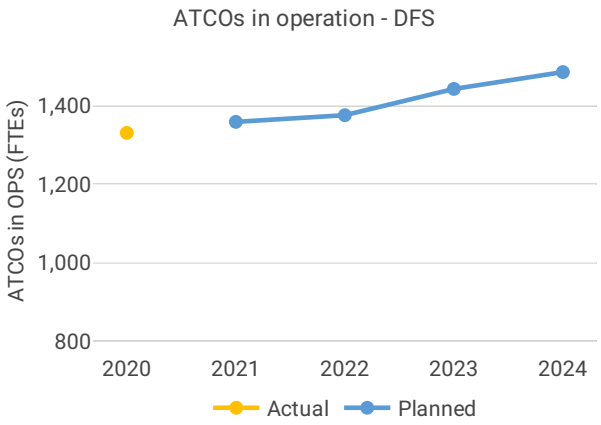
NSA's assessment of capacity performance

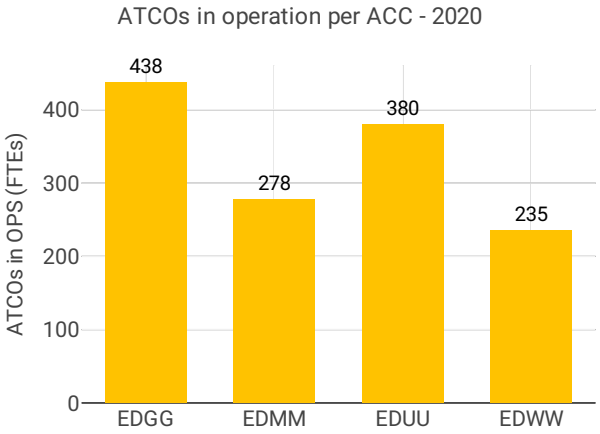
Monitoring process for capacity performance

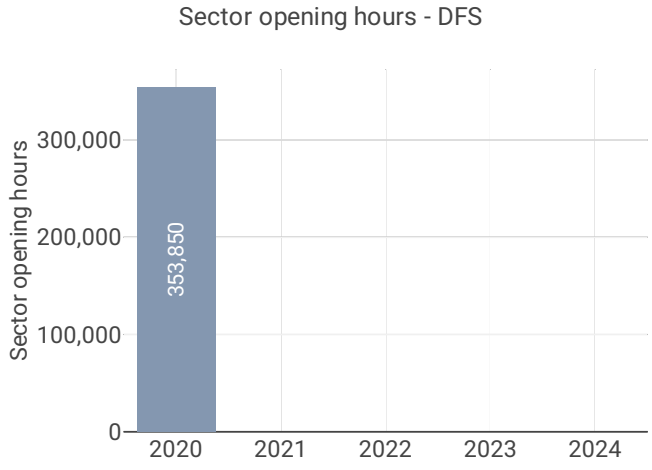
Capacity planning

Application of Corrective Measures for Capacity (if applicable)

4.2.2 Other indicators



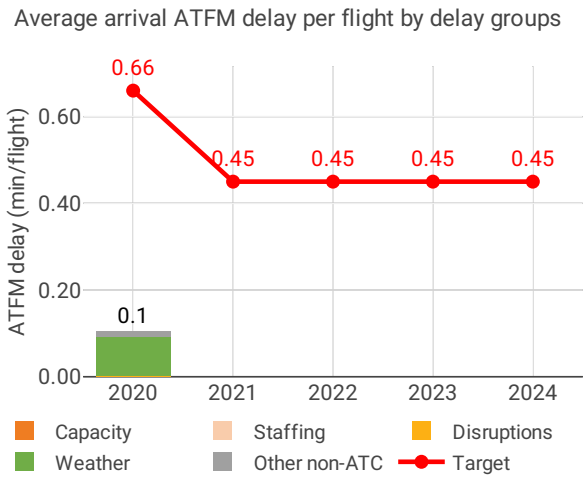


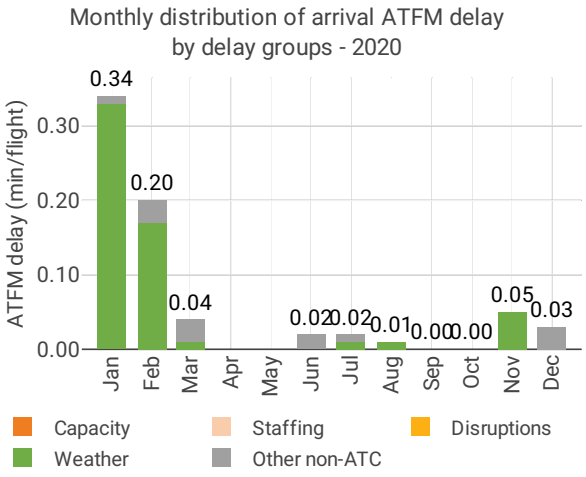


Focus on ATCOs in operations

4.3 Terminal performance

4.3.1 Arrival ATFM delay (KPI#2)





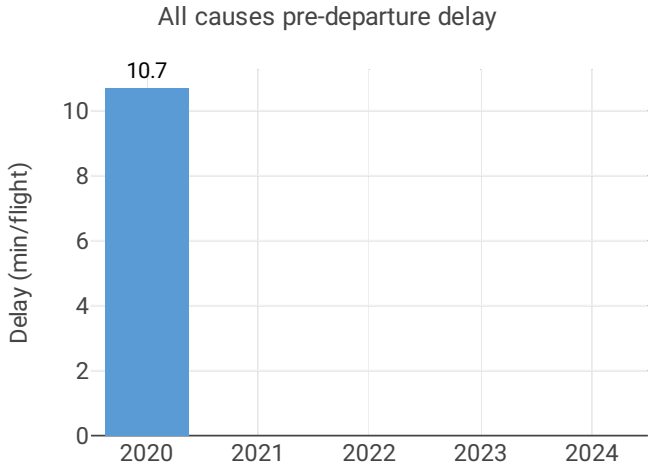
Focus on arrival ATFM delay

Germany identifies a total of 16 airports as subject to RP3 monitoring.
However, in accordance with IR (EU) 2019/317 and the traffic figures, only 8 of those airports must be monitored for pre-departure delays.
The Airport Operator Data Flow, necessary for the monitoring of these pre-departure delays, is established for the 8 airports required. Nevertheless, the quality of the reporting does not allow for the calculation of the ATC pre-departure delay at any of these airports, with more than 60% of the reported delay not allocated to any cause.
Traffic at the ensemble of German airports under monitoring decreased by 59% in 2020 with respect to 2019. The reduction per airport depends very much on the type of operation. Leipzig (EDDP), with an important cargo operation observed only a 18% drop in traffic, while Munich (EDDM) and Dusseldorf (EDDL) observed a 65% reduction.
Berlin Tegel ceased operations as of November 2020, so 2020 is the only year it will appear in the monitoring.
This traffic drop obviously had an important impact in terms of arrival ATFM delays, with virtually zero delays as of April. Slot adherence is above 90% for all German airports and regarding All causes pre-departure delay, Frankfurt stands out with the second highest delay among the SES monitored airports.

The national average arrival ATFM delay at these German airports in 2020 was 0.10 min/arr, significantly lower compared with 0.39 min/arr in 2019 (-74%).
The biggest contributor to the minutes of arrival ATFM delays was Frankfurt (EDDF: 2019: 0.69 min/arr.; 2020: 0.19 min/arr.) with important delays in the first trimester. 92% of all delays at EDDF were attributed to weather.
Dusseldorf showed very high weather delays in the first two months of the year, leaving this airport with the highest annual average arrival ATFM delay per flight in Germany (EDDL: 2019: 0.68 min/arr.; 2020: 0.26 min/arr.) although still very low. 81% of these delays were due to weather.
In a very similar way, Munich (EDDM: 2019: 0.25 min/arr.; 2020: 0.08 min/arr.) only had delays the first two months of the year, and mostly associated with weather (81%)
Leipzig had some weather delays at different moments in the year.

The provisional national target on arrival ATFM delay in 2020 was met.
In accordance with Article 3 (3) (a) of Implementing Regulation (EU) 2020/1627: The incentive scheme shall cover only the calendar years 2022 to 2024.

4.3.2 Other terminal performance indicators (PI#1-3)



Airport level

	Avg arrival ATFM delay (KPI#2)				Slot adherence (PI#1)			
Airport name	2020	2021	2022	2023	2020	2021	2022	2023
Berlin Schönefeld	NA	NA	NA	NA	97.7%	NA%	NA%	NA%
Berlin-Tegel	0.05	NA	NA	NA	94.2%	NA	NA	NA
Bremen	0.01	NA	NA	NA	94.9%	NA%	NA%	NA%
Dresden	NA	NA	NA	NA	99.7%	NA%	NA%	NA%
Düsseldorf	0.26	NA	NA	NA	95.8%	NA%	NA%	NA%
Erfurt	NA	NA	NA	NA	96.0%	NA%	NA%	NA%
Frankfurt	0.19	NA	NA	NA	92.3%	NA%	NA%	NA%
Hamburg	0.03	NA	NA	NA	97.5%	NA%	NA%	NA%
Hannover	NA	NA	NA	NA	95.9%	NA%	NA%	NA%
Köln-Bonn	0.03	NA	NA	NA	97.2%	NA%	NA%	NA%
Leipzig	0.14	NA	NA	NA	98.9%	NA%	NA%	NA%
München	0.08	NA	NA	NA	94.3%	NA%	NA%	NA%
Münster-Osnabrück	NA	NA	NA	NA	97.1%	NA%	NA%	NA%
Nürnberg	NA	NA	NA	NA	97.6%	NA%	NA%	NA%
Saarbrücken	NA	NA	NA	NA	98.4%	NA%	NA%	NA%
Stuttgart	NA	NA	NA	NA	98.9%	NA%	NA%	NA%

	ATC pre departure delay (PI#2)				All causes pre departure delay (PI#3)			
Airport name	2020	2021	2022	2023	2020	2021	2022	2023
Berlin Schönefeld	0.04	NA	NA	NA	8.2	NA	NA	NA
Berlin-Tegel	NA	NA	NA	NA	6.7	NA	NA	NA
Bremen	0.01	NA	NA	NA	3.4	NA	NA	NA
Dresden	0.00	NA	NA	NA	7.9	NA	NA	NA
Düsseldorf	0.11	NA	NA	NA	8.2	NA	NA	NA
Erfurt	0.00	NA	NA	NA	4.8	NA	NA	NA
Frankfurt	0.28	NA	NA	NA	16.5	NA	NA	NA
Hamburg	0.08	NA	NA	NA	7.4	NA	NA	NA
Hannover	0.01	NA	NA	NA	11.6	NA	NA	NA
Köln-Bonn	NA	NA	NA	NA	10.8	NA	NA	NA
Leipzig	0.16	NA	NA	NA	15.2	NA	NA	NA
München	0.01	NA	NA	NA	7.3	NA	NA	NA
Münster-Osnabrück	0.00	NA	NA	NA	8.6	NA	NA	NA
Nürnberg	0.03	NA	NA	NA	13.4	NA	NA	NA
Saarbrücken	0.00	NA	NA	NA	3.3	NA	NA	NA
Stuttgart	0.05	NA	NA	NA	6.9	NA	NA	NA

Focus on performance indicators at airport level

ATFM slot adherence

With the drastic drop in traffic, the share of regulated departures from German airports virtually disappeared as of April. These annual figures are therefore driven by the performance in the first trimester. All German airports showed adherence above 92% and the national average was 95.5%. With regard to the 4.5% of flights that did not adhere, 3.5% was early and 1% was late.

It is worth mentioning that at the two biggest airports Frankfurt and Munich, the share of departures ahead of the Slot Tolerance Window (6.6% and 4.9%, respectively) was significantly higher than the departures after the STW (1.1% and 0.7%)

ATC pre-departure delay

The share of unidentified delay reported by all 8 German airports subject to monitoring of this indicator in 2020 has been above 40% for more than 2 months in the year, preventing the calculation of this indicator. This is partially due to the special traffic composition for most months in 2020. Most of these airports normally had proper reporting before the pandemic and only after April 2020 the share of unidentified delay exceeded the required minimum for the computation.
On the other hand the insufficient data quality provided by Cologne (EDDK) is a long standing issue prior to April 2020.

All causes pre-departure delay

The total (all causes) delay in the actual off block time at German airports in 2020 was between 6.71 min/dep for Tegel (EDDT) and 16.49 min/dep. for Frankfurt (EDDF) which is the 2nd highest among the RP3 monitored airports.
The higher delays per flight were observed in the second trimester of the year, due to the lower traffic and extraordinary circumstances. In December there was also a general increase at most of these airports.

5 COST-EFFIENCY - GERMANY

5.1 PRB monitoring

• The 2020 actual service units (6,792K) were 55% lower than the actual service units in 2019 (15,155K).

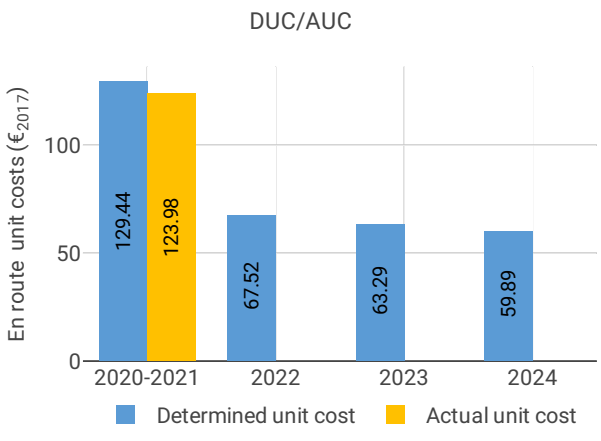
• Germany reduced total costs in 2020 by only 21 M€2017 (-2%) compared to 2019 actual costs. The reduction was mainly driven by a 33 M€2017 lower cost of capital (-58%), resulting from a lower WACC due to a change in capital structure.

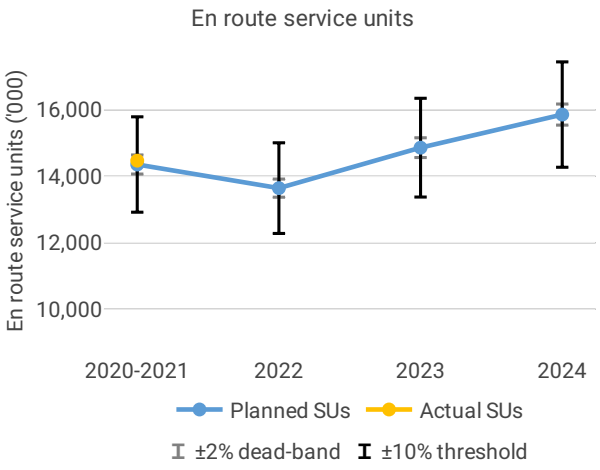
• Germany increased other operating costs by 18 M€2017 (+15%) due to “many unspecified individual measures”.

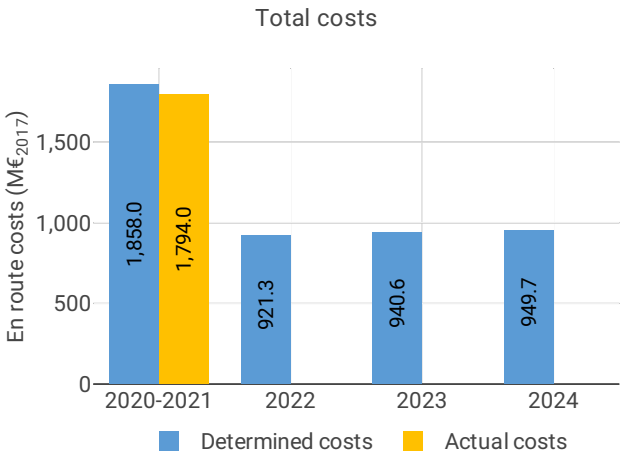
• DFS spent 87 M€2017 in 2020 related to costs of investments, 3% less than planned in the 2019 draft performance plan (90 M€2017).The reduction is mainly driven by a decrease in costs related to existing investments. Moreover, most of new major investments (which were planned for later years of the reference period) have been either postponed or the planning has been revised in order to achieve long term costs savings in response to COVID-19.

5.2 En route charging zone

5.2.1 Unit cost (KPI#1)

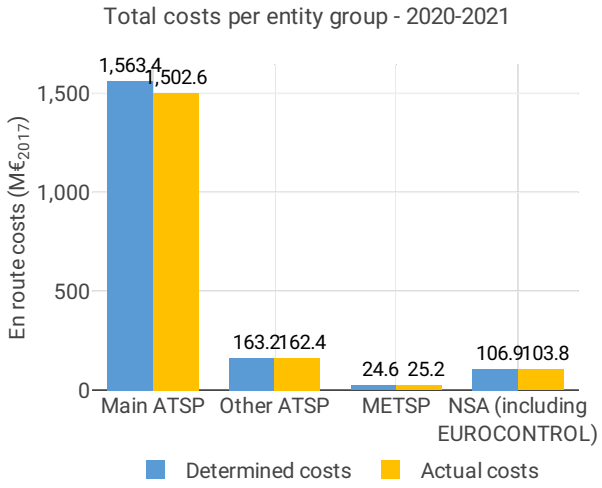


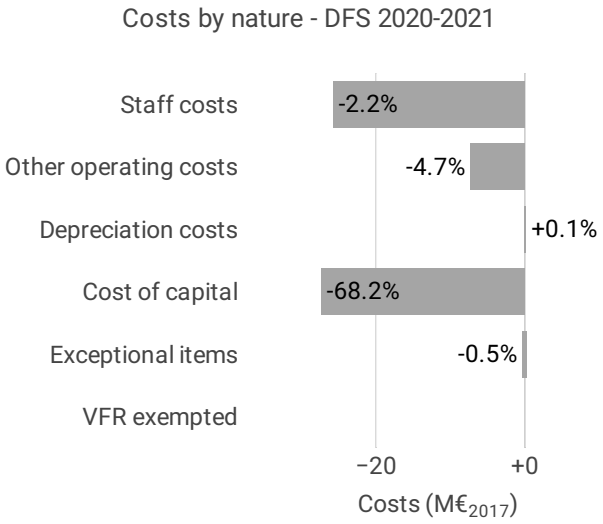




Actual and determined data

Total costs - nominal (M€)	2020-2021	2022	2023	2024
Actual costs	1,877	NA	NA	NA
Determined costs	1,935	977	1,010	1,034
Difference costs	-59	NA	NA	NA
Inflation assumptions	**2020-2021**	**2022**	**2023**	**2024**
Determined inflation rate	NA	1.1%	1.5%	1.7%
Determined inflation index	NA	107.2	108.8	110.6
Actual inflation rate	NA	NA	NA	NA
Actual inflation index	NA	NA	NA	NA
Difference inflation index (p.p.)	NA	NA	NA	NA





Focus on unit cost

AUC vs. DUC

In the combined year 2020-2021, the en route AUC was -4.2% (or -5.46€2017) lower than the planned DUC. This results from the combination of slightly higher than planned TSUs (+0.8%) and lower than planned en-route costs in real terms (-3.4%, or -64.0 M€2017).

En route service units

The difference between actual and planned TSUs (+0.8%) falls within the ±2% dead band. Hence the resulting additional en-route revenue is kept by the ANSPs.

En route costs by entity

Actual real en route costs are -3.4% (-64.0 M€2017) lower than planned. This is driven by the main ANSP, DFS (-3.9%, or -60.8 M€2017), MUAC (-0.5%, or -0.7 M€2017), the MET service provider (+2.7%, or +0.7 M€2017) and the NSA/EUROCONTROL costs (-2.9%, or -3.1 M€2017).

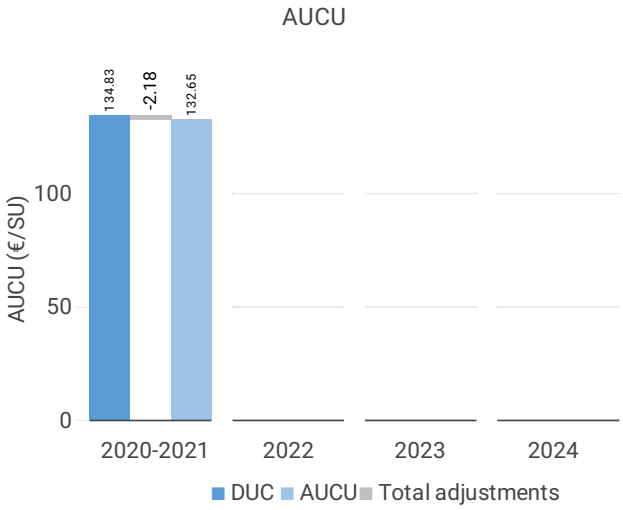
En route costs for the main ANSP at charging zone level

The lower than planned en route costs in real terms for DFS (-3.9%, or -60.8 M€2017) result from:
- lower staff costs (-2.2%), due to “short-term measures to counter the effects of the Corona pandemic, such as suspension of new hires, partial suspension of operational training, and conclusion of a collective agreement to make personnel costs more flexible in the short term”;
- lower other operating costs (-4.7%), due to “a number of several smaller measures and components as travel-expense, education and training, allowance on receivables.”;
- slightly higher depreciation (+0.1%); and
- lower cost of capital (-68.2%), due to a positive financial result in 2021;

- exceptional items corresponding to the IFRS conversion effects in line with the plan (-0.5%).

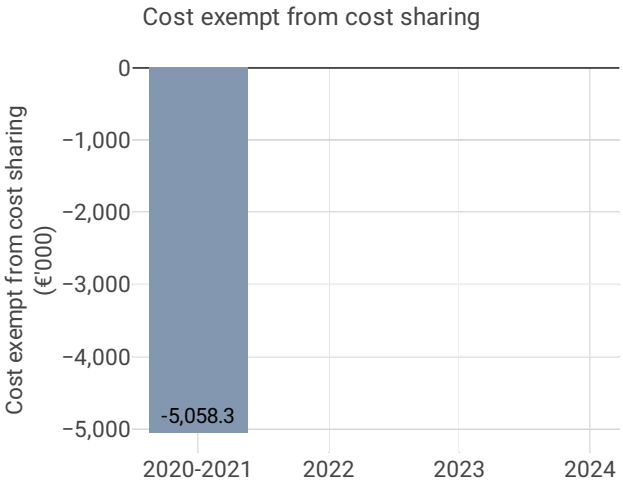
Note: When expressed in €2017, the depreciation and cost of capital are not adjusted for inflation, in accordance with Article 26 of Regulation (EU) 2019/317.

5.2.2 Actual unit cost incurred by the users (AUCU) (PI#1)



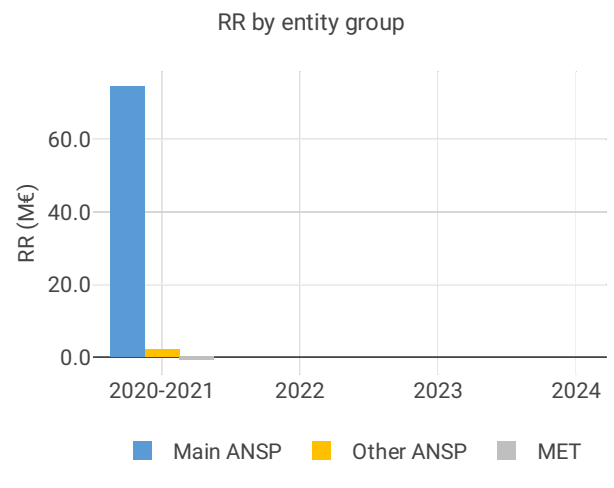
AUCU components (€/SU) – 2020-2021

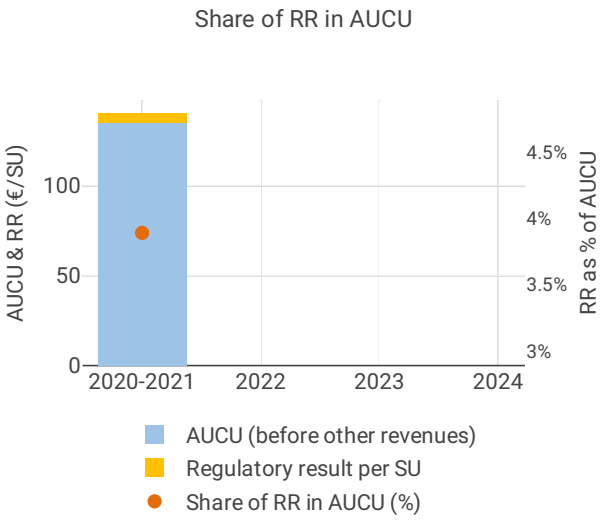
Components of the AUCU in 2020-2021	€/SU
DUC	**134.83**
Inflation adjustment	0.54
Cost exempt from cost-sharing	-0.35
Traffic risk sharing adjustment	0.00
Traffic adj. (costs not TRS)	-0.07
Finantial incentives	0.00
Modulation of charges	0.00
Cross-financing	0.00
Other revenues	-2.29
Application of lower unit rate	0.00
Total adjustments	-2.18
AUCU	**132.65**
AUCU vs. DUC	**-1.6%**

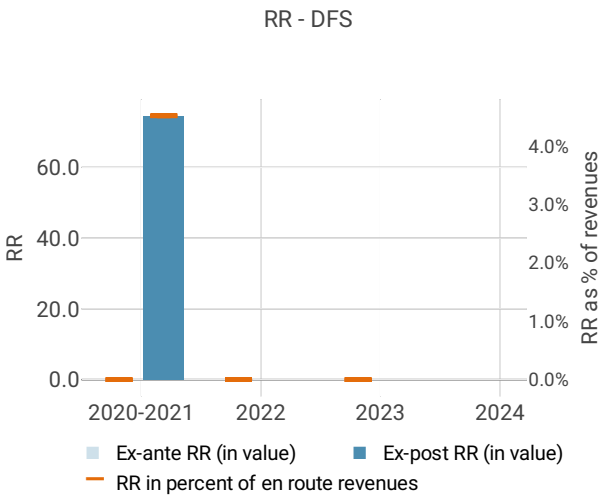


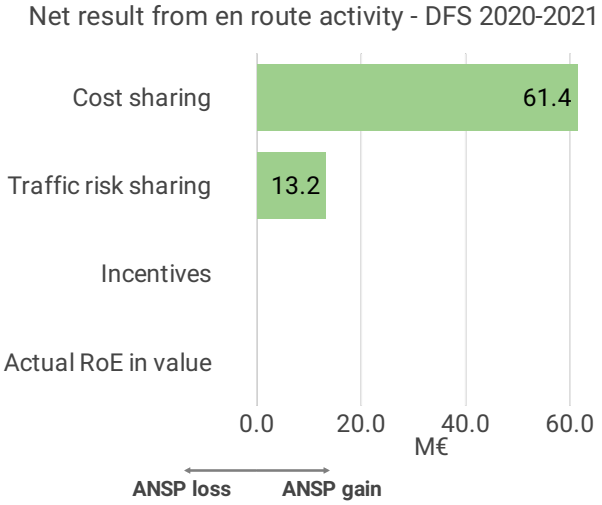
Cost exempt from cost sharing by item - 2020-2021	€'000	€/SU
New and existing investments	-71.9	0.00
Competent authorities and qualified entities costs	-1,005.0	-0.07
Eurocontrol costs	-2,132.5	-0.15
Pension costs	-1,849.0	-0.13
Interest on loans	0.0	0.00
Changes in law	0.0	0.00
Total cost exempt from cost risk sharing	**-5,058.3**	**-0.35**

5.2.3 Regulatory result (RR)









Focus on regulatory result

DFS net gain on activity in Germany en route charging zone in the combined year 2020-2021

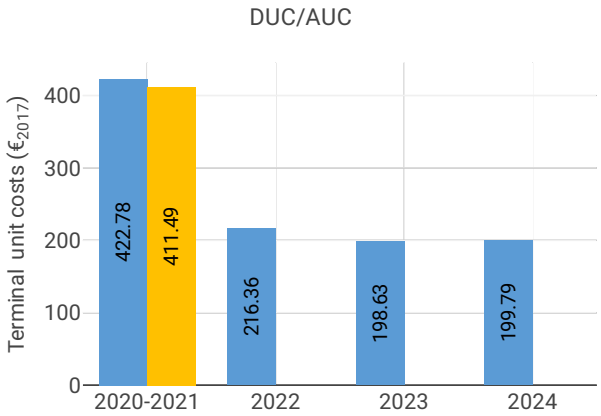
DFS incurred a net gain of +74.6 M€, resulting from a gain of +61.4 M€ arising from the cost sharing mechanism and a gain of +13.2 M€ arising from the traffic risk sharing mechanism.

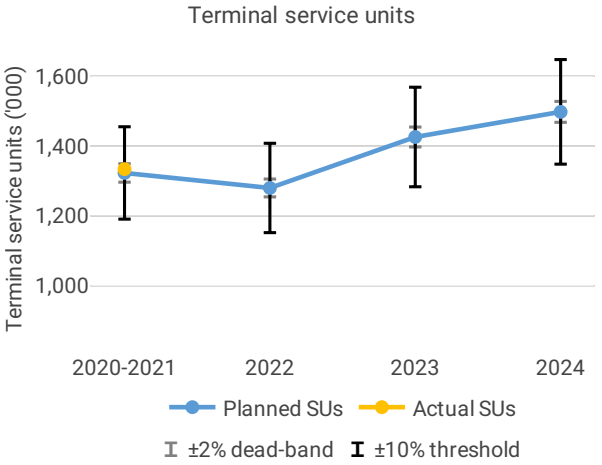
DFS overall regulatory results (RR) for the en route activity

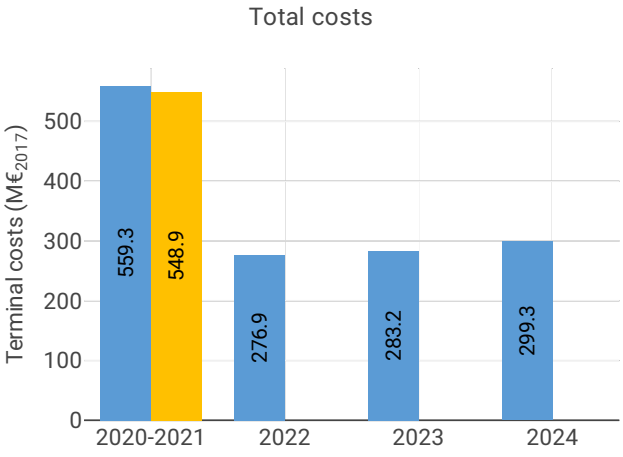
Ex-post, the overall RR corresponds to the net gain from the en route activity mentioned above (+74.6 M€), as the RoE for DFS has been set to zero throughout RP3. The ex-post RR corresponds to 4.5% of the en route revenues). The resulting ex-post rate of return on equity is 7.0%, compared to 0% planned in the PP.

5.3 Terminal charging zone

5.3.1 Unit cost (KPI#1)

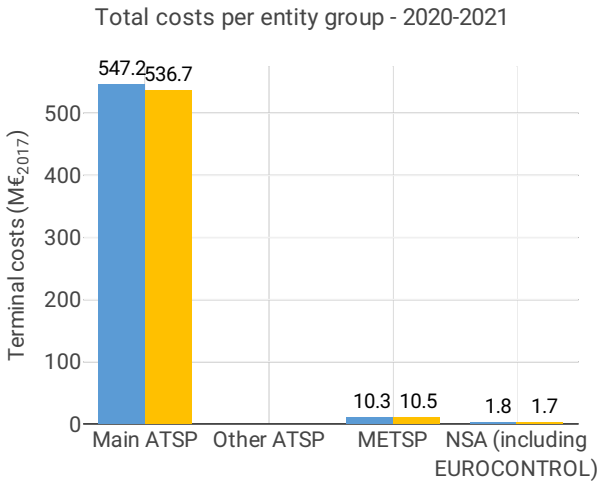


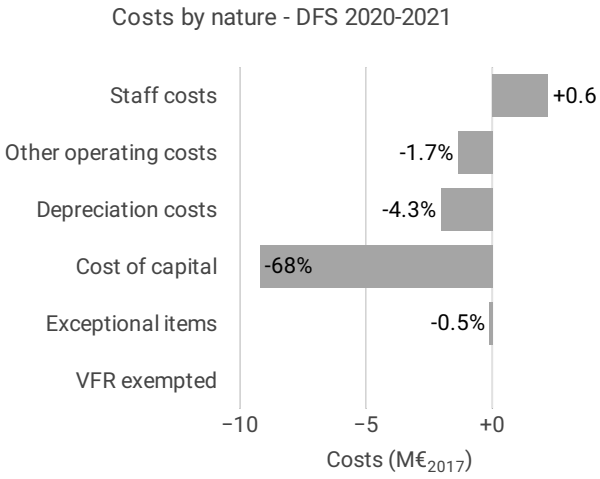




Actual and determined data

Total costs - nominal (M€)	2020-2021	2022	2023	2024
Actual costs	576	NA	NA	NA
Determined costs	584	294	305	327
Difference costs	-8	NA	NA	NA
Inflation assumptions	**2020-2021**	**2022**	**2023**	**2024**
Determined inflation rate	NA	1.1%	1.5%	1.7%
Determined inflation index	NA	107.2	108.8	110.6
Actual inflation rate	NA	NA	NA	NA
Actual inflation index	NA	NA	NA	NA
Difference inflation index (p.p.)	NA	NA	NA	NA





Focus on unit cost

AUC vs. DUC

The AUC for the combined year 2020-2021 is lower than the planned DUC (by -2.7%, or -11.28 €2017). This is due to the combination of higher than planned TNSUs (+0.8%) and lower than planned terminal costs in real terms (by -1.9%, or -10.4 M€2017).

Terminal service units

The difference between actual and planned TSUs (+0.8%) falls within the ±2% dead band. Hence the resulting gain is kept by the ANSPs.

Terminal costs by entity

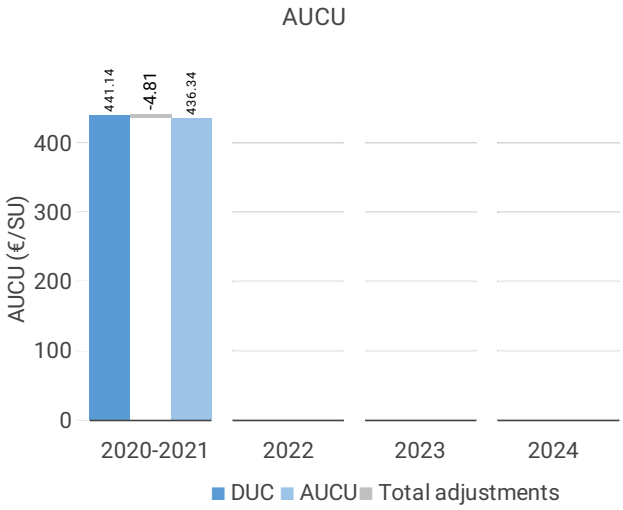
Actual real terminal costs for 2020-2021 are -1.9% (-10.4 M€2017) lower than planned. This result is driven by the main ANSP, DFS (-1.9%, or -10.5 M€2017), the METSP (+1.9%, or +0.2M€2017) and the NSA costs (-4.9%, or -0.1 M€2017).

Terminal costs for the main ANSP at charging zone level

Overall, the terminal costs in real terms for DFS in 2020-2021 were lower than the determined costs from the performance plan (by -1.9%, or -10.5 M€2017 lower). This results from:
- slightly higher staff costs (+0.6%),
- lower other operating costs (-1.6%), due “a number of several smaller measures and components as travel-expense, education and training, allowance on receivables.”
- lower depreciation (-4.3%);
- lower cost of capital (-68.0%) due to a positive financial result in 2021; and
- exceptional items corresponding to the IFRS conversion effects in line with the plan (-0.5%).

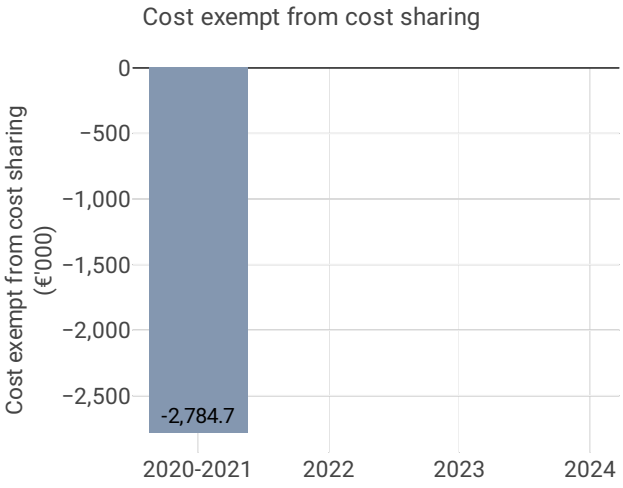
Note: When expressed in €2017, the depreciation and cost of capital are not adjusted for inflation, in accordance with Article 26 of Regulation (EU) 2019/317.

5.3.2 Actual unit cost incurred by the users (AUCU) (PI#1)



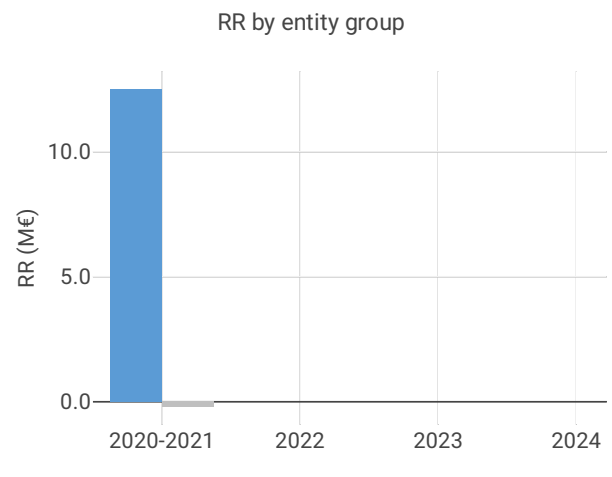
AUCU components (€/SU) – 2020-2021

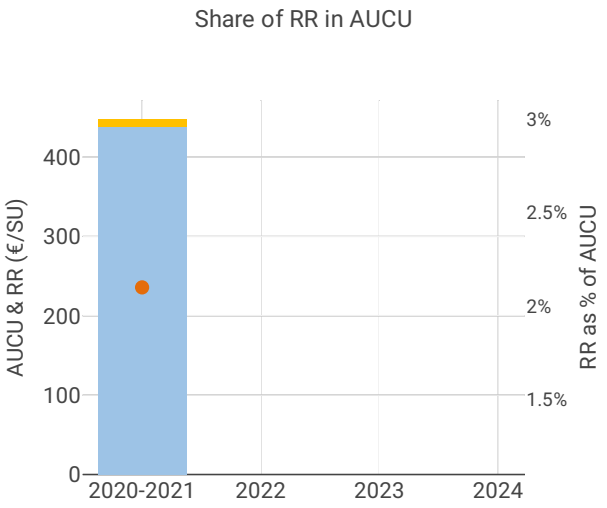
Components of the AUCU in 2020-2021	€/SU
DUC	**441.14**
Inflation adjustment	1.84
Cost exempt from cost-sharing	-2.09
Traffic risk sharing adjustment	0.00
Traffic adj. (costs not TRS)	-0.08
Finantial incentives	0.00
Modulation of charges	0.00
Cross-financing	0.00
Other revenues	-2.42
Application of lower unit rate	-2.06
Total adjustments	-4.81
AUCU	**436.34**
AUCU vs. DUC	**-1.1%**

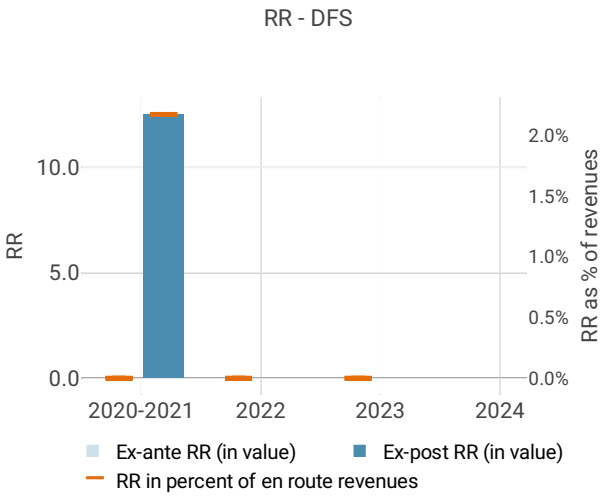


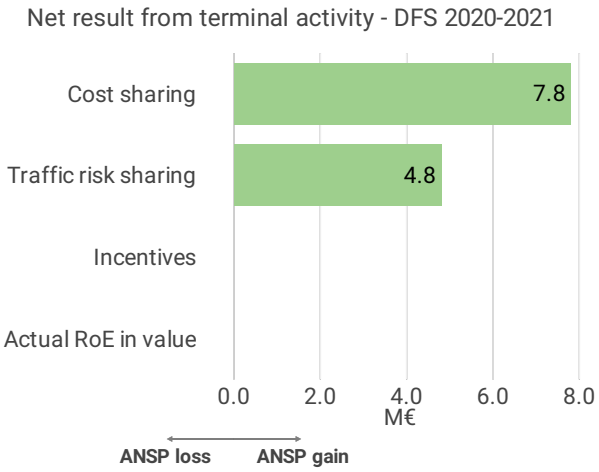
Cost exempt from cost sharing by item - 2020-2021	€'000	€/SU
New and existing investments	-2,048.7	-1.54
Competent authorities and qualified entities costs	-87.4	-0.07
Eurocontrol costs	0.0	0.00
Pension costs	-648.6	-0.49
Interest on loans	0.0	0.00
Changes in law	0.0	0.00
Total cost exempt from cost risk sharing	**-2,784.7**	**-2.09**

5.3.3 Regulatory result (RR)









Focus on regulatory result

DFS net gain on activity in Germany terminal charging zone in the combined year 2020-2021
DFS incurred a net gain of +12.5 M€, resulting from a gain of +7.8 M€ arising from the cost sharing mechanism and a gain of +4.8 M€ arising from the traffic risk sharing mechanism.
DFS overall regulatory results (RR) for theterminal activity
Ex-post, the overall RR corresponds to the net gain from the en route activity mentioned above (+12.5 M€) as the RoE for DFS has been set to zero throughout RP3. The ex-post RR corresponds to 2.2% of the en route revenues). The resulting ex-post rate of return on equity is 10.8%, compared to 0% planned in the PP.