Network Manager
nominated by
the European Commission

EUROCONTROL

EUROCONTROL Seven-Year Forecast February 2019

Flight Movements and Service Units 2019-2025

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Executive Summary

This report presents the February 2019 update of the EUROCONTROL seven-year flight and service units forecast. It replaces the previous forecast report published in October 2018 (Ref. 1).

This forecast has been prepared as part of the revised, more inclusive forecast process that was agreed at the 40th session of the Provisional Council in 2013. A first draft containing the input data and assumptions available in early January 2019 was presented to Stakeholders together with the flight and service unit forecasts resulting from these inputs. Stakeholder comments and our responses to them are available through the STATFOR OneSky Teams platform.

Forecast

Any user of this seven-year forecast should consult the entire forecast range (low-growth to high-growth) as an indicator of risk. This forecast includes downside risks (e.g. the economic indicators could worsen) and upside risks (e.g. currently high load factors could trigger higher flight counts sooner-than-expected). Moreover, a large package of measures is currently in preparation to make best use of all available capacity for Summer 2019. These measures will shift traffic flows and lead to overflight increases or decreases, depending on the States. At the time of forecasting, details were not available, so the possible impact has not been included, except that we have assumed that effects continue that are similar to the "NM/4ACCs" measures implemented in 2018.

IFR movements

In 2018, IFR movements continued to grow strongly (+3.8% versus 2017), making last year a new record year in terms of traffic volumes. Summer months were particularly busy and the counterpart was high delays. The latter were nevertheless eased via the specific routing measures put in place by the EUROCONTROL Network Manager and ANSPs ("NM/4ACCs"), making best use of all available capacity in the network.

For most of 2018, European airlines increased both load factors and seats per flight, which resulted in record passenger numbers, even if late 2017 had seen the loss of some significant airlines. Some concerns arose during the second half of 2018: increasing or volatile fuel costs, geopolitical tensions outside Europe and a weakening European economy.

In early 2019, the economic outlook remains fragile: as the forecast was being prepared, there were several significant downward revisions to economic forecasts, such as for Germany, Italy, France and the UK. We assume an "orderly" withdrawal of UK from the European Union in the base scenario, while a "harder" Brexit is considered in the low scenario; the main effects modelled are economic rather than aviation-specific. Other updated inputs include 2018 flights and routing patterns, the most recent population forecast, high-speed train network development, low-cost market share evolution, as well as future airport capacities.

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The flight forecast for Europe is for slightly slower growth rates over the seven-year horizon than the previous forecast publication (October 2018). This downwards revision is mostly notable in 2019, consistent with this economic situation, as well as with the impact of Germania's failure. Compared to the previous forecast, 2019 shows a wider uncertainty (±1.5 pp), driven by a lower low-scenario because we see strong downwards risks (possibility of worse-than-expected Brexit, or of more struggling or bankrupt airlines).

As shown in Figure 1, the forecast growth rate of IFR movements for 2019 is +2.8% (±1.5 pp) to reach 11.31 million flights. For 2020, we forecast 3.0% growth[1] to reach 11.65 million flights (±1.2 pp).

From 2021 onwards, the forecast has long been for slower economic growth than at the beginning of the horizon. This, coupled with the continuing increase of aircraft size means decelerating flight growth. Hence, European daily flight growth is expected to slow down from an average of 3.2% per year (2016-2020) to around 1.8% per year (2021-2025).

Figure 1. Summary of flight forecast for Europe (ECAC[2]).

ECAC		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	AAGR 2019-2025	RP2 2015-2019 AAGR	RP3 2020-2024 AAGR
IFR Flight Movements (Thousands)	H	.	.	.	.	11,448	11,922	12,317	12,656	12,984	13,335	13,635	**3.1%**	**3.2%**	**3.1%**
	B	9,923	10,197	10,604	11,002	11,308	11,646	11,865	12,094	12,293	12,501	12,672	**2.0%**	**3.0%**	**2.0%**
	L	.	.	.	.	11,132	11,329	11,324	11,398	11,451	11,521	11,527	**0.7%**	**2.6%**	**0.7%**
Annual Growth (compared to previous year unless otherwise mentioned)	H	.	.	.	.	4.1%	4.1%	3.3%	2.8%	2.6%	2.7%	2.2%	**3.1%**	**3.2%**	**3.1%**
	B	1.6%	2.8%	4.0%	3.8%	2.8%	3.0%	1.9%	1.9%	1.6%	1.7%	1.4%	**2.0%**	**3.0%**	**2.0%**
	L	.	.	.	.	1.2%	1.8%	0.0%	0.7%	0.5%	0.6%	0.0%	**0.7%**	**2.6%**	**0.7%**

Total En-Route Service Units

In 2018, the total en-route service units in participating EUROCONTROL member states (CRCO16[3]) grew by 6.1% above 2017 levels, in line with the forecast published in October 2018.

Overall, service units are still growing faster than flights because of the continuing trend in increasing weight factors observed in the past years as well as increasing average distance flown. Both of these are linked to the fact that, on average, there continues to be a stronger increase of long-haul traffic than short-haul one.

In 2019, 169.3 million en-route service units (TSU) are expected to be produced in the CRCO16 area, corresponding to a growth of 4.2% (±1.4 pp) compared to 2018. Overall, TSU are expected to reach 175.6 million service units in 2020 in CRCO16, thus a growth of 3.7% (±1.2 pp). The strong growth rates observed during the first

[1] The 2020 total growth rate is inflated by 0.3 pp (compared to the daily growth rate) as 2020 is a leap year. Conversely, the 2021 total growth rate is depressed by 0.3 pp (compared to the daily growth rate).
[2] ECAC is the European Civil Aviation Conference. See Annex 1 - Traffic Region Definitions
[3] 'CRCO16' refers to the sum of all the charging zones formed by the EUROCONTROL Member States participating in the Multilateral Route Charges System in 2016. This list comprises: CRCO14 and Estonia, which joined EUROCONTROL in 2015.

couple of years of the forecast should fade out and service units growth should average 2.2% per year over the period 2021-2025. Distance and weight growth trends are expected to soften in the period. The total en-route service units in the CRCO16 area are expected to reach 196 million in 2025.

Over the seven-year period 2019-2025, the forecast for the participating EUROCONTROL member states (CRCO16) is for an average annual growth rate of 2.7% and a total growth of 21% of total en-route service units compared to 2018.

Figure 2. Summary of forecast of total service units in Europe.

Total service units (Thousands)		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total growth 2018-2025	AAGR RP2 2015-2019	AAGR RP3 2020-2024
CRCO16	H	.	.	.	.	171,490	179,875	187,180	193,760	200,181	206,988	212,988	31%	5.2%	3.8%
	B	138,505	144,274	153,194	162,512	169,302	175,616	179,909	184,459	188,522	192,691	196,267	21%	5.0%	2.6%
	L	.	.	.	.	166,944	171,099	171,815	173,685	175,272	177,110	177,930	9%	4.7%	1.2%
RP2Region†	H	.	.	.	.	141,320	147,691	153,212	158,165	162,930	167,916	172,217	29%	4.8%	3.5%
	B	115,063	120,208	126,928	134,016	139,583	144,333	147,446	150,871	153,854	156,855	159,372	19%	4.6%	2.4%
	L	.	.	.	.	137,722	140,703	140,925	142,114	143,107	144,296	144,617	8%	4.3%	0.9%

Total service units (Growth)		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	AAGR 2019-2025	AAGR RP2 2015-2019	AAGR RP3 2020-2024
CRCO16	H	.	.	.	.	5.5%	4.9%	4.1%	3.5%	3.3%	3.4%	2.9%	3.9%	5.2%	3.8%
	B	4.2%	4.2%	6.2%	6.1%	4.2%	3.7%	2.4%	2.5%	2.2%	2.2%	1.9%	2.7%	5.0%	2.6%
	L	.	.	.	.	2.7%	2.5%	0.4%	1.1%	0.9%	1.0%	0.5%	1.3%	4.7%	1.2%
RP2Region†	H	.	.	.	.	5.4%	4.5%	3.7%	3.2%	3.0%	3.1%	2.6%	3.6%	4.8%	3.5%
	B	3.0%	4.5%	5.6%	5.6%	4.2%	3.4%	2.2%	2.3%	2.0%	2.0%	1.6%	2.5%	4.6%	2.4%
	L	.	.	.	.	2.8%	2.2%	0.2%	0.8%	0.7%	0.8%	0.2%	1.1%	4.3%	0.9%

† RP2Region stands for the sum over all the 30 states involved in the EU-wide performance target setting (28 EU member states plus Norway and Switzerland). RP2 series includes service units for flight segments performed as Operational Air Traffic (OAT) for Germany.

The service unit forecast presented in Figure 2 is based on official CRCO statistics derived from the route filed in the flight plan ("Model 2"). On 17 December 2018, Member States decided to change the service unit calculation[4] to the actual route ("Model 3") from 2020. To give a sense of the likely effect of the change from "Model 2" to "Model 3" from 2020 onwards, the Central Route Charges Office (CRCO) prepared an initial evaluation based on actual data in the note attached (see Annex 4). Aircraft operators might route differently in response to this change in charging. There is therefore a high risk that actual TSU may diverge from the forecast. STATFOR will adopt the new calculation of the service units ("Model 3") as of the September 2019 forecast.

Latvia and Lithuania have agreed that the Latvian and Lithuanian charging zones will coincide with the Vilnius and Riga FIR respectively from the 1st of January 2020.

[4] New Performance & Charging Scheme adopted on 17/12/2018 means inter alia that charging will be based on actual routes as of 2020 (see Annex VIII, 1.2, of the to-be-published new performance and charging scheme adopted on the 17 December 2018, laying down a performance and charging scheme in the Single European Sky and repealing Implementing Regulations (EU) No 390/2013 and (EU) No 391/2013).

This forecast takes into account how this modification will affect en-route service units.

Terminal Service Units

The terminal navigation service units (TNSU) are both driven by the number of departures and the aircraft weight factor of flights at airports belonging to the Terminal Charging Zones within the Performance Scheme. Compared to the previous forecast publication (October 2018), the number of departures started from a higher baseline (2018) but remained quite similar across the seven year horizon. It is to be noted that, around 40% of these airports are expected to face the effect of capacity constraints by 2024, either directly or at some partner airports. On the other hand, this forecast is also influenced by the fact at these specific airports, growth of the weight factor has slowed.

Hence, the forecast for the terminal navigation service units has been revised downwards compared to the previous forecast. The growth rate for TNSU generated in the Terminal Charging Zones of the participating countries in the Performance Scheme (RP2 Region) in 2019 is expected to reach 2.9% (±1.4 pp), thus 8.8 million service units.

By 2025, the TNSU for RP2 Region are expected to grow by 1.8% per year and to reach 9.6 million.

Figure 3. Total Terminal Navigation Service Units generated in the RP2Region area.

Total Terminal Navigation service units (RP2 Region)		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	AAGR 2019-2025	AAGR RP2 2015-2019	AAGR RP3 2020-2024
TNSU Total (Thousands)	H	.	.	.	.	.	8,878.4	9,218.0	9,483.1	9,722.5	9,937.9	10,157.1	10,341.8	**2.8%**	**4.1%**	**2.7%**
	B	7,266.7	7,484.2	7,854.9	8,195.3	8,532.6	8,781.1	9,022.4	9,153.9	9,308.7	9,430.5	9,552.8	9,643.8	**1.8%**	**3.9%**	**1.7%**
	L	.	.	.	.	.	8,655.3	8,775.7	8,715.9	8,734.5	8,736.5	8,748.6	8,709.0	**0.3%**	**3.6%**	**0.2%**
TNSU (Growth)	H	.	.	.	.	.	4.1%.	3.8%	2.9%	2.5%	2.2%	2.2%	1.8%	**2.8%**	**4.1%**	**2.7%**
	B	0.6%	3.0%	5.0%	4.3%	4.1%	2.9%	2.7%	1.5%	1.7%	1.3%	1.3%	1.0%	**1.8%**	**3.9%**	**1.7%**
	L	.	.	.	.	.	1.4%.	1.4%	-0.7%	0.2%	0.0%	0.1%	-0.5%	**0.3%**	**3.6%**	**0.2%**

The EUROCONTROL 7-year forecast will be next updated in September 2019.

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1 Introduction

This is the final report on the 7-year forecast, February 2019 edition. This document has been prepared as part of the revised, more-inclusive forecast process that was agreed at the 40th session of the Provisional Council in 2013.

The quality of the input data and assumptions for the forecast is of key importance to producing the best-possible forecast. Therefore, the process put in place at the end of 2013 aims to encourage comments on the forecast assumptions from a wide group of Stakeholders Stakeholders (NMB, PC, ERC, NDOP and STATFOR User Group).

This final forecast is the last step of the four-month preparation process of the February 2019 forecast. This forecast is a refinement of a draft issued in January 2019. It includes a review of the forecast inputs and traffic trends up until January 2019.

This 7-year IFR movements and Service Units forecast replaces the September 2019 report (Ref.1).

2 Flight and Service Units trends in 2018

2.1 IFR movements

In 2018, the number of flights in Europe increased by 3.8% (compared to 2017), driving the total above 11 million, an all-time record. Summer months were in line with the high-growth scenario of the February 2018 forecast. Airlines, planning when fuel costs were low and helped by strong demand for flight, maximised their load factors and the total number of passengers carried grew much more strongly.

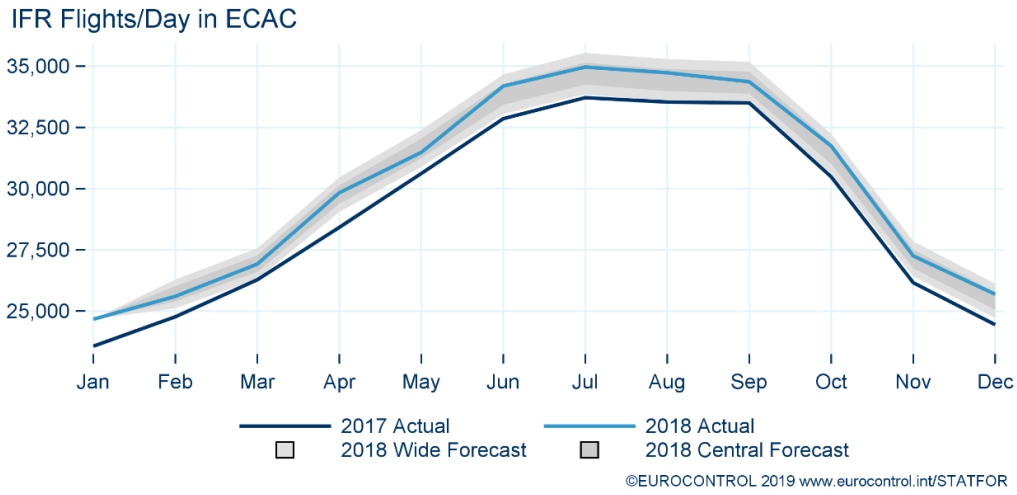
The overall positive trend in 2018 however hid some local disparities: Germany and Spain were the busiest contributors to the local traffic growth in Europe while UK and Sweden recorded losses in their respective local traffic.

2018 was an exceptional year in Europe (ECAC): the number of flights controlled reached an all-time record of more than 11 million. The number of IFR movements increased by 3.8% (compared to 2017), very similar to 2017's 4% growth rate.

On average, there were 30,142 flights per day in ECAC; with the busiest traffic day ever on 7 September where 36,910 flights were controlled. In fact, there were 19 days in 2018 with over 36,000 flights – there were none in 2017. Across 2018, the second and the last quarters recorded higher than average growth rates (compared to 2017); the last quarter's growth was particularly boosted due to heavy cancellations in 2017 (airline failures and snow). See Figure 4.

Overall, growth was in line with the forecast for the first part of the year, hovering near the high-growth scenario from June 2018, see Figure 4.

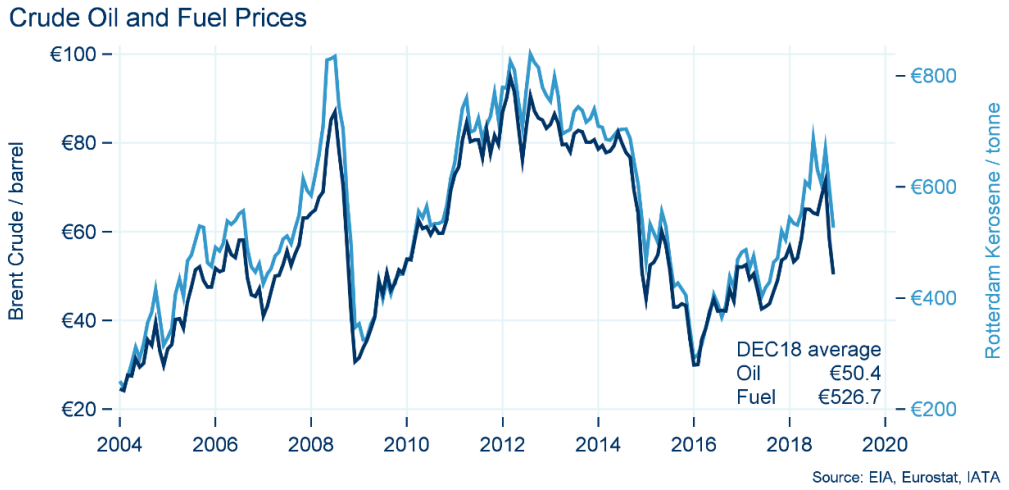
Figure 4. 2018 European traffic saw 3.8% more flights than in 2017. Actual traffic was in line with the February 2018 forecast, nearing the high-growth scenario rates from June onwards.



Since 2013, air passenger and air freight volumes have constantly increased, driven by a progressive economic recovery in Europe (see Section 0) from the

double dip in 2009 and 2012. In 2018, Europe (EU28) recorded a 2% economic growth that stimulated the demand, although there were signs of the mini economic boom giving out by the end of the year. Fuel costs were very variable during 2018, which creates its own issues for airlines. Oil prices averaged €60 per barrel, starting at around €55 per barrel in January 2018, to increase to €70 early October, before falling down to €50 at the end of the year as some big producers suddenly increased their crude oil production[5] to compensate for the anticipated the decline of Iran oil exports (US sanctions).

Figure 5. Oil prices average at €60 per barrel in 2018 (ARA).



Some new and more efficient aircraft were delivered: Boeing (806 deliveries, out of which 20% in Europe) and Airbus (800 deliveries, 17% in Europe) added mainly aircraft such as B737 Max or A320neo in 2018.

With fuel costs relatively manageable when they were planning (late 2017), and a favourable economic context, airlines brought capacity to the network in 2018. The Europe-wide available seat kilometres grew by 5.8% and the available freight tonne kilometres grew by 3.2% in 2018. Building on post-crisis efforts (restructuring and concentrating on filling-up the aircraft), European airlines posted passenger load factors of 84.8% (a 0.6 pp increase on 2017), the highest of all regions as Europe. Freight load factors were at 54.3% (source: IATA, February 2019, see footnote 8).

Limiting the analysis to the ECAC passenger[6] market only, the total number of seats increased more rapidly (+5.8%) than the total number of flights[7] in 2018 (+4.2%), when compared to 2017. Hence, the average number of seats per flights increased by 1.5%, closely linked to the increasing trend in aircraft weights. Increasing number of flights, seats per flight, average flown distance and load factors together resulted in a continuous increase in passenger numbers: revenue passenger kilometres (RPK) posted +6.4% rise in 2018 (source: IATA, estimation December 2018).

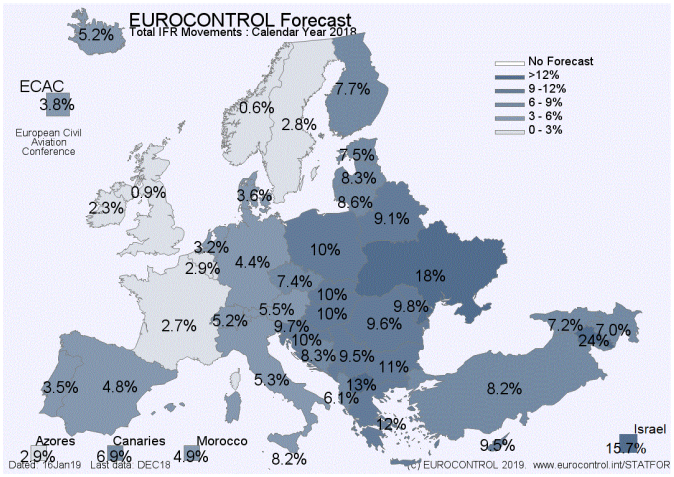
[5] Russia, Saudi Arabia, Kuwait, Iraq and the US
[6] Here, passenger market takes consists of: traditional scheduled, non-scheduled and low-cost markets.
[7] Traffic comprises departures, arrivals and domestic flights (but excludes ECAC overflights).

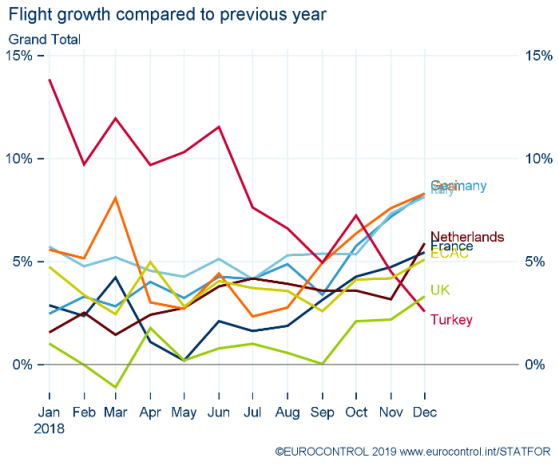
Overall European airlines recorded net profits[8] of $7.5 billion in 2018, slightly less than in 2017 ($8.2 billion) and 2016 ($8.5 billion) as some concerns arose during the second half of the year: some European failures (Primera Air, PrivatAir for example), the challenges of offering new business models with new aircraft across the Atlantic affecting Norwegian and WOW, geopolitical tensions (US-China, amongst others) or; some mixed signs on the economic backdrop in the region (eg. Germany).

2.1.1 Busiest States

At the end of the year, four of the eight busiest European States (Germany, Spain, Italy and Turkey) reported a flight growth rate above the ECAC average for the year as a whole (3.8%). The monthly graph (Figure 6) shows for most of these States an acceleration of growth from October 2018 (except Turkey). Part of this growth is artificial and notably explained by the Air Berlin and Monarch failures in October 2017, together with strikes and snow (December 2017) leading to cancellations, a year ago.

Figure 6. Left: 2018 growth per State. Right: Top 8 busiest States and ECAC growth per month in 2018. ECAC recorded higher than average growth rates during the fourth quarter, owing to cancellations in 2017. Germany, Italy and Spain have seen a big impact of this.





Germany, the busiest European State in terms of IFR movements, recorded a 4.4% growth in 2018 stimulated by demand in Southern Europe: the fact that some major carriers (Lufthansa, EasyJet and Eurowings) took over after the Air Berlin failure might have stimulated the demand on some flows, though there was a gap of several months. For the same reason, growth rates in Germany were artificially inflated during the last quarter of the year (counter-effect of the Air Berlin failure in October 2017). The growth in France (second busiest) was 2.7% in 2018, due to increased demand to Southern Europe (Spain, Portugal, Greece) and North Africa (Egypt, Tunisia and Morocco), but hindered by decreases on its domestic flow (-0.4%) and its flows from and to UK (-4.1%).

[8] Air Passenger Market Analysis – Dec. 2018, IATA, February 2019 and Air Freight Market Analysis – Dec. 2018, IATA, February 2019.

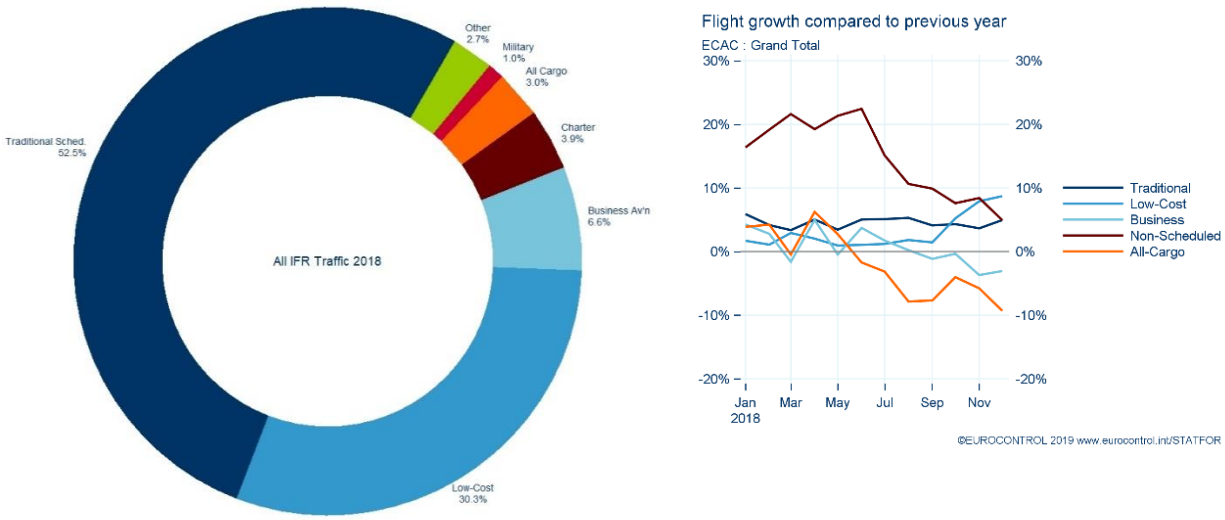
UK (third busiest) recorded less than 1% growth in 2018 (vs 2017), explained by a slowdown of traffic on its domestic flow (-3%) as well as on its flows from and to major European States (Spain, Germany, France, Netherlands), in part due to the failure of Monarch airlines.

Turkey recorded an overall growth of 8.2%, starting the year strongly (10%-15%) owing to strong growth on flows from and to Germany, Russian Federation, UK and Poland. However, the decline of its domestic flow (accounting for 25% of the total traffic), linked to its domestic economic challenges, reduced the overall growth rate from July onwards.

2.1.2 Market Segments

The traditional scheduled market segment, accounting for 52.5% of all IFR movements, grew strongly by 4.5%, followed by low-cost segment (30.3% market share) which posted a 2.8% increase, with an acceleration during the last quarter related to the 1-year post failure effect of some major carriers[9] (see Figure 7).

Figure 7. Left: Market Segment share in 2018. Right: Market segment growth in 2018.



2018 was the strongest growth by the traditional scheduled segment for at least 15 years[10], and the first time over the same period that the traditional scheduled flights outgrew the low-cost flights, even if the likely reason for the latter was the Air Berlin and Monarch failures.

The charter segment (3.9% market share) recorded a 14.4% increase starting the year with exceptionally high growth rates, linked to a recovery to Egypt and Tunisia.

Business aviation, accounting for 6.6% of the European traffic, remained mostly flat (+0.5% in 2018, vs 2017), even if it started declining from September 2018 across a broad range of geographic markets. Lastly, all-cargo flights (3% of the

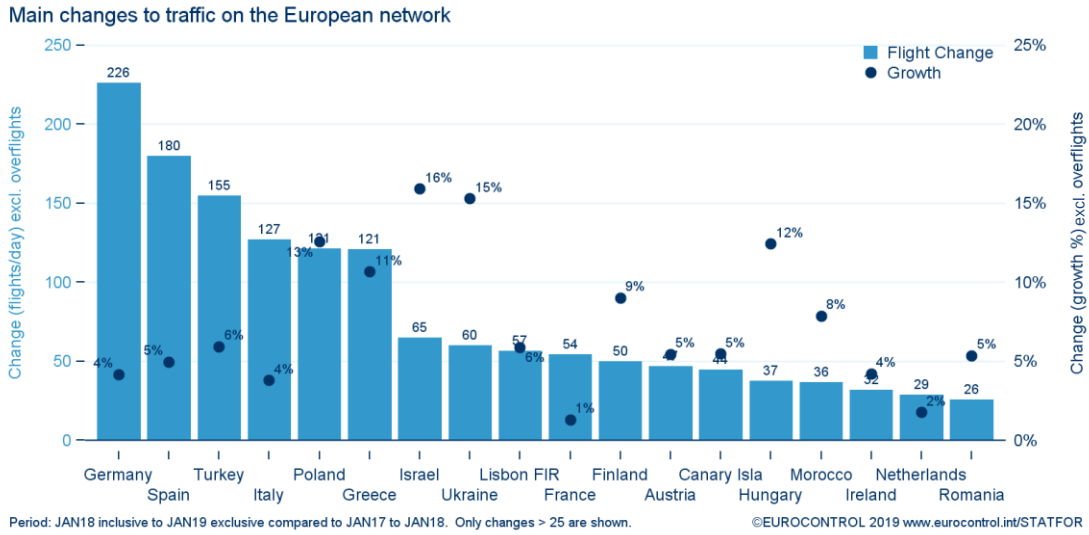
[9] Air Berlin, Monarch Scheduled, Niki Luftfahrt Gmbh
[10] STATFOR flights have been classified into market segments since 2005.

total traffic) recorded a 2.2% decline, losing pace during the second half of the year, linked to weakness in European manufacturers' export order books (particularly in Germany, see Section 3).

2.1.3 Network contributors

Referring to local traffic only (ie excluding overflights), all but two States have been adding flights to the network in 2018.

Figure 8. Main contributors to network growth (excl. overflights) in 2018.



Germany remained the main contributor (+4.2%, adding 226 flights/day), helped during the last quarter by the rebound following the first anniversary of the Air Berlin failure (in October 2017). Germany recorded strong growth on flows from and to Mediterranean states (Turkey, Spain, Greece as well as Egypt). Spain was the second biggest contributor to network growth (+4.9%, adding 180 flights/day) owing to a particularly dynamic domestic flow and strong growth from and to Germany. Then, Turkey (+5.9%, adding 155 flights/day), stimulated by the continuing traffic recovery from and to Russian Federation as well as strong growth from and to Germany, but held back by weak domestic flows. Italy (+3.8%, adding 127 flights/day) ranked fourth, notably due to strong traffic from and to Spain and from and to Russian Federation. Poland (+12.6%, adding 121 flights/day) completed the top five owing to strong growth and flows from and to Ukraine, Germany and Turkey). For the remainder of the contributors, see Figure 8.

At the other end of the scale, Sweden and UK saw declines of their local traffic but to minor extent (respectively 14 and 8 flights per day less than in 2017). UK recorded a general decrease on its busiest flows: Spain, Germany, France, Netherlands, Switzerland and Canary Islands.

2.1.4 Routing Changes

As every year, 2018 has been marked by changes in traffic patterns: some flights have used different routes compared to the ones used in 2017, notably because

airlines constantly optimise their routes and the network is also continuously refined, for example, recently with the growth of free route airspace.

Particular to 2018 was that, during the Summer, the EUROCONTROL Network Manager launched a joint initiative with ANSPs, the "eNM/4 ACCs" initiative, to optimise[11] the en-route flows through the centres' airspace as a single whole, so as to increase overall capacity and throughput.

This had an impact at sector level, in the core area of the network, on the flight routings and flight levels as well as on the distance flown and the aircraft weights. That being said, it is difficult to isolate the changes due to "eNM/4ACCs" at State level. We noted that flows between North-West European States (Germany, UK, Belgium/Luxembourg or France) and Italy have, for example, been more routed through Switzerland in 2018 while they were more going through Austria the year before.

When comparing 2018 routings to 2017 ones, other route changes on bi-directional flows at State level include:

- Flows between North-West Europe States (Germany, UK) and Turkey have been routed more via southern routes along the Adriatic coast (Croatia, Bosnia-Herzegovina, Serbia&Montenegro, Greece) than the northern routes used in 2017 (Czech Republic, Slovakia, Hungary, Romania, Bulgaria),
- Flows between Germany and Egypt have been routed more through eastern routes (via Czech Republic, Turkey, Cyprus) than through the 2017 routes along the Adriatic coast (via Croatia, Albania),
- Probably because of the jet stream position during the year, flows between North-Atlantic and Middle-East have been more routed through southern routes (via UK, Ireland, Bulgaria, Turkey) than northern routes (via Iceland, Norway, Sweden, Finland and Russian Federation),
- Flows between UK and Canaries have been more routed through France, Spain and Morocco than via the Atlantic routes (Ireland, Santa Maria),
- Flows between Italy and Middle-East have been routed through Bosnia Herzegovina, Bulgaria and Turkey than through southern routes (Greece, Cyprus).

2.1.5 Outside Europe

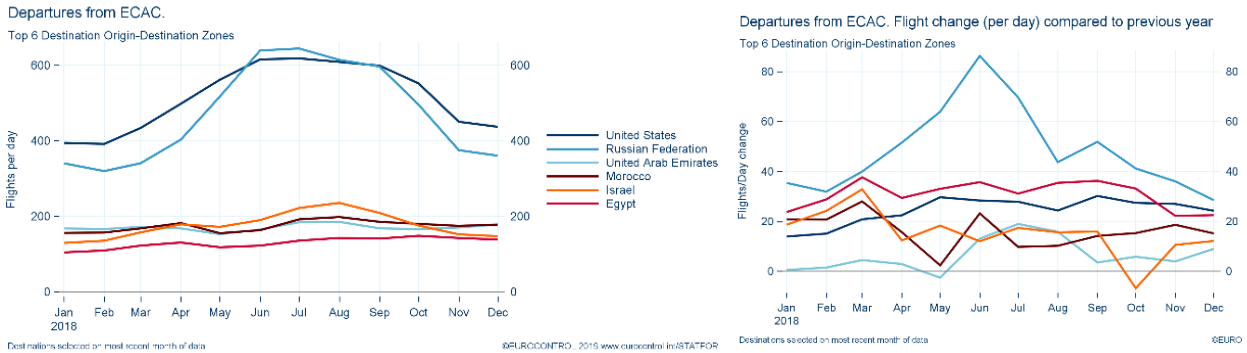
Outside Europe[12], the United States remained the number one destination from Europe in terms of number of fights with circa 1,030 flights per day on average in 2018 (total of both directions), recording a growth of 5% on 2017. The Russian Federation was the second destination from Europe with ~940 flights per day, continuing its recovery from the Russian economic slowdown (2014) with an 11.4% growth across the year. During Summer months (June-August), Russia

[11] In practice: a new ATS route has been opened in Poland to ease the passage of traffic between northern and southern Europe, local measures have been introduced to reduce the demand in Karlsruhe UAC and Maastricht UAC and some RAD (Route Availability Document) measures have been adopted to lower the network delay and minimise the route extension.

[12] Europe = ECAC. Morocco and Israel are considered as external partner (though they belong to NM area)

grew even more strongly and became the number one destination, overtaking the United States. The third destination from Europe remains United Arab Emirates, with an average daily traffic of 340 flights per day (+4% on 2017). Then, Morocco and Israel are the two next destinations from Europe with ~350 flights per day on each flow. Egypt is the sixth destination from Europe, slowly recovering from its extended decline (2011 and 2015) with ~260 flights per day, a 31% increase on 2017 but still 15% below 2010 levels. See Figure 9.

Figure 9. Top 6 extra-European partners in 2018. Left: number of flights per day (unidirectional). Right: additional number of flights per day in 2018 (vs 2017).



2.2 En-route Service Units

Figure 10 presents the monthly total en-route service units (TSU) recorded in the Member States of EUROCONTROL over the last four years ("CRCO16" region).

In 2018, 162.5 million total en-route service units (TSU) were produced in the CRCO16 region. This was a 6.1% increase compared to 2017, making 2018 the peak year. 2018 was the second year in a row to record rates above 6%.

Figure 10. Total service units recorded in CRCO16 area since 2015.

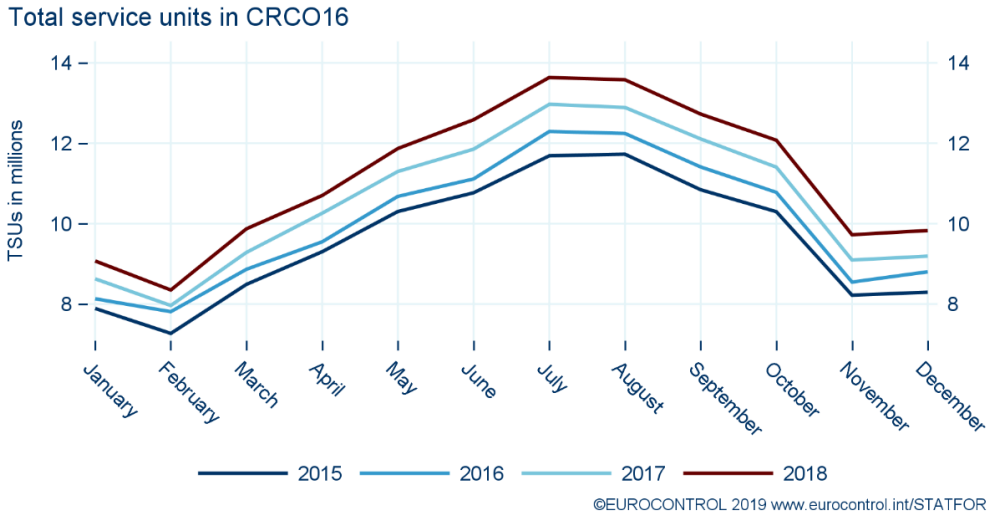
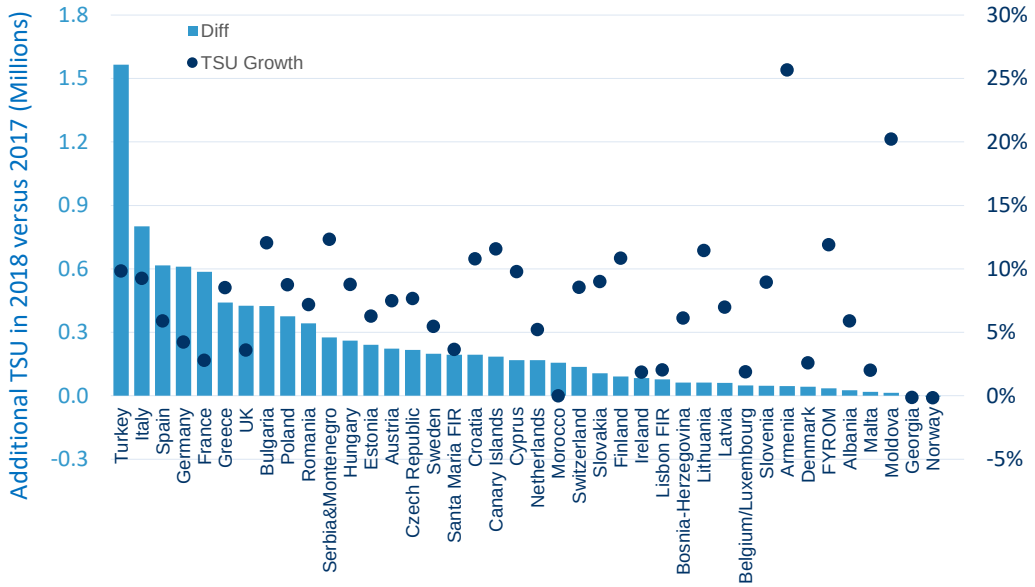


Figure 11 presents the contributors to the total en-route service units (TSU) in 2018 ranked by additional number of TSU.

Figure 11. Contributing States to the TSU growth in 2018 (versus 2017): Turkey generated the biggest additional number of TSU in 2018.



The top five contributors were:

- Turkey (+9.9% vs 2017) owing to an increase in flights (+8.2%), an increase in average weights (+1%), as well as a slight distance increase. Turkish service units were positively influenced by overflying flows from and to Middle-East.
- Italy (+9.3% vs 2017), recorded a strong increase in flights (+5.3%) as well increases in weights and distances (respectively 1% and 1.3%). Strong flows between North-West European countries and Greece had an impact on service units during summer.
- Spain (+6.8% vs 2017), increased its service units thanks to a sustained growth in flights (+4.8%) as well as a stronger increase in average distance flown (+0.7%) than in average weights (+0.5%). The distances were positively influenced by the flights between Canaries and UK as well as Portugal to Italy.
- Germany (+4.3%) and France (2.8%) also recorded high number of TSU compared to 2017 even if they recorded a drop in average distance flown during Summer 2018.

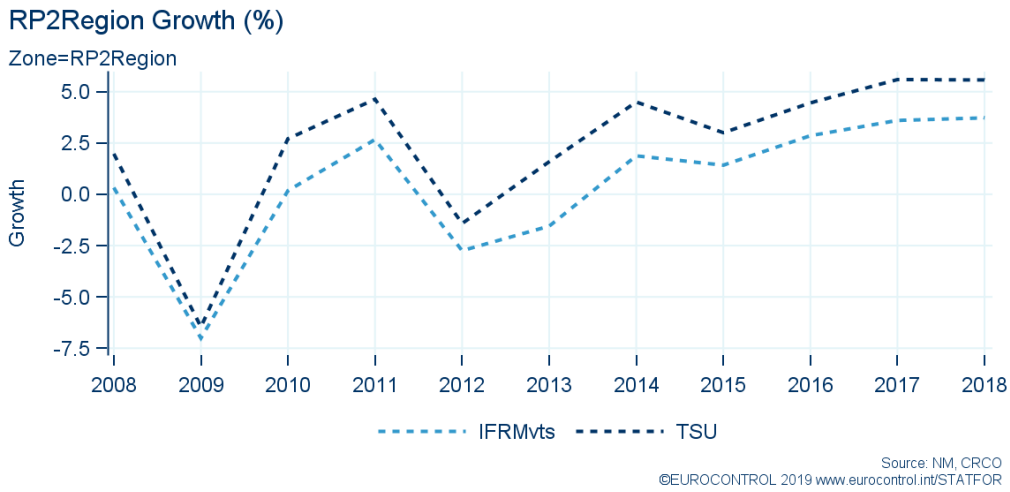
For UK[13], the average distance flown in 2018 remained mostly stable on 2017 (+0.3%), even if a drop was observed on overflights to North-Atlantic during summer. On the other hand, average weights grew by 1% which, together with the modest flight growth rate (+0.9%) helped the TSU to grow by 3.6% (vs 2017).

Armenia recorded TSU growth rates exceeding 25%, owing to similar strong growth of its overflight traffic (increase of flows between Middle-East and Russian Federation, North-West Europe and Asia).

Lastly, only two of the 40 States recorded small decreases of TSU in 2018: Norway and Georgia.

As shown in Figure 12, TSU have been steadily growing faster than flights over the last ten years over the RP2 Region. The gap between the two growth indicators is quite stable since 2015 and explained by the constant increase in average weights and average distance flown, on top of the flight growth.

Figure 12. Comparison of the growth in flights and the growth in total service units for RP2 Region.



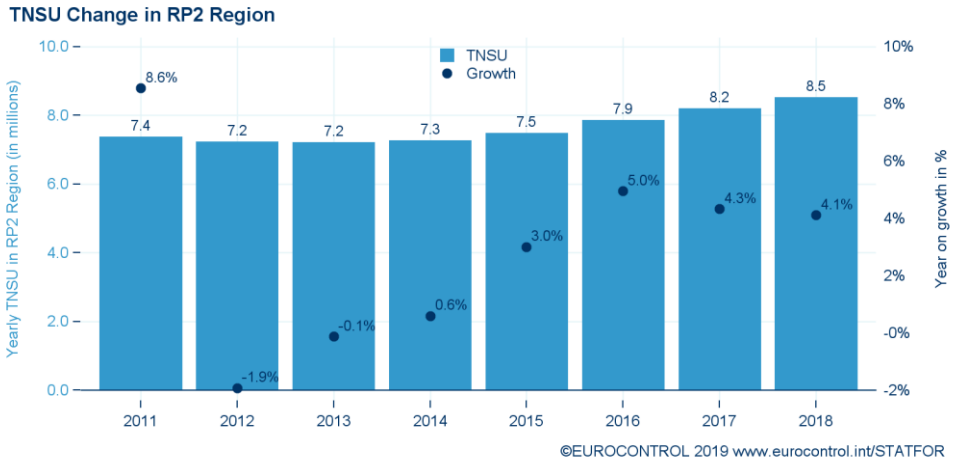
2.3 Terminal Service Units

Similarly to en-route service units, Figure 13 shows that terminal service units recorded a 4.1% growth in 2018, comparable to the 2017 rate. This growth is mainly driven by the growth of departures in the sample[14] of airports belonging to the RP2 Region: +3.2% in 2018 (vs 2017). The weight factors, for the same sample, remained quite stable at RP2 Region level (+0.1% in 2018, compared to 2017). This the second year in a row the growth of the overall weight factor is levelling off.

[13] The seventh contributor to the overall TSU growth.

[14] Total number of TNSU in 2017 slightly differs from the previous forecast publication as one airport has been added in the Terminal Charging Zone of Sweden (see Annex 3).

Figure 13. Terminal Navigation Service Units and corresponding growth for RP2 Region.



3 Forecast inputs and assumptions

3.1 Context

Economic growth and other factors strongly influence demand for air travel. This section describes in detail the many input assumptions used for the forecast, including those on economic growth.

The improved forecast process (Ref. 2) enables the use of the most up-to-date forecast inputs and assumptions reflecting the main drivers and influential factors over the next 7 years: economic growth (Section 0), events and trends (Section 0), low-cost traffic (Section 3.4), load factors (Section 0), demographics and propensity to fly (Section 0), airport capacity (Section 3.7), high-speed rail network development (Section 0) and airline schedules (Section 0). Neither Emissions Trading Scheme (ETS) nor Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) have been considered in this forecast (Section 3.10).

As usual, there are three forecast scenarios presented in this 7-year forecast:

- **High**: based on assumptions of strong economic growth (relative to the baseline forecast), stronger growth of low-cost market segment, stronger effect of events (e.g. one-off sporting events) and slower development of high-speed rail. This stronger growth goes with weaker load factors[15];
- **Low**: based on assumptions of weak economic growth, weaker growth in low-cost market segment, weaker (and later) effect of events (e.g. EU accession) and quicker development of high-speed rail; this weaker growth means stronger load factors which partly absorb the flight demand;
- **Base**: the most-likely of the 3 scenarios, representing an intermediate point between high and low.

The specific factors which are used in the scenarios are described below. The first three have the biggest effect on the forecast. Details of how they have this effect are in the methodology document (Ref. 2).

3.2 Economic Growth

Forecasts of growth in gross domestic product (GDP) are provided by Oxford Economics Ltd for most of the States. For some States, when recommended by stakeholders, other GDP forecasts are used. In particular, official government forecasts have been used for Ireland. All other States or region GDP forecast data in this report originate from the January 2019 update of the OE forecast.

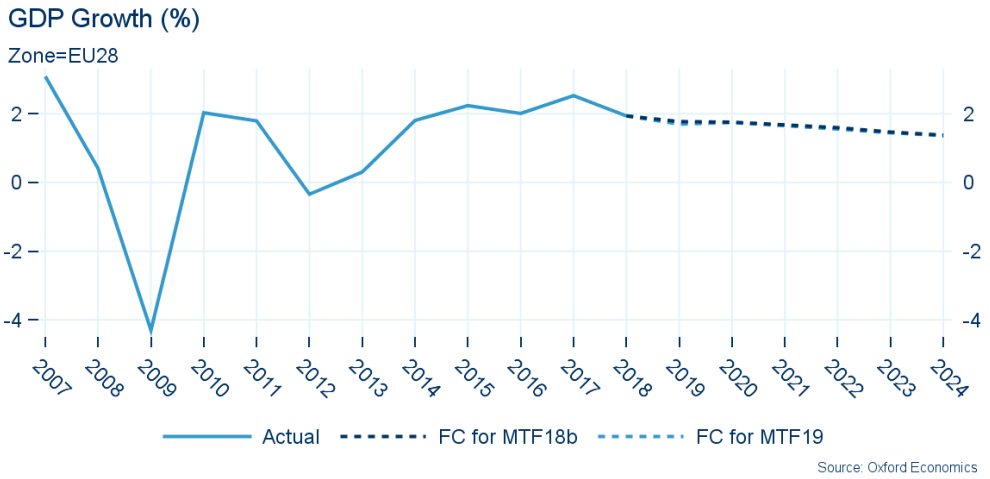
[15] See Section 3.4.

The high- and low-growth scenarios are based on fixed offsets[16] from these forecasts.

3.2.1 Economic forecast for Europe

Figure 14 illustrates how the recent economic forecast for EU countries (indicated as MTF19) has changed since the preparation of the October 2018 flight forecast (indicated as MTF18b).

Figure 14. EU GDP growth forecast has been revised downwards for 2019 to 2021 since the OE August 2018 update used in MTF18b



Growth in Europe (EU28) eased from a 10-year high of 2.5% in 2017 to 1.9% in 2018. OE forecasts a further moderation to 1.7% in 2019, 2020 and 2021. The trade tensions with the United States and the impact of rising oil prices on inflation explain the slight downward revision of the forecast (0.1 pp) for 2020 and 2021.

The baseline scenario of Oxford Economics assumes that the UK and the EU reach a withdrawal agreement. The situation remains fluid. We separate the potential impacts of no-deal into aviation-specific and general economic:

- Aviation: The Commission already foresaw last December a contingency measure for aviation in case of no-deal Brexit. This would allow direct flights between an airport in UK territory and EU cities until the end of 2019 for UK airlines. The UK will reciprocate and has also been lining up aviation agreements with other States.
- Even if aviation will still go on largely as normal after 29 March, the UK low-growth economic scenario allows for a wider uncertainty to take into account the additional trade frictions, as well as the deteriorated business, household and investor sentiment generated by the no-deal Brexit. While global spillovers are expected to be limited overall, some other European economies may be affected in this no-deal, low-growth

[16] +1%, -1% for early years and big States, +1.5%, -1.5% for early years and small States, +0.5%, -0.5% for late years and big States, +0.8%, -0.8% for late years and small States.

scenario, such as Ireland, Poland and the Czech Republic. Additional details on this scenario are available in section 3.3.4.

3.2.2 Details per State

The GDP forecasts are shown for all forecasted states and groupings in Figure 15 and in Figure 16 as well as for certain non-European states in

Figure 17. For all other States, the economic growth of the traffic region is used.

Figure 15. GDP Growth by Traffic Zone

Source: 2005-2025 from Oxford Economics Ltd, Jan19; Forecast of Irish Government, Oct18.
Comments: Real GDP Growth in Euro. Units: Growth per year. Data last updated: 06/02/2019

	Actual			Base						
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Albania	3.3%	3.8%	4.2%	3.6%	3.9%	4.0%	4.1%	4.1%	4.0%	3.7%
Armenia	0.2%	7.5%	7.5%	5.9%	5.5%	5.4%	5.2%	4.8%	4.6%	4.5%
Austria	2.1%	2.7%	2.6%	2.1%	1.9%	1.8%	1.8%	1.7%	1.6%	1.5%
Azerbaijan	-3.0%	-0.3%	1.8%	2.5%	3.1%	3.3%	3.5%	3.5%	3.5%	3.4%
Belarus	-2.5%	2.4%	2.9%	2.8%	2.5%	2.3%	2.4%	2.5%	2.5%	2.2%
Belgium/Luxembourg	1.5%	1.7%	1.4%	1.5%	1.5%	1.4%	1.3%	1.2%	1.2%	1.3%
Bosnia-Herzegovina	2.9%	3.0%	3.0%	3.0%	2.9%	2.9%	3.0%	2.9%	2.9%	2.4%
Bulgaria	3.9%	3.8%	3.3%	3.5%	2.6%	2.0%	1.8%	1.8%	1.9%	1.7%
Canary Islands	3.2%	3.0%	2.5%	2.3%	2.0%	1.7%	1.4%	1.2%	1.2%	1.0%
Croatia	3.5%	2.9%	2.8%	2.6%	2.2%	2.1%	2.0%	2.0%	1.9%	1.8%
Cyprus	4.8%	4.2%	3.7%	3.1%	2.5%	2.2%	1.8%	1.6%	1.3%	0.7%
Czech Republic	2.4%	4.5%	2.8%	2.6%	2.2%	1.8%	1.9%	1.8%	1.8%	1.9%
Denmark	2.4%	2.3%	1.1%	2.0%	2.0%	2.2%	2.3%	2.2%	1.7%	1.6%
Estonia	3.5%	4.8%	3.4%	3.2%	3.0%	2.9%	2.9%	2.8%	2.7%	2.6%
FYROM	2.8%	0.2%	2.4%	3.0%	3.0%	2.9%	2.7%	2.7%	2.8%	2.8%
Finland	2.5%	2.8%	2.4%	2.0%	1.7%	1.7%	1.5%	1.2%	1.2%	1.0%
France	1.1%	2.3%	1.5%	1.6%	1.7%	1.6%	1.5%	1.5%	1.4%	1.3%
Georgia	2.8%	5.0%	5.5%	4.3%	4.5%	4.5%	4.4%	4.4%	4.4%	4.3%
Germany	2.2%	2.5%	1.4%	1.4%	1.6%	1.3%	1.1%	1.0%	0.9%	0.9%
Greece	-0.3%	1.4%	2.2%	1.9%	2.1%	2.5%	2.5%	2.6%	2.5%	2.3%
Hungary	2.2%	4.4%	4.9%	3.3%	2.4%	2.1%	2.0%	2.0%	2.0%	1.9%
Iceland	7.4%	4.0%	4.2%	2.9%	3.0%	2.8%	2.4%	2.1%	1.7%	1.4%
Ireland	4.9%	7.2%	7.5%	4.2%	3.6%	2.5%	2.6%	2.7%	2.7%	2.7%
Italy	1.3%	1.6%	0.9%	0.3%	0.8%	0.8%	0.7%	0.7%	0.7%	0.7%
Latvia	2.1%	4.6%	5.1%	3.6%	3.0%	3.0%	2.9%	2.9%	2.8%	2.8%
Lisbon FIR	1.9%	2.8%	2.1%	1.7%	1.4%	1.1%	0.9%	0.8%	0.9%	0.8%
Lithuania	2.4%	4.1%	3.3%	2.9%	2.6%	2.6%	2.4%	2.2%	1.9%	1.5%
Malta	5.2%	6.7%	5.4%	5.1%	4.1%	3.3%	2.5%	2.0%	2.1%	2.0%
Moldova	4.5%	4.4%	4.6%	3.6%	3.9%	3.8%	3.8%	3.8%	3.8%	3.8%
Morocco	1.2%	4.1%	2.8%	3.3%	3.7%	4.0%	4.0%	4.0%	3.8%	3.8%
Netherlands	2.1%	3.0%	2.6%	1.8%	1.6%	1.5%	1.5%	1.4%	1.2%	1.2%
Norway	0.9%	2.4%	1.7%	2.2%	2.0%	1.9%	1.8%	1.7%	1.8%	1.7%
Poland	3.1%	4.9%	5.3%	3.6%	2.7%	2.6%	2.3%	2.2%	2.2%	2.2%

	Actual			Base						
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Romania	4.8%	6.8%	4.3%	2.8%	1.5%	1.4%	1.4%	1.3%	1.3%	1.3%
Santa Maria FIR	1.9%	2.8%	2.1%	1.7%	1.4%	1.1%	0.9%	0.8%	0.9%	0.8%
Serbia&Montenegro	3.3%	2.0%	4.4%	3.4%	3.7%	3.4%	3.2%	3.0%	2.8%	2.7%
Slovakia	3.1%	3.2%	4.2%	3.7%	2.7%	2.3%	2.0%	2.0%	2.3%	2.5%
Slovenia	3.2%	5.3%	4.7%	3.8%	3.1%	3.1%	3.2%	3.1%	3.1%	3.1%
Spain	3.2%	3.0%	2.5%	2.3%	2.0%	1.7%	1.4%	1.2%	1.2%	1.0%
Sweden	2.5%	2.4%	2.3%	1.9%	2.0%	2.1%	2.3%	2.1%	2.0%	2.0%
Switzerland	1.6%	1.6%	2.6%	1.3%	1.7%	1.4%	1.8%	1.3%	1.8%	1.3%
Turkey	3.2%	7.4%	2.9%	-1.4%	3.8%	3.7%	3.5%	3.4%	3.4%	3.4%
UK	1.8%	1.8%	1.4%	1.7%	2.0%	2.1%	2.0%	1.9%	1.7%	1.6%
Ukraine	2.4%	2.5%	2.9%	3.0%	3.0%	3.0%	2.5%	2.4%	2.2%	2.0%
EU	2.0%	2.5%	1.9%	1.7%	1.7%	1.7%	1.6%	1.4%	1.4%	1.4%

Figure 16. GDP Growth by Origin-Destination Zone

Source: 1993-2004 from STATFOR records. 2005 onwards from Oxford Economics Ltd, Jan19.
Comments: Real GDP Growth in Euro. Units: Growth per year. Data last updated: 14/01/2019

	Actual			Base						
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Brazil	-3.3%	1.1%	1.2%	2.3%	2.6%	2.6%	2.5%	2.4%	2.3%	2.2%
China	6.7%	6.9%	6.6%	6.1%	5.8%	5.4%	5.2%	5.0%	4.9%	4.7%
India	7.9%	6.2%	7.4%	7.3%	7.0%	6.8%	6.5%	6.4%	6.3%	6.2%
Israel	4.0%	3.4%	3.2%	3.2%	3.7%	3.7%	3.7%	3.8%	3.7%	3.7%
South Africa	0.6%	1.3%	0.7%	1.9%	2.2%	2.6%	2.6%	2.6%	2.6%	2.5%

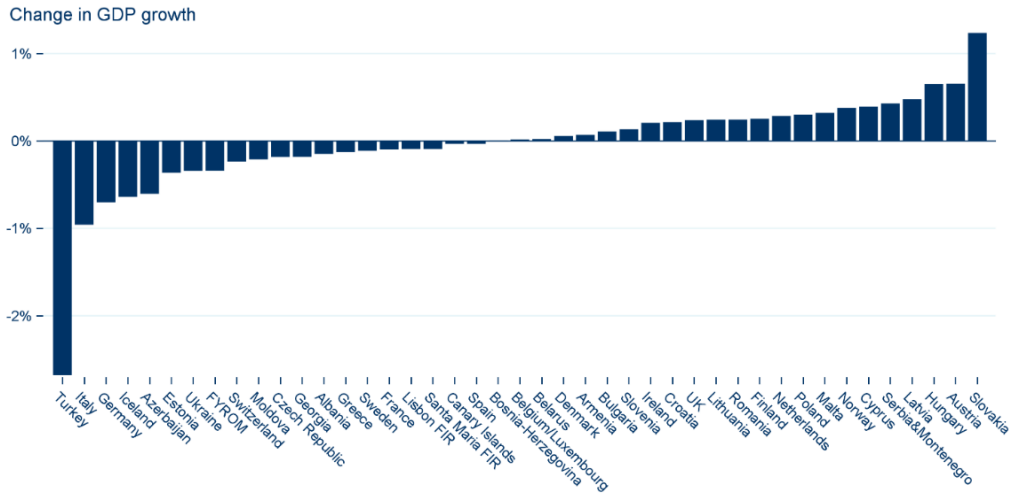
Figure 17. GDP Growth by Traffic Region

Source: 2005 onwards updated from Oxford Economics Ltd, Jan19.
Comments: Real GDP Growth in Euro. Units: Growth per year. Data last updated: 14/01/2019

	Actual			Base						
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Asia/Pacific	1.9%	2.8%	2.2%	2.1%	1.8%	2.1%	2.1%	2.1%	2.1%	2.0%
ESRA East	3.1%	4.6%	4.5%	3.3%	2.5%	2.3%	2.2%	2.1%	2.1%	2.1%
ESRA Mediterranean	2.2%	3.3%	1.9%	0.6%	1.9%	1.8%	1.6%	1.6%	1.6%	1.5%
ESRA North-West	1.9%	2.3%	1.8%	1.7%	1.8%	1.7%	1.6%	1.5%	1.4%	1.3%
Mid-Atlantic	2.4%	2.2%	2.0%	2.2%	2.2%	2.3%	2.6%	2.6%	2.5%	2.5%
Middle-East	7.6%	0.7%	1.2%	0.4%	2.3%	2.4%	2.7%	3.0%	3.2%	3.3%
North Atlantic	1.5%	2.3%	2.8%	2.5%	1.8%	1.7%	1.8%	1.8%	1.9%	1.9%
North-Africa	1.9%	10%	4.9%	3.8%	3.8%	4.6%	4.3%	4.0%	3.8%	3.6%
Other Europe	-0.0%	1.9%	2.0%	1.7%	1.9%	1.8%	1.8%	1.7%	1.7%	1.6%
South-Atlantic	-1.1%	1.0%	-0.6%	0.3%	3.0%	3.2%	3.3%	3.1%	3.0%	2.7%
Southern Africa	2.0%	3.4%	3.5%	4.1%	4.5%	4.8%	5.1%	5.2%	5.1%	5.0%

Comparison per state between the GDP forecast for 2019 used in this report and the one used to produce the previous forecast in October 2018 is shown in Figure 18.

Figure 18. GDP Growth change per State in 2019 between this forecast (MTF19) and the previous forecast (MTF18b)



At European level, we observe that the slowdown of the economy is going to affect all major economies, but is expected to hit Italy harder, as the country is forecasted to record the lowest growth rate in Europe. The two largest economies of the EU28, Germany and France, were also revised downward in 2019 compared to the previous estimates (respectively 0.7 pp and 0.1 pp) due to the slowdown in the global economy and more specifically for Germany the weaker car sector.

On the other hand, Slovakia has been revised upward thanks to the dynamism of the foreign direct investment, especially in the automotive and electronic sectors.

GDP multipliers or 'elasticities' convert economic growth into growth in passengers. They are estimated from historical data on this relationship and the updated values can be found in Figure 19 and Figure 20.

Figure 19. GDP Multipliers per Traffic Region Pair

Source: STATFOR Analysis and modelling. Comments: Re-calibration based on data up to 2017. Units: Multiplier (Elasticity). Data last updated: 11/01/2019. Note: Elasticity reduced by 1.1 for all domestic flights within States in ESRA.

	ESRA North-West	ESRA Mediterranean	ESRA East	Other Europe	Asia / Pacific	North Atlantic	Mid-Atlantic	South-Atlantic
ESRA North-West	1.6	2.2	2.8	2.5	1.2	1.8	1.0	2.1
ESRA Mediterranean	2.2	3.2	3.2	3.0	3.5	2.6	0.3	2.8
ESRA East	2.8	3.2	2.8	2.9	3.2	.	.	.
Other Europe	2.5	3.0	2.9	3.4	3.5	3.5	.	.
Asia/Pacific	1.2	3.5	3.2	3.5	.	.	.	.
North Atlantic	1.8	2.6	.	3.5	.	.	.	.
Mid-Atlantic	1.0	0.3	.	.	.	.	.	.
South-Atlantic	2.1	2.8	.	.	.	.	.	.
North-Africa	1.9	3.1	3.1	3.5	.	1.8	.	.
Southern Africa	1.1	2.0	.	.	.	.	.	.
Middle-East	2.4	2.2	3.1	3.2	3.1	0.4	.	.
TR-For Unknown	1.4	.	.	.	.	.	.	.

	North-Africa	Southern Africa	Middle-East	TR-For Unknown
ESRA North-West	1.9	1.1	2.4	1.4
ESRA Mediterranean	3.1	2.0	2.2	.
ESRA East	3.1	.	3.1	.
Other Europe	3.5	.	3.2	.
Asia/Pacific	.	.	3.1	.
North Atlantic	1.8	.	0.4	.
Mid-Atlantic	.	.	.	.
South-Atlantic	.	.	.	.
North-Africa	2.4	1.9	2.4	.
Southern Africa	1.9	.	3.5	.
Middle-East	2.4	3.5	.	.
TR-For Unknown	.	.	.	.

Figure 20. GDP Multipliers per Traffic Zone / Traffic Region Pair
Source: STATFOR Analysis and modelling
Comments: GDP elasticity per TZ2 flow
Units: Multiplier (Elasticity). Data last updated: 11/01/2019

	France	Germany	Greece	Ireland	Italy	Norway	Spain	Turkey	North Atlantic	Middle-East
France	0.3	.	.	.	.	.	.	.	.	.
Germany	.	0.3	.	.	.	.	.	.	.	.
Greece	.	.	0.7	.	.	.	.	.	.	.
Italy	.	3.5	.	.	1.5	.	.	.	.	.
Norway	.	.	.	.	.	0.5	.	.	.	.
Spain	3.3	.	.	.	.	.	0.7	.	.	.
Turkey	.	1.5	.	.	.	.	.	2.2	.	3.2
UK	.	.	.	0.8	3.5	.	.	.	0.5	.

3.3 Events and Trends

The ‘events and trends’ assumptions consist of adjustments to the future arrival, departure, internal, overflight traffic (IFR movements) to account for specific local factors and adjust the forecast.

This forecast has taken into account the main sport events (EURO2020, EURO2024 and Olympics 2024) falling into the 7-year horizon. It also includes a reduction of traffic to account for the failure of Germania in February 2019 but no longer assumes a recovery of the charter traffic between the Russian Federation and Egypt. The various adjustments to the forecast can be found in Figure 21and Figure 22, and the content of this section describes with more details the local factors that have been considered.

3.3.1 Sport events

EURO2020 (European football cup) is to be held in 13 different European countries (Azerbaijan, Denmark, Germany, Hungary, Ireland, Italy, Netherlands, Romania, Russia, Scotland, Spain, UK holding the final and semi-finals) during the middle of 2020 is likely to have a small impact on traffic in those countries.

We used the EURO2008 (co-organised by Austria and Switzerland) historical data to estimate the boost for the different countries. Since most of the extra flights are generated during the final and semi-finals, 80% of the total impact was attributed to the UK. The rest of the impact was split between the other countries. The adjusted factor is too small to be noticed in Figure 21.

FIFA World Cup 2022 will take place in Qatar and is not expected to generate significant additional traffic for Europe.

The host of the EURO2024 will be Germany in June and July 2024. We currently estimate the forecast impact to be similar to the impact on the French traffic (i.e. on international arrivals and departures and on domestic traffic) in 2016 when France hosted a similar event.

Summer Olympics 2024 will take place in Paris. We have used information about the impact of Olympics 2012 in the UK to estimate the potential impact on the French traffic, i.e. international (+0.07 pp over 2024) and domestic IFR movements (+0.01 pp over 2024).

3.3.2 Airline Failures

With the recent increase in fuel price and the lower exchange rates of the Euro compared to the US Dollar, several small airlines have encountered financial difficulties and have ceased operations during the last quarter of 2018, though not all had a significant impact on the traffic at State level. Amongst these, the main two airline failures were Cobalt Air, based in Cyprus, and Primera (based in Denmark) that respectively ceased operations on 17th October and 1st October 2018. They respectively used to represent 8% of the market for arrival and departure traffic in Cyprus for Cobalt, and around 2% of the arrivals and departures in Denmark for Primera.

The downturn is mainly visible in Cyprus air traffic but there is currently no sign that the slots will be taken over by other airlines and no adjustment has been done in this draft to compensate the lower growth that is currently forecast for Cyprus. As for the failure of Primera, the impact on the Danish traffic seems too small to necessitate an adjustment of the forecast and the recovery is expected to follow the current trends.

On 5th February 2019, the German-based airline Germania ceased operations. Its main destinations were the Canary Islands and Egypt and the slots it will free in Germany (i.e. around 1.4% of the market share of arrivals and departures) are expected to be progressively taken over within very few months. In the forecast, we have reduced the monthly forecast between February and May 2019 to model the consequences of this failure and the progressive recovery of the empty slots over a four months period. It will affect Germany with a reduction from 1.4% in February but also the Canary Islands with a reduction of the monthly forecast from 2.9% in February, Egypt with a reduction from 3.1% in February, Serbia-Montenegro with a reduction from 2.6%. The monthly impact on their respective forecast will then progressively be reduced to no impact from June 2019. Some impact on the Overflights of Albania, Bulgaria, Lisbon FIR (Continental Portugal) and Morocco are also considered (see Figure 22).

3.3.3 Recovery of traffic between the Russian Federation and Egypt

Since November 2015, the Russian Federation banned air traffic with Egypt following the explosion on a Russian aircraft that killed 224 passengers en route from Sharm El Sheikh to Saint Petersburg on 31 October 2015. In mid-December 2017, the Russian Minister of Transport and Egyptian Minister of Civil Aviation signed an agreement in Moscow to resume regular flights between the two countries. Scheduled traffic has already re-started but not charter traffic yet, which corresponds to much greater volumes of traffic. We are expecting this charter traffic to resume at a moment or another within the forecast horizon but it is difficult to say exactly when as this recovery has now been delayed for more than a year. We have thus taken the likely impact of this recovery out of this forecast. This recovery is now part of the upwards risks for this forecast (see Section 6). We advise users of the forecast to refer to past publications to see the impact we anticipate for this recovery: an impact on the overflights of a few Eastern European states such as Turkey and Cyprus.

3.3.4 Brexit Uncertainty

In this forecast, we have included the possibility of a hard Brexit to happen in the Low scenario: i.e. no deal Brexit. As discussed earlier, we assume that aviation agreements are arranged even in this case, but that an impact is felt in terms of economic growth. We have not capped growth at 0 between EU and UK in the low-growth forecast scenario, although this could legally be the situation.

The estimation of its impact on the air-traffic is consistent with the specific GDP forecast provided by Oxford Economics if such a scenario were to happen. The corresponding additional downturn is added to the low scenario not only for UK, but also for other states: Ireland, Poland and the Czech Republic that have tight economic relationships with the UK.

In numbers, we assume in the Low Scenario an additional decline of the flights by 0.8 pp for UK, 0.5 pp for Ireland and Poland and 0.4 pp for the Czech Republic. In the forecast method, to achieve these adjustments we make the events and trends assumptions as in Figure 21.

3.3.5 Traffic Uncertainty in Turkey

The weak economic forecast in Turkey (see Section 3.2.2) leads to a significant reduction of its international traffic in 2019. We do not believe this will happen as the weakness of the Turkish lira could rather be an advantage to European tourism with lower prices and as reports have shown strong booking to Turkey in the summer. We have thus boosted the Turkish arrivals and departures to keep a stronger growth in 2019 in the Baseline and High forecast but have kept a similar forecast to that without corrections in the Low forecast to allow for some uncertainty associated to the Turkish economic outlook.

Figure 21. Events and Trends assumptions by Traffic Zone[17].

Source: STATFOR analysis and modelling Units: Growth index (Baseline Year=1.0). Data last updated: 11/02/2019

						2019	2020	2021	2022	2023	2024	2025
Azerbaijan	Total: Arr/Dep	H				.	1.000	.	.	.	.	.
		B				.	1.000	.	.	.	.	.
		L				.	1.000	.	.	.	.	.
Bulgaria	Total: Arr/Dep	H				1.050	1.050	1.050	1.050	1.050	1.050	1.050
		B				1.025	1.025	1.025	1.025	1.025	1.025	1.025
		L				1.013	1.013	1.013	1.013	1.013	1.013	1.013
Canary Islands	Total: Arr/Dep	H				0.996	.	.	.	.	.	.
		B				0.996	.	.	.	.	.	.
		L				0.996	.	.	.	.	.	.
Croatia	Total: Arr/Dep	H				1.042	1.042	1.042	1.042	1.042	1.042	1.042
		B				1.017	1.017	1.017	1.017	1.017	1.017	1.017
		L				1.004	1.004	1.004	1.004	1.004	1.004	1.004
Czech Republic	Total: Arr/Dep	L				0.993	0.986	0.986	0.986	0.986	0.986	0.986
Denmark	Total: Arr/Dep	H				.	1.000	.	.	.	.	.
		B				.	1.000	.	.	.	.	.
		L				.	1.000	.	.	.	.	.
Egypt	Total: Arr/Dep	H				0.996	.	.	.	.	.	.
		B				0.996	.	.	.	.	.	.
		L				0.996	.	.	.	.	.	.
France	Total: Internal	H				.	.	.	.	.	1.000	.
		B				.	.	.	.	.	1.000	.
		L				.	.	.	.	.	1.000	.
	Total: Arr/Dep	H				.	.	.	.	.	1.001	.
		B				.	.	.	.	.	1.001	.
		L				.	.	.	.	.	1.000	.
Germany	Total: Internal	H				.	.	.	.	.	1.002	.
		B				.	.	.	.	.	1.001	.
		L				.	.	.	.	.	1.000	.
	Total: Arr/Dep	H				0.995	0.998	0.998	0.998	0.998	1.000	0.998
		B				0.992	0.995	0.995	0.995	0.995	0.996	0.995
		L				0.987	0.990	0.990	0.990	0.990	0.991	0.990
Greece	Total: Arr/Dep	H				1.060	1.080	1.080	1.080	1.080	1.080	1.080
		B				1.030	1.040	1.040	1.040	1.040	1.040	1.040
		L				1.015	1.020	1.020	1.020	1.020	1.020	1.020
Hungary	Total: Arr/Dep	H				.	1.000	.	.	.	.	.
		B				.	1.000	.	.	.	.	.
		L				.	1.000	.	.	.	.	.
Ireland	Total: Arr/Dep	H				.	1.000	.	.	.	.	.
		B				.	1.000	.	.	.	.	.
		L				0.991	0.982	0.982	0.982	0.982	0.982	0.982

[17] Values '1.000' hide adjustments significant for one or two months, but not at an annual level.

					2019	2020	2021	2022	2023	2024	2025
Italy	Total: Internal	H			0.959	0.959	0.959	0.959	0.959	0.959	0.959
		B			0.959	0.959	0.959	0.959	0.959	0.959	0.959
		L			0.959	0.959	0.959	0.959	0.959	0.959	0.959
	Total: Arr/Dep	H			.	1.000	.	.	.	.	.
		B			.	1.000	.	.	.	.	.
		L			.	1.000	.	.	.	.	.
Netherlands	Total: Arr/Dep	H			.	1.000	.	.	.	.	.
		B			.	1.000	.	.	.	.	.
		L			.	1.000	.	.	.	.	.
Poland	Total: Arr/Dep	H			1.030	1.040	1.040	1.040	1.040	1.040	1.040
		B			1.015	1.020	1.020	1.020	1.020	1.020	1.020
		L			0.998	0.990	0.990	0.990	0.990	0.990	0.990
Romania	Total: Arr/Dep	H			.	1.000	.	.	.	.	.
		B			.	1.000	.	.	.	.	.
		L			.	1.000	.	.	.	.	.
Serbia&Montenegro	Total: Arr/Dep	H			0.996	.	.	.	.	.	.
		B			0.996	.	.	.	.	.	.
		L			0.996	.	.	.	.	.	.
Spain	Total: Arr/Dep	H			0.998	0.998	0.998	0.998	0.998	0.998	0.998
		B			0.995	0.995	0.995	0.995	0.995	0.995	0.995
		L			0.990	0.990	0.990	0.990	0.990	0.990	0.990
Turkey	Total: Arr/Dep	H			1.050	1.070	1.070	1.070	1.070	1.070	1.070
		B			1.025	1.035	1.035	1.035	1.035	1.035	1.035
		L			1.005	1.005	1.005	1.005	1.005	1.005	1.005
UK	Total: Arr/Dep	H			0.998	0.998	0.998	0.998	0.998	0.998	0.998
		B			0.995	0.995	0.995	0.995	0.995	0.995	0.995
		L			0.975	0.960	0.960	0.960	0.960	0.960	0.960
Ukraine	Total: Arr/Dep	H			1.050	1.050	1.050	1.050	1.050	1.050	1.050
		B			1.025	1.025	1.025	1.025	1.025	1.025	1.025
		L			1.013	1.013	1.013	1.013	1.013	1.013	1.013

Figure 22. Adjustments for Overflights

Source: STATFOR analysis and modelling Units: Growth index (Baseline Year=1.0).
Data last updated: 11/02/2019

State	First Month of Adjustment	Last Month of adjustment	Flow	Adjustment
Albania	2019-02	2019-02	O	0.9750
	2019-03	2019-03	O	0.9900
	2019-04	2019-04	O	0.9950
	2019-05	2019-05	O	0.9950
Bulgaria	2019-02	2019-02	O	0.9880
	2019-03	2019-03	O	0.9900
	2019-04	2019-04	O	0.9950
	2019-05	2019-05	O	0.9950
Lisbon FIR	2019-02	2019-02	O	0.9780
	2019-03	2019-03	O	0.9900
	2019-04	2019-04	O	0.9950
	2019-05	2019-05	O	0.9950

State	First Month of Adjustment	Last Month of adjustment	Flow	Adjustment
Morocco	2019-02	2019-02	O	0.9750
	2019-03	2019-03	O	0.9900
	2019-04	2019-04	O	0.9950
	2019-05	2019-05	O	0.9950
Norway	2019-06	2019-09	O	0.9200
	2020-06	2020-09	O	0.9200

3.4 Low-Cost Effect

The additional flight movements generated by low-cost carrier growth are represented by the input assumptions given in Figure 23.

The figure shows the actual (based on 2018 data) and future low-cost market share for each scenario. Compared to previous forecast, the figures account for a more recent (2014 to 2018) evolution of the low-cost market share in the ECAC zone than in previous forecasts. This results in a slower growth of the low-cost segment, which in the low forecast scenario can even allow some reduction of this market share, as it accounts for the recent failures of low-cost carriers, such as Air Berlin: a situation that could happen again before the end of the forecast horizon. Note that the reduction of the low-cost segment growth generates a lower flight growth rate than what would be forecast with the same low-cost effect as last year.

Figure 23. Low-Cost effects by Traffic Zone

Source: STATFOR Analysis and modelling
Comments: Additional growth for Low-Cost, but only the baseline year is a true statistic for low-cost market share
Units: Percentage Additional Growth Due to Low-Cost Growth. Data last updated: 01/02/2019

	Actual	Low	Base	High
	2018	2025	2025	2025
Albania	7%	5%	8%	10%
Armenia	6%	4%	8%	10%
Austria	17%	14%	19%	22%
Azerbaijan	5%	2%	7%	10%
Belarus	0%	0%	1%	3%
Belgium/Luxembourg	18%	15%	20%	23%
Bosnia-Herzegovina	36%	33%	38%	41%
Bulgaria	40%	37%	42%	45%
Canary Islands	48%	46%	50%	52%
Croatia	31%	28%	33%	36%
Cyprus	32%	28%	35%	39%
Czech Republic	30%	25%	34%	40%
Denmark	26%	23%	28%	31%
Estonia	20%	15%	24%	30%

	Actual	Low	Base	High
	2018	2025	2025	2025
FYROM	48%	43%	52%	58%
Finland	13%	10%	15%	19%
France	31%	28%	33%	36%
Georgia	17%	15%	19%	21%
Germany	32%	29%	34%	37%
Greece	31%	28%	33%	36%
Hungary	48%	45%	50%	53%
Iceland	22%	19%	24%	27%
Ireland	37%	35%	38%	40%
Israel	18%	14%	21%	25%
Italy	42%	39%	43%	47%
Latvia	74%	69%	71%	75%
Lisbon FIR	39%	36%	41%	44%
Lithuania	45%	44%	46%	47%
Malta	40%	37%	42%	45%
Moldova	9%	7%	10%	12%
Morocco	31%	27%	34%	38%
Netherlands	29%	27%	30%	33%
Norway	24%	21%	26%	29%
Poland	35%	34%	36%	37%
Romania	34%	31%	36%	39%
Santa Maria FIR	10%	8%	9%	10%
Serbia&Montenegro	18%	14%	21%	25%
Slovakia	33%	32%	34%	35%
Slovenia	8%	5%	10%	14%
Spain	53%	52%	54%	55%
Sweden	22%	19%	24%	27%
Switzerland	17%	16%	18%	20%
Turkey	32%	30%	33%	36%
UK	48%	47%	49%	50%
Ukraine	11%	7%	14%	18%

3.5 Load Factors

Assumptions about the development of load factors are based on STATFOR analysis of historical data from Eurostat between January 2009 and December 2017 included. Forecasts are estimated using the recent trends shown in the

monthly data. These are used as inputs to the forecast, and are shown in Figure 24.

Each load factor forecast is based on the trends and this forecast is combined with assumptions about maximum limits that can be maintained by the airlines in the medium-term. The baseline scenario load factors in 2025 are relatively high, between 77.1% and 87.5% depending on the flow. The forecast assumes that a maximum of 85% is feasible for short-haul, and 87.5% for long-haul.

Some low-cost carriers report already higher load factors than this, but usually on the basis of tickets sold rather than revenue passengers flown. We use the latter (lower figure) uniformly in our modelling.

Figure 24. Load factors by Traffic Region.

Source: Actual: AEA up to 2008, Eurostat from January 2009 to December 2016. Forecast: STATFOR analysis and modelling.
Comments: 2018 estimated with forecast (Baseline)
Units: Percentage Load Factor for this Traffic Region. Data last updated: 14/01/2019

	Actual									Low	Base	High
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2025	2025	2025
Asia/Pacific	80.5%	78.5%	80.2%	80.7%	80.0%	80.0%	80.4%	84.6%	83.8%	87.5%	87.1%	80.0%
ESRA East	70.1%	71.7%	73.9%	74.8%	76.4%	78.1%	78.8%	81.2%	82.3%	85.0%	85.0%	85.0%
ESRA Mediter.	73.7%	75.3%	77.0%	77.8%	79.2%	80.2%	80.9%	82.8%	83.9%	85.0%	85.0%	85.0%
ESRA North-West	73.4%	74.0%	75.4%	76.3%	77.2%	77.7%	78.3%	80.1%	80.6%	85.0%	85.0%	85.0%
Mid-Atlantic	78.0%	78.6%	81.5%	82.9%	84.1%	83.2%	84.2%	84.1%	84.2%	87.5%	86.3%	76.8%
Middle-East	74.6%	73.3%	73.7%	75.0%	76.6%	75.5%	75.0%	77.8%	78.3%	80.0%	80.0%	77.6%
North Atlantic	81.8%	80.4%	81.8%	82.3%	81.2%	80.2%	80.4%	82.0%	81.6%	85.3%	82.2%	79.0%
North-Africa	75.3%	73.3%	75.8%	72.8%	75.0%	74.3%	73.8%	76.3%	77.1%	80.0%	77.1%	69.4%
Other Europe	68.4%	69.4%	72.0%	70.8%	73.4%	74.2%	75.7%	78.6%	79.0%	85.0%	85.0%	83.1%
South-Atlantic	78.9%	79.5%	80.7%	81.9%	82.2%	81.4%	82.4%	85.5%	85.8%	87.5%	87.5%	87.5%
Southern Africa	77.2%	76.6%	77.2%	78.8%	78.8%	77.7%	79.9%	81.0%	81.4%	87.5%	85.4%	81.9%

3.6 Demographics

The demography model combines the evolution of population age structure with the age structure of the passengers.

The population data are based on the 2017 United Nations (UN) population forecast update which is the last available as in last year forecast.

The input data are shown at traffic zone level in Figure 25 and at traffic region level in Figure 26.

Figure 25. Population distribution per Traffic Zone.

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2017 Revision
Comments: Only the population age distributions, not numbers (in 000s) are used.
Units: Percentage of TZ population in this age range. Data last updated: 18/12/2018

	Actual										Base									
	2015										2025									
	Age 0 to 14	Age 15 to 19	Age 20 to 24	Age 25 to 34	Age 35 to 44	Age 45 to 54	Age 55 to 59	Age 60 to 64	Age 65 to 74	Age 75+	Age 0 to 14	Age 15 to 19	Age 20 to 24	Age 25 to 34	Age 35 to 44	Age 45 to 54	Age 55 to 59	Age 60 to 64	Age 65 to 74	Age 75+
Albania	18%	8.6%	7.7%	14%	13%	14%	6.9%	5.3%	7.4%	5.1%	17%	5.3%	6.3%	15%	13%	12%	6.3%	6.9%	11%	6.7%
Armenia	20%	6.2%	8.2%	18%	12%	13%	7.2%	4.9%	5.2%	5.7%	19%	6.7%	5.6%	14%	17%	12%	5.4%	6.4%	9.9%	5.0%
Austria	14%	5.3%	6.4%	13%	13%	16%	6.9%	5.5%	10%	8.8%	14%	4.6%	4.9%	12%	14%	13%	7.8%	7.6%	11%	11%
Azerbaijan	23%	7.5%	9.3%	18%	13%	14%	5.5%	3.5%	3.1%	2.6%	23%	6.7%	6.1%	15%	17%	12%	5.8%	5.8%	6.7%	2.3%
Belarus	16%	4.9%	6.5%	16%	14%	14%	7.6%	6.1%	7.4%	6.9%	18%	5.5%	4.8%	11%	16%	14%	6.3%	6.9%	11%	6.7%
Belgium/Luxembourg	17%	5.6%	6.2%	13%	13%	14%	6.7%	5.9%	9.0%	8.9%	17%	5.7%	5.6%	12%	13%	13%	6.6%	6.6%	11%	9.8%
Bosnia-Herzegovina	14%	6.6%	6.7%	14%	14%	15%	7.3%	6.6%	8.2%	7.5%	14%	5.0%	5.1%	13%	14%	14%	6.7%	7.5%	12%	8.0%
Bulgaria	14%	4.2%	5.5%	13%	15%	14%	7.0%	7.0%	12%	8.3%	14%	5.2%	4.6%	10%	14%	16%	6.8%	6.6%	12%	10%
Canary Islands	15%	4.5%	4.8%	12%	17%	16%	6.7%	5.6%	9.4%	9.5%	13%	5.3%	5.0%	9.7%	12%	17%	7.8%	7.3%	11%	11%
Croatia	15%	5.7%	5.7%	13%	14%	14%	7.2%	7.0%	9.9%	9.0%	14%	5.4%	5.0%	12%	14%	14%	6.5%	7.1%	13%	10%
Cyprus	17%	6.7%	9.3%	17%	14%	12%	5.6%	4.9%	7.5%	5.3%	16%	5.9%	6.8%	15%	15%	14%	6.1%	5.7%	9.2%	7.0%
Czech Republic	15%	4.3%	5.8%	14%	17%	13%	6.3%	6.9%	11%	6.9%	15%	5.4%	4.6%	10%	14%	17%	6.4%	5.9%	11%	10%
Denmark	17%	6.3%	6.8%	12%	13%	14%	6.3%	5.7%	11%	7.6%	16%	5.8%	6.0%	14%	12%	12%	7.0%	6.4%	10%	11%
Estonia	16%	4.4%	5.8%	15%	14%	13%	6.8%	6.3%	9.6%	9.2%	16%	6.0%	4.9%	10%	15%	14%	6.2%	6.5%	12%	10%
FYROM	17%	6.3%	7.4%	16%	15%	14%	6.5%	6.1%	7.7%	4.8%	16%	5.4%	5.8%	13%	15%	14%	6.7%	6.3%	11%	5.8%
Finland	16%	5.5%	6.3%	13%	12%	13%	6.7%	6.8%	12%	8.7%	16%	5.6%	5.4%	12%	13%	12%	6.1%	6.4%	12%	12%
France	18%	5.9%	5.8%	12%	13%	13%	6.3%	6.1%	9.6%	9.3%	17%	6.0%	6.0%	12%	12%	12%	6.3%	6.2%	11%	11%
Georgia	19%	6.0%	7.1%	14%	13%	14%	6.7%	5.7%	7.7%	7.0%	19%	6.4%	5.3%	12%	14%	13%	6.1%	6.6%	11%	6.4%
Germany	13%	5.0%	5.6%	13%	12%	17%	7.3%	6.2%	10%	11%	13%	4.4%	4.8%	12%	13%	12%	8.1%	8.0%	12%	12%
Greece	15%	5.0%	5.0%	13%	15%	15%	6.8%	5.8%	9.6%	10%	12%	5.3%	5.1%	11%	13%	16%	7.8%	7.0%	12%	11%
Hungary	14%	5.2%	6.4%	13%	16%	13%	7.0%	7.5%	10%	7.4%	14%	5.2%	5.2%	12%	13%	16%	6.6%	5.5%	12%	9.2%
Iceland	20%	6.6%	7.6%	14%	13%	13%	6.3%	5.4%	7.7%	6.0%	19%	6.6%	6.1%	14%	13%	12%	5.8%	5.9%	10%	7.8%
Ireland	22%	5.7%	5.4%	14%	16%	13%	5.5%	5.2%	7.9%	5.4%	19%	7.1%	6.3%	11%	13%	15%	6.0%	5.8%	9.2%	7.4%
Italy	14%	4.7%	4.9%	11%	14%	16%	6.9%	6.2%	11%	11%	13%	4.8%	4.9%	10%	11%	15%	8.1%	7.7%	12%	14%
Latvia	15%	4.4%	6.2%	14%	13%	14%	7.2%	6.1%	10%	9.3%	15%	5.7%	4.6%	10%	14%	14%	6.7%	7.2%	12%	10%
Lisbon FIR	14%	5.3%	5.2%	12%	15%	15%	6.7%	6.3%	11%	10%	12%	4.9%	5.3%	11%	12%	16%	7.3%	7.2%	12%	12%
Lithuania	15%	5.8%	7.1%	13%	13%	15%	7.3%	5.8%	9.4%	9.3%	16%	4.9%	4.7%	13%	13%	13%	6.9%	7.4%	11%	9.8%
Malta	14%	5.6%	6.8%	15%	14%	13%	7.1%	6.7%	11%	7.0%	15%	4.7%	4.9%	13%	15%	13%	5.6%	6.3%	12%	11%
Moldova	16%	6.0%	8.2%	19%	14%	13%	6.9%	6.6%	5.6%	4.3%	15%	5.4%	5.0%	14%	19%	14%	5.6%	6.8%	11%	4.1%
Netherlands	17%	6.0%	6.3%	12%	13%	15%	6.8%	6.2%	10%	7.6%	16%	5.4%	5.9%	12%	12%	12%	7.2%	7.0%	12%	11%
Norway	18%	6.3%	6.7%	14%	14%	14%	6.1%	5.5%	9.4%	6.9%	17%	5.9%	6.1%	13%	13%	13%	6.6%	5.8%	9.8%	9.0%
Poland	15%	5.3%	6.5%	16%	15%	12%	7.6%	6.9%	8.6%	7.0%	14%	5.3%	4.7%	12%	16%	15%	5.9%	6.0%	13%	8.8%
Romania	15%	5.5%	5.8%	14%	16%	13%	7.0%	6.9%	9.0%	8.0%	15%	5.5%	5.4%	11%	14%	16%	7.7%	5.2%	12%	8.7%
Russian Federation	17%	4.4%	6.2%	17%	14%	14%	7.5%	6.6%	6.9%	6.6%	18%	5.6%	4.9%	11%	17%	14%	5.5%	6.7%	11%	6.2%
Santa Maria FIR	14%	5.3%	5.2%	12%	15%	15%	6.7%	6.3%	11%	10%	12%	4.9%	5.3%	11%	12%	16%	7.3%	7.2%	12%	12%
Serbia&Montenegro	17%	6.1%	6.5%	14%	14%	13%	6.7%	7.4%	9.4%	6.8%	16%	5.6%	6.0%	13%	14%	14%	6.2%	6.0%	12%	7.8%
Slovakia	15%	5.3%	6.7%	16%	16%	13%	7.0%	6.6%	8.5%	5.6%	15%	5.2%	4.8%	12%	16%	16%	6.2%	6.3%	12%	7.4%
Slovenia	15%	4.6%	5.2%	14%	15%	15%	7.3%	7.1%	9.5%	8.5%	15%	5.1%	4.5%	9.9%	14%	15%	7.1%	7.0%	13%	10%
Spain	15%	4.5%	4.8%	12%	17%	16%	6.7%	5.6%	9.4%	9.5%	13%	5.3%	5.0%	9.7%	12%	17%	7.8%	7.3%	11%	11%
Sweden	17%	5.2%	7.1%	13%	13%	13%	5.9%	5.6%	11%	8.5%	18%	5.8%	5.5%	13%	13%	12%	6.4%	5.8%	10%	11%
Switzerland	15%	5.2%	6.1%	14%	14%	16%	6.6%	5.5%	9.7%	8.3%	15%	4.8%	5.2%	12%	14%	13%	7.5%	7.1%	11%	10%
Turkey	26%	8.5%	8.1%	16%	14%	11%	4.5%	3.7%	4.8%	3.0%	22%	7.6%	7.7%	15%	14%	13%	5.3%	4.5%	6.6%	3.8%
UK	18%	5.8%	6.4%	14%	13%	14%	6.1%	5.4%	9.8%	8.3%	18%	5.8%	5.5%	12%	13%	12%	6.6%	6.4%	10%	10%
Ukraine	15%	4.7%	6.1%	16%	15%	14%	7.1%	6.6%	8.3%	7.5%	16%	5.5%	4.5%	11%	16%	15%	6.2%	6.7%	11%	7.4%

Figure 26: Population distribution per Traffic Region.

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat
Comments: Only the population age distributions, not numbers (in 000s) are used
Units: Percentage of TR population **in this age range. Data last updated: 18/12/2018**

	Actual										Base									
	2015										2025									
	Age 0 to 14	Age 15 to 19	Age 20 to 24	Age 25 to 34	Age 35 to 44	Age 45 to 54	Age 55 to 59	Age 60 to 64	Age 65 to 74	Age 75+	Age 0 to 14	Age 15 to 19	Age 20 to 24	Age 25 to 34	Age 35 to 44	Age 45 to 54	Age 55 to 59	Age 60 to 64	Age 65 to 74	Age 75+
Asia/Pacific	17%	5.8%	7.1%	16%	15%	16%	5.8%	5.7%	6.9%	4.3%	16%	5.6%	5.4%	12%	15%	15%	8.1%	6.6%	9.7%	5.8%
ESRA East	16%	4.7%	6.2%	16%	15%	13%	7.3%	6.7%	7.9%	6.9%	17%	5.5%	4.9%	11%	16%	14%	5.9%	6.4%	12%	7.2%
ESRA Med.	15%	5.0%	5.2%	12%	15%	15%	6.8%	6.1%	10%	9.9%	13%	5.1%	5.1%	10%	12%	15%	7.7%	7.3%	12%	12%
ESRA NW	16%	5.5%	5.8%	13%	13%	15%	6.9%	6.1%	10%	9.7%	15%	5.1%	5.4%	12%	13%	12%	7.3%	7.2%	12%	11%
Mid-Atlantic	28%	9.4%	9.0%	16%	14%	10%	3.8%	3.2%	4.0%	2.9%	24%	8.1%	8.2%	16%	14%	12%	4.7%	3.9%	5.5%	3.6%
Middle-East	30%	8.8%	8.6%	17%	14%	9.8%	3.5%	2.7%	3.3%	2.0%	27%	8.3%	8.0%	16%	15%	11%	4.2%	3.4%	4.4%	2.2%
North Atlantic	19%	6.6%	7.2%	14%	13%	14%	6.8%	5.9%	8.5%	6.3%	18%	6.2%	6.3%	14%	13%	12%	5.9%	6.2%	11%	8.3%
North-Africa	32%	8.8%	8.9%	17%	12%	9.3%	3.6%	2.8%	3.4%	1.8%	31%	8.8%	7.7%	14%	14%	10%	4.0%	3.3%	4.5%	2.1%
Other Europe	17%	4.4%	6.2%	17%	14%	14%	7.5%	6.6%	6.9%	6.7%	18%	5.6%	4.9%	11%	17%	14%	5.5%	6.7%	11%	6.3%
South-	24%	8.5%	8.5%	17%	14%	12%	4.6%	3.8%	4.9%	3.1%	21%	7.4%	7.6%	15%	15%	12%	5.3%	4.7%	6.6%	4.2%
Southern	43%	11%	9.0%	14%	9.7%	6.2%	2.2%	1.7%	2.2%	0.9%	41%	11%	9.3%	15%	10%	6.9%	2.4%	1.8%	2.3%	1.0%

On top of the United Nations forecast of population, we also rely on data related to the propensity[18] to fly (see Figure 27) to estimate the future number of passengers, hence the future traffic demand. This propensity to fly information has been updated in this forecast with new data from the UK CAA based on surveys conducted in 2017 at the five main UK airports that have been combined with previous data from the DGAC France in which propensity data have been collected over 13 French airports over the period 2015-2016.

Figure 27: Propensity to fly per age group.

Source: UK CAA and French DGAC passenger surveys (2015-2017) and UN population forecast (2017 Revision)
Units: Flight Factor (%passengers/%population) per age bracket. Data last updated: 18/12//2018.
Note: base, high and low scenario values are identical

	Actual	Low	Base	High
	2018	2025	2025	2025
Age of Bracket				
Age 0 to 14	0.14	0.14	0.14	0.14
Age 15 to 19	0.62	0.61	0.61	0.61
Age 20 to 24	1.71	1.82	1.82	1.82
Age 25 to 34	1.80	1.94	1.94	1.94
Age 35 to 44	1.41	1.44	1.44	1.44
Age 45 to 54	1.32	1.48	1.48	1.48
Age 55 to 59	1.28	1.23	1.23	1.23
Age 60 to 64	1.13	1.02	1.02	1.02
Age 65 to 74	0.79	0.74	0.74	0.74
Age 75+	0.22	0.18	0.18	0.18

[18] Propensity to fly is the annual number of flights generated per thousand population.

3.7 Airport

The forecast takes airport capacity into account. The airport capacity model used in the 7-year forecast is based on 'effective annual capacity in total IFR flight movements' figures that are applied to the forecasted total annual traffic demand at the airports and reduce the final forecasted number of movements to be within the annual capacity limits of the airports. A comprehensive set of capacity data has been gathered through the EUROCONTROL Network Manager Airport Unit's online tool named the 'Airport Corner'. The information, coming directly from the airports and validated by the EUROCONTROL Airport Unit, is deemed to be complete, realistic, reliable and of high quality. Where there are gaps, the dataset has been completed by using direct information from Stakeholders. The data collection process for this forecast has been updated in January 2019 and covers a set of 114 airports, including the major ones. To respect the commercial sensitivity of this airport information, it is not published.

The transfer of passenger traffic to the new Istanbul airport is now included: it is expected to be operational from the beginning of March 2019. We assumed that LTBA will continue to operate (lesser extent) after the third airport will open.

The Berlin Brandenburg (EDDB) airport is also expected to open in October 2020 and a switch in traffic from Berlin Tegel (EDDT) has been taken into account.

The entire traffic shifts corresponding to the opening of the new airports can be found in Figure 28.

Figure 28. Airport Traffic Switch

Source: EUROCONTROL Data and analysis

Comments: Updated for MTF18 inputs. Units: Airport Traffic Switching. Data last updated: 16/01/2019

				Low				Base				High			
				2019	2020	2021	2022	2019	2020	2021	2022	2019	2020	2021	2022
Traffic Type	Traffic Between	And Region	Move To												
All	EDDT	-	EDDB	.	0%	46%	100%	.	8%	88%	100%	.	8%	88%	100%
Other	LTBA	-	LTFM	75%	100%	.	.	80%	100%	.	.	80%	100%	.	.

3.8 High-Speed Train Network (HST)

The HST travel times input data have been reviewed for this 7-year forecast. A review of current state of projects has been conducted; the principal source of the HST data being the International Union of Railways (UIC[19]), Wikipedia or Stakeholder-supplied information (DGAC France, DFS Germany and DHMI Turkey). The rail projects listed here are only the ones for which improvements in travel time will be found within the forecast horizon. The impact of high-speed train is reduced compared to the one considered in the February 2018 forecast as many HST developments have been delayed or postponed beyond the scope of this forecast (e.g. Frankfurt to London) or have simply been implemented last

[19] UIC website: http://www.uic.org/

year. There is no plan for new HST in 2025, which explains why the year is not visible in Figure 29.

Figure 29. High-Speed Train Times that change during the forecast.
Source: Actuals from on-line timetables. Plans from various sources.
Units: Travel time (minutes). Distances estimated from airport locations.
Data last updated: 01/02/2019.

			Distance	Rail Time (mins)							Speed (km/h)						
			Km	2018	2019	2020	2021	2022	2023	2024	2018	2019	2020	2021	2022	2023	2024
Ankara	Afyon	H	236	192	.	.	90	.	.	.	74	.	.	157	.	.	.
		B	236	192	.	.	90	.	.	.	74	.	.	157	.	.	.
		L	236	192	.	.	.	90	.	.	74	.	.	.	157	.	.
	Sivas	H	354	345	.	120	.	.	.	.	62	.	177	.	.	.	.
		B	354	345	.	120	.	.	.	.	62	.	177	.	.	.	.
		L	354	345	.	.	120	.	.	.	62	.	.	177	.	.	.
	Izmir	H	519	405	.	.	.	210	.	.	77	.	.	.	148	.	.
		B	519	405	.	.	.	210	.	.	77	.	.	.	148	.	.
		L	519	405	.	.	.	.	210	.	77	.	.	.	.	148	.
Casablanca	Tanger	H	303	217	125	.	.	.	.	.	84	146	.	.	.	.	.
		B	303	217	125	.	.	.	.	.	84	146	.	.	.	.	.
		L	303	217	125	.	.	.	.	.	84	146	.	.	.	.	.
Istanbul	Sivas	H	682	584	.	300	.	.	.	.	70	.	136	.	.	.	.
		B	682	584	.	300	.	.	.	.	70	.	136	.	.	.	.
		L	682	584	.	.	300	.	.	.	70	.	.	136	.	.	.
Madrid	Bilbao	H	327	245	.	.	.	.	150	.	80	.	.	.	.	131	.
		B	327	245	.	.	.	.	150	.	80	.	.	.	.	131	.
		L	327	245	.	.	.	.	.	150	80	.	.	.	.	.	131
	San Sebastian	H	363	304	.	.	.	.	160	.	72	.	.	.	.	136	.
		B	363	304	.	.	.	.	160	.	72	.	.	.	.	136	.
		L	363	304	.	.	.	.	.	160	72	.	.	.	.	.	136
	Santiago	H	476	307	.	180	.	.	.	.	93	.	159	.	.	.	.
		B	476	307	.	180	.	.	.	.	93	.	159	.	.	.	.
		L	476	307	.	.	180	.	.	.	93	.	.	159	.	.	.
	Vigo	H	455	369	.	250	.	.	.	.	74	.	109	.	.	.	.
		B	455	369	.	250	.	.	.	.	74	.	109	.	.	.	.
		L	455	369	.	.	250	.	.	.	74	.	.	109	.	.	.
Stuttgart	Munchen	H	187	132	.	.	.	113	.	.	85	.	.	.	99	.	.
		B	187	132	.	.	.	113	.	.	85	.	.	.	99	.	.
		L	187	132	.	.	.	.	113	.	85	.	.	.	.	99	.
Zurich	Milan	H	221	202	.	.	165	.	.	.	66	.	.	80	.	.	.
		B	221	202	.	.	165	.	.	.	66	.	.	80	.	.	.
		L	221	202	.	.	.	165	.	.	66	.	.	.	80	.	.

3.9 Airline Schedules

The schedules data of Innovata LLC from January 2019 have been used for this draft forecast up to the end of March 2019 (see Figure 30). Schedules up to August 2019 are also shown (in grey) but have not been used in this forecast.

Figure 30. Overview of the Airline Schedule (Innovata LLC, January 2019)

State	Schedule Reference Date 01JAN19							
	ADI[20] Growth (vs same month 2018)							
	JAN19	FEB19	MAR19	APR19	MAY19	JUN19	JUL19	AUG19
Albania	4%	6%	5%	5%	6%	8%	7%	8%
Armenia	18%	20%	23%	5%	11%	15%	5%	2%
Austria	12%	12%	11%	11%	8%	8%	8%	6%
Azerbaijan	-7%	-8%	-9%	-2%	-5%	-5%	-9%	-10%
Belarus	9%	11%	9%	-0%	-1%	-2%	-1%	-0%
Belgium/Luxembourg	6%	6%	4%	3%	2%	-2%	-4%	-3%
Bosnia-Herzegovina	-0%	-1%	-7%	11%	10%	11%	5%	6%
Bulgaria	-0%	1%	-3%	-6%	-8%	-14%	-15%	-15%
Canary Islands	3%	0%	2%	3%	3%	1%	0%	-0%
Croatia	7%	5%	-3%	17%	7%	5%	2%	0%
Cyprus	-2%	-3%	-7%	-5%	-6%	-7%	-8%	-8%
Czech Republic	2%	1%	-0%	3%	2%	1%	-1%	-1%
Denmark	-1%	-2%	3%	-2%	0%	-1%	2%	2%
Estonia	12%	6%	3%	2%	-3%	-3%	-10%	-6%
FYROM	-0%	-2%	-5%	7%	10%	7%	5%	7%
Finland	4%	5%	5%	0%	1%	4%	4%	1%
France	2%	1%	1%	5%	5%	2%	2%	7%
Georgia	25%	26%	19%	24%	14%	8%	4%	0%
Germany	8%	7%	6%	3%	5%	2%	2%	1%
Greece	10%	11%	7%	13%	7%	-3%	-6%	-7%
Hungary	7%	8%	6%	8%	6%	6%	5%	4%
Iceland	1%	-0%	0%	-0%	1%	4%	6%	7%
Ireland	4%	5%	1%	6%	4%	3%	3%	6%
Israel	10%	9%	9%	-8%	-5%	-5%	-6%	-6%
Italy	9%	10%	6%	3%	2%	0%	0%	5%
Latvia	5%	5%	2%	5%	3%	2%	2%	3%
Lisbon FIR	7%	6%	3%	5%	4%	0%	-0%	-0%
Lithuania	6%	6%	4%	5%	5%	0%	-4%	-1%
Malta	13%	14%	7%	11%	9%	9%	7%	7%
Moldova	9%	9%	6%	-0%	-3%	-12%	-13%	-13%
Morocco	13%	14%	15%	14%	17%	24%	13%	12%
Netherlands	-0%	-0%	-1%	2%	2%	2%	2%	2%
Norway	-2%	-1%	8%	-8%	4%	-3%	-2%	-1%
Poland	8%	8%	6%	7%	7%	4%	2%	2%
Romania	7%	7%	4%	6%	6%	2%	-2%	-3%
Santa Maria FIR	3%	3%	-3%	-1%	-2%	1%	-3%	-6%
Serbia&Montenegro	7%	6%	1%	5%	6%	6%	4%	3%
Slovakia	-4%	-4%	-7%	-11%	-8%	-14%	-26%	-26%
Slovenia	7%	9%	7%	3%	0%	6%	8%	11%
Spain	5%	4%	1%	6%	4%	2%	1%	1%
Sweden	-4%	-4%	-2%	-10%	-5%	1%	1%	2%
Switzerland	2%	2%	1%	0%	2%	0%	1%	1%
Turkey	-1%	0%	-1%	-0%	1%	0%	-3%	-2%
Ukraine	16%	16%	15%	16%	16%	11%	5%	4%
UK	-3%	-1%	-1%	1%	1%	-0%	-0%	0%

[20] The growth rates are for Arriving, Departing and Internal flows.

3.10 Emissions Trading Schemes

The aviation industry has joined the EU Emission Trading Scheme (ETS) in 2012. In April 2013, the EU decided to temporarily suspend enforcement of the EU ETS requirements for flights operated in 2010, 2011, and 2012 from or to non-European countries, while continuing to apply the legislation to flights within and between countries in Europe. In autumn 2013, the International Civil Aviation Organization (ICAO) Assembly, mandated by the EU, reached an agreement to tackle aviation emissions globally. The ICAO Assembly agreed to develop a global market-based mechanism addressing international aviation emissions and apply it by 2020: the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

Considering the fact that the scope of the EU ETS application and its impact was reduced, we have estimated that the impact of an emissions trading scheme measure on flight demand was small relative to the uncertainty within the 7-year horizon of this forecast. This component has therefore been de-activated although, given recent rises in the costs of allowances under ETS, we keep this decision under review.

3.11 Distance flown

Changes in the jet stream influence airlines' choice of where to leave (or enter) North-Atlantic oceanic airspace and enter (or leave) Irish and UK airspace. We have explored the variability of these choices over the last 12 years: there can be considerable change from day to day, let alone from month to month (month being the granularity of our forecasting).

The average latitude of OEP affects the chargeable distance flown (more for the UK than Ireland) and the number of overflights (for Ireland). We have compared forecasts that assume that average latitudes follow recent months, with forecasts that assume that average latitudes return immediately to their long-term average.

The differences are significant for:

- Irish overflight counts: with long-term average latitudes counts could be 1% higher, though the results here were not deemed robust enough to be included in the forecast;
- UK average chargeable distances: with long-term average latitudes distances would be 3% shorter.

For this new forecast, we have used the UK analysis long-term average result as a guide, resulting in a distance trend close to 565-570km, lower than what was initially found. The modelling of the Irish data is not sufficiently robust to use the results in the draft forecast.

4 Growth in IFR Flights to 2025

In early 2019, the economic outlook remains fragile: as the forecast was being prepared, there were several significant downward revisions to economic forecasts, such as for Germany, Italy, France and the UK. We assume an "orderly" withdrawal of UK from the European Union in the base scenario, while a "harder" Brexit is considered in the low scenario; the main effects modelled are economic rather than aviation-specific. Other updated inputs include 2018 flights and routing patterns, high-speed train network development, low-cost market share evolution, as well as future airport capacities.

The flight forecast for Europe is for slightly slower growth rates over the seven-year horizon than the previous forecast publication (October 2018). This downwards revision is mostly notable in 2019, consistent with this economic situation, as well as with the impact of Germania's failure. Compared to the previous forecast, 2019 shows a wider uncertainty (±1.5 pp), driven by a lower low-scenario because we see strong downwards risks (possibility of worse-than-expected Brexit, or of more struggling or bankrupt airlines).

Any user of this seven-year forecast should consult the entire forecast range (low-growth to high-growth) as an indicator of risk. This forecast includes downside risks (e.g. the economic indicators could worsen) and upside risks (e.g. currently high load factors could trigger higher flight counts sooner-than-expected). Moreover, a large package of measures, named 'eNM/ANSPs Summer 2019 initiatives', is currently in preparation to optimise airspace capacity for Summer 2019. These measures will shift traffic flows and lead to overflight increases or decreases, depending on the States. At the time of forecasting, details were not available, so the possible impact has not been included, except that we have assumed that effects continue that are similar to the "eNM/4ACCs" measures implemented in 2018.

Figure 31. Summary of flight forecast for Europe (ECAC[21]).

ECAC		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	AAGR 2019-2025	RP2 2015-2019 AAGR	RP3 2020-2024 AAGR
IFR Flight Movements (Thousands)	H	.	.	.	.	11,448	11,922	12,317	12,656	12,984	13,335	13,635	3.1%	3.2%	3.1%
	B	9,923	10,197	10,604	11,002	11,308	11,646	11,865	12,094	12,293	12,501	12,672	2.0%	3.0%	2.0%
	L	.	.	.	.	11,132	11,329	11,324	11,398	11,451	11,521	11,527	0.7%	2.6%	0.7%
Annual Growth (compared to previous year unless otherwise mentioned)	H	.	.	.	.	4.1%	4.1%	3.3%	2.8%	2.6%	2.7%	2.2%	3.1%	3.2%	3.1%
	B	1.6%	2.8%	4.0%	3.8%	2.8%	3.0%	1.9%	1.9%	1.6%	1.7%	1.4%	2.0%	3.0%	2.0%
	L	.	.	.	.	1.2%	1.8%	-0.0%	0.7%	0.5%	0.6%	0.0%	0.7%	2.6%	0.7%

[21] ECAC is the European Civil Aviation Conference. See Annex 1 - Traffic Region Definitions

4.1 Short-term outlook (2019-2020)

With the general revision downwards of the economic forecast in Italy, Germany and France and the weaknesses of airlines, the forecast has been revised downwards by -0.2 pp to 2.8% and 11.31 million flights in 2019. However, there is variation in these revisions for individual states whose forecasts for 2019 and 2020 can be found in Figure 32 and in Figure 33 and with more details in Annex 3.

For 2019, the economic forecast used in this traffic forecast expects an “orderly” Brexit from the second quarter of 2019. However some adjustments have been made on the low scenario of the traffic forecast to account for a “No-deal” Brexit, which would have an impact beyond UK boundaries (see Section 3.3.4).

As a consequence of this specific hypothesis to the “low scenario”, the range from the baseline to the low scenario is now wider (-1.6 pp in 2019) than the range from the baseline towards the high forecast scenario (+1.3 pp in 2019) compared to what was published in the October 2018 forecast.

For 2020, we forecast a 3.0% growth to reach 11.65 million flights (±1.2 pp). As 2020 is a leap year, it includes 0.3 pp of additional growth for the extra day of traffic that will be generated in the year: it corresponds to an increase of 2.7% of the average daily traffic.

With the current economic outlook and the uncertainty around the Brexit, the risk goes towards the low scenario. However, some upwards risk does exist, in particular for some countries, mainly Eastern-European countries that might benefit from the implementation of ‘eNM/ANSPs Summer 2019 initiatives’ to reduce delays over Europe. Some states may thus gain traffic from the re-routing out of the congested areas during the summer schedule, in a similar way to what happened with the “eNM/4ACCs” initiatives last year. Their specific impact could not be taken into account in this forecast as they will only be finalised after its publication. However, a partial impact can be assumed to be taken on-board in this forecast as the overflight forecast used the routes implemented in 2018, some following the “eNM/4ACCs” initiatives. Similar initiatives are also expected to be put in place at least in 2020.

The risks in the forecast are captured in the range between the high and low forecast. For more discussion of the risks, see Section 6.

Figure 32. Flight forecast details for 2019

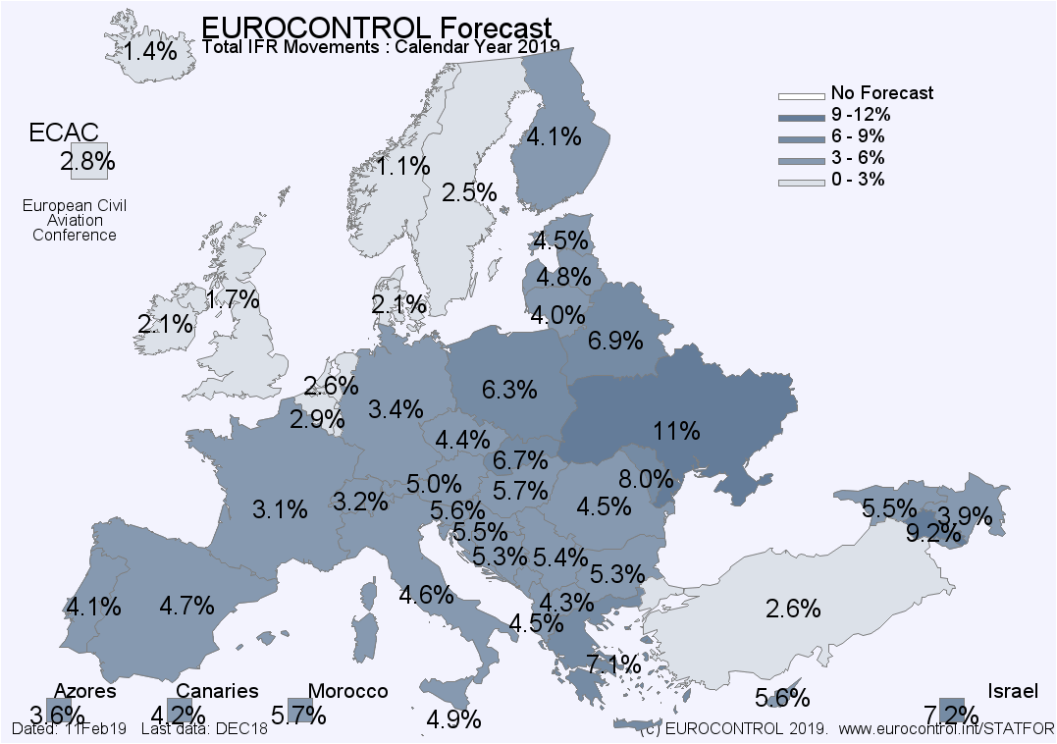
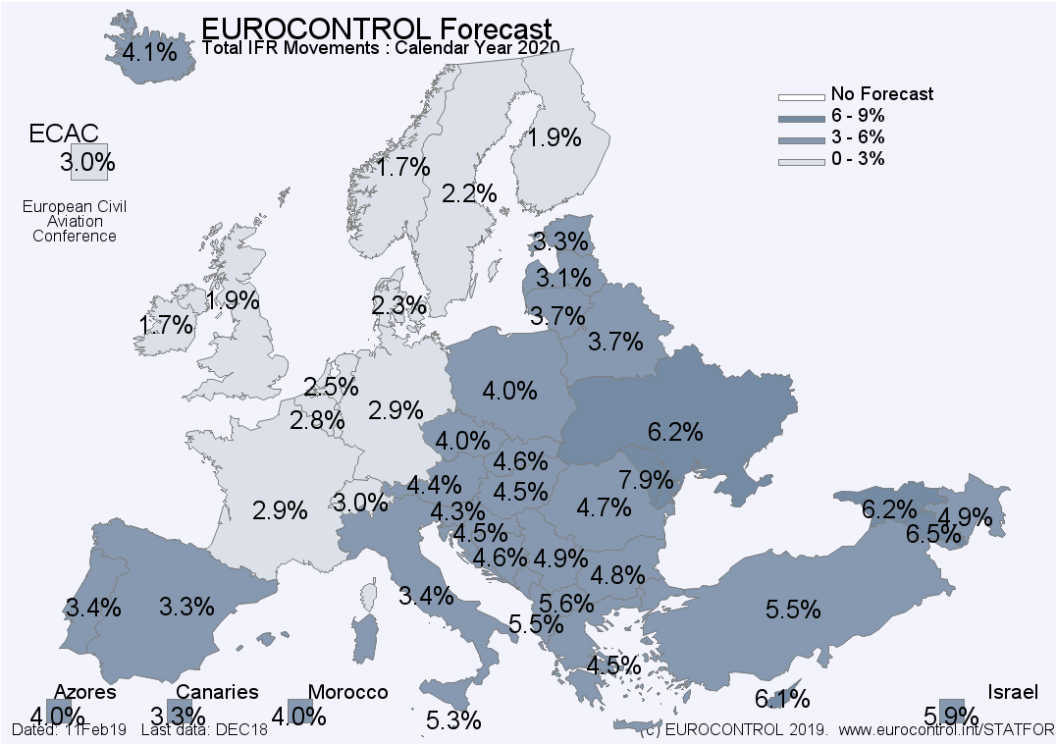


Figure 33. Flight forecast details for 2020



Western Europe

The 2019 forecast is higher for most countries compared to October 2018 as a direct consequence of the strong growth observed at the end of 2018 after weaker summers. This is in particular the case for Spain, Italy, and Portugal who have seen such a change in their seasonality that cannot be only explained by the weaker growth of October to December 2018 associated to major failures (e.g. Air Berlin) or the bad weather of December 2018.

Conversely, as a consequence of the weaker economy in UK and the uncertainty around the Brexit, the traffic forecast for UK and Ireland have been revised downwards (-0.2 pp and -1.3 pp respectively).

Finland and Iceland have also been revised downwards after the reduction of the growth of their arrivals, departures and overflights in particular during the second half of the year. The weakness of their overflights is a consequence of the jet stream position during the year (see Section 2).

For this area, there exists a strong downside risk associated to a weaker economy and the 'eNM/ANSPs Summer 2019 initiatives' during the summer schedule could either result in additional traffic (e.g. Spain, Portugal) or lower traffic (e.g. Germany, Netherlands).

North-Eastern Axis

The 2019 forecast remains similar to what was published in the October 2018 forecast and Poland and Ukraine are still expected to generate traffic in Europe. There exists an upside risk for the region, particular for Poland, associated with the re-routings that might be put in place by the 'eNM/ANSPs Summer 2019 initiatives' during the summer schedule and there also exists an additional upside risk in the area when the traffic between Egypt and the Russian Federation recovers (see Section 3.3.3).

South-Eastern Axis

Most of the countries in the region are relatively small and thus subject to route changes. For 2019, their forecast have been typically revised downwards compared to the October 2018 forecast by around -1 pp. It cannot be attributed to the weakness of the economic outlook in Turkey as we have assumed its impact will be limited on its international arrivals and departures traffic (See Section 3.3.5). However, it can be linked to the fact that we have not included a recovery of the traffic between Egypt and the Russian Federation in this forecast compared to what was published in the previous forecast (see Section 3.3.3).

If the weakness of the Turkish Lira could be seen as an advantage for foreign tourists who are still expected to fly to Turkey, it will affect local travel and the decline of the internal Turkish traffic has led to a revision downwards of the total traffic forecast by -2.8 pp to only grow by 2.6% in 2019 compared to the October 2018 publication. The forecasts for Turkey and Cyprus are also affected by the fact that we are no longer accelerating the recovery of the traffic between Egypt and the Russian Federation. Note that some wider uncertainty was also considered in the low scenario for the growth of the international traffic to Turkey to account for some wider economic uncertainty (see Section 3.3.5).

Contrary to most forecasts in the region, flight growth in Greece has been revised upwards by +0.2 pp as we are still expecting the country to be an attractive tourism destination during the summer.

All forecasts in the region are both subject to downside risks, if the economic outlook deteriorates, and upside risks associated to the re-routing put in place by the 'eNM/ANSPs Summer 2019 initiatives' and the recovery of the traffic between Egypt and the Russian Federation.

4.2 Medium-term outlook (up to 2025)

From 2021 onwards, the forecast has long been for slower economic growth than at the beginning of the horizon. This, coupled with the continuing increase of aircraft size, means decelerating flight growth. Hence, European daily flight growth is expected to slow down from an average of 3.2% per year (2016-2020) to around 1.8% per year (2021-2025).

Note that 2024 shows additional growth as it is a leap year and 2021 displays a lower growth in reaction to the greater growth of the leap year 2020. In 2025, the forecast is for 12.7 million IFR flight movements (+0.9 million, -2.1 million) in Europe, which is an average annual growth rate of 2% and 15% more IFR movements than in 2018. The variation in the range between the high - baseline forecast and the baseline - low forecast is linked to the specific low scenario that was considered to include the hypothesis of a 'hard' Brexit (Section 3.3.4), and a weaker international traffic evolution in Turkey (Section 3.3.5).

As Figure 34 and Figure 35 show, the growth is not uniform across Europe.

While the growth (in percentage terms) is much weaker in most of the more mature markets of Western Europe, some of them will be amongst the states which will see the greatest number of extra flights per day by 2025. Turkey, despite its weaker forecast of 2019, will be the second country adding the most traffic in 2025 compared to 2018 with around 1270 more daily flights than in 2018. Such a figure is close to that of Germany who will take the first place of the countries to add traffic compared to 2018 (+1,300 daily flights) and of France in the third place (+1,250 daily flights). UK will only be in the fifth place, behind Spain and Italy.

Figure 36 shows the equivalent of Figure 34 at Functional Airspace Block level (FAB). Danube FAB and BLUE MED FAB are expected to have the highest average annual growth rate (3.2% and 3.0% respectively) over the next seven years. FABEC and Blue Med FAB are the busiest European FABs with respectively 2,250 and 1,648 additional flights per day in 2025 compared to 2018.

The details of forecast traffic and growth per State and areas (ECAC, FAB, EU28…) are available in Annex 3.

Figure 34. Average Annual Growth per State, 2025 vs 2018 (Base scenario).

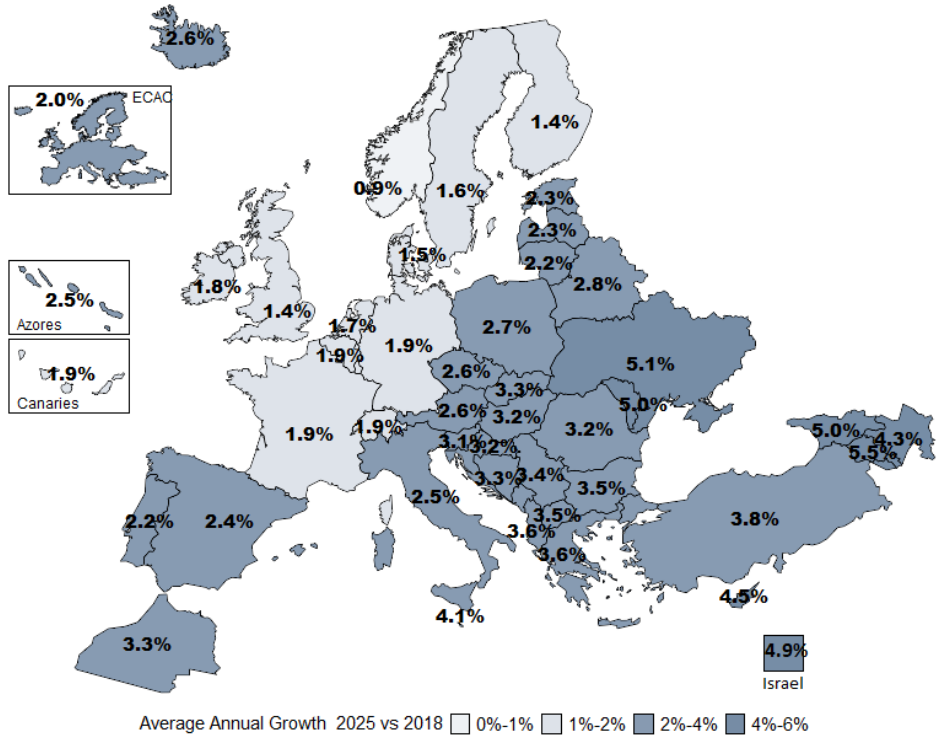


Figure 35. Number of additional movements per day for each State, 2025 vs 2018 (Base scenario).

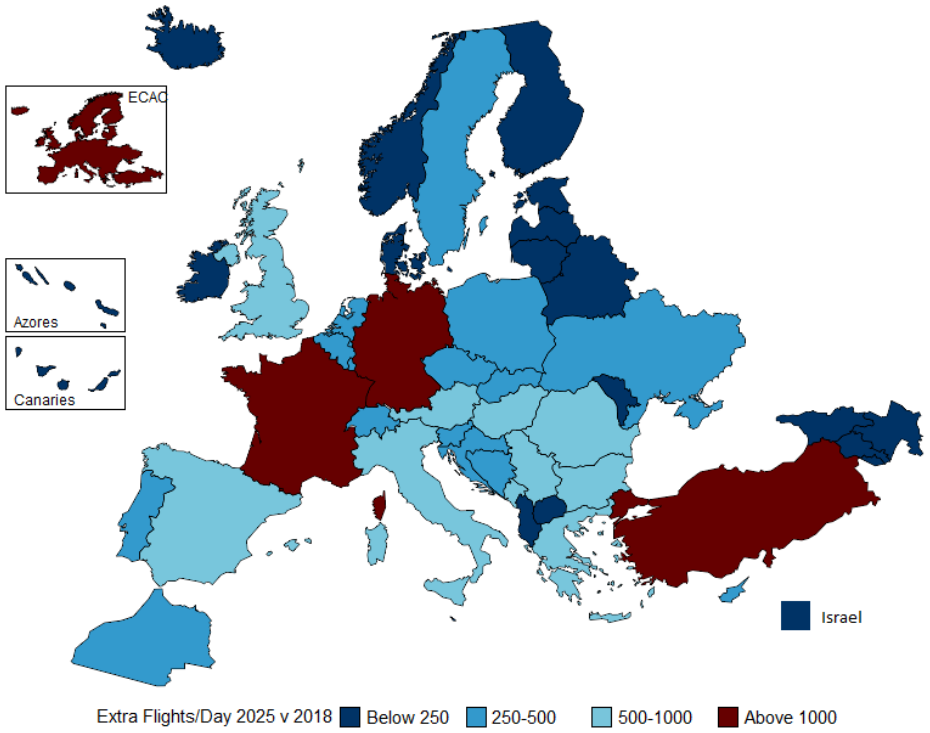
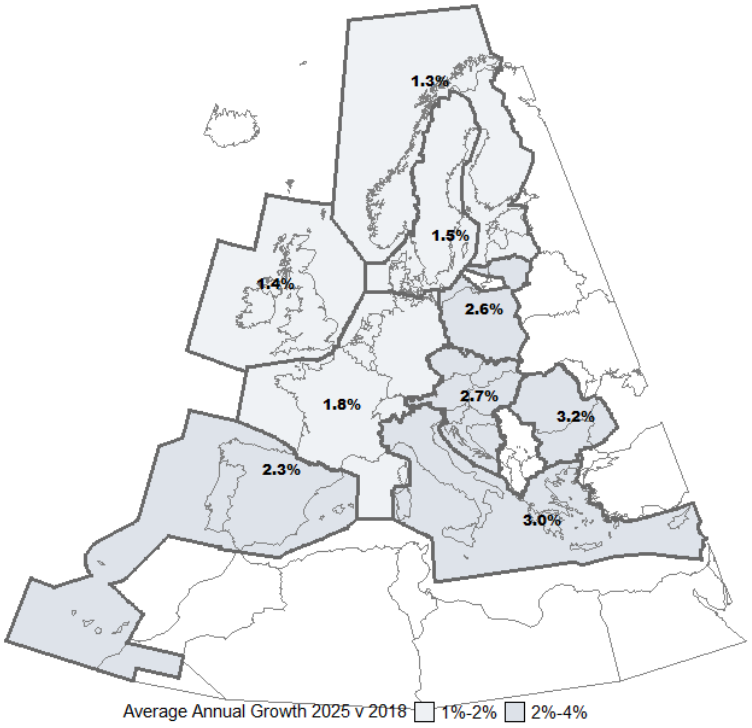


Figure 36. Average Annual Growth per FAB, 2028 vs 2018 (Base scenario).



4.3 Comparison with Previous Forecast

Overall, the baseline forecast is lower than that of October 2018 and the uncertainty around the high-and low-scenario has been reduced.

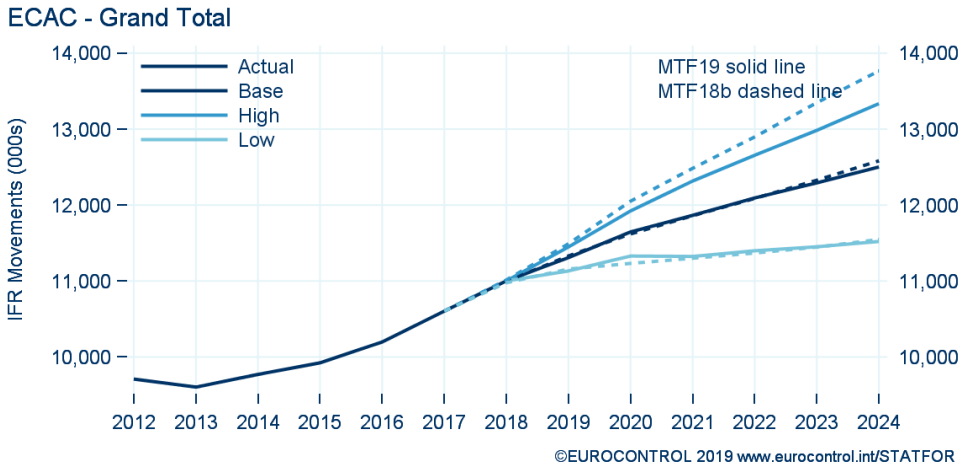
As this forecast looks now at a shorter horizon than the previous forecast, the uncertainty is reduced up to 2024 (narrower low-to-high ranges) but as the Low forecast accounts for a more pessimistic outlook than the other forecasts, it remains similar to that of the previous forecast, only the High scenario is now significantly lower. This High forecast, apart from the fact it forecasts at a shorter horizon, and thus with a lower uncertainty, can also be explained by a Low-cost effect that is weaker in this forecast and generates a weaker flight growth (see Section 3.4). As this forecast looks now at a shorter horizon than the previous forecast, the uncertainty is reduced up to 2024 (narrower low-to-high ranges) but as the Low forecast accounts for a more pessimistic outlook than the other forecasts, it remains similar to that of the previous forecast, only the High scenario is now significantly lower. This High forecast, apart from the fact it forecasts at a shorter horizon, and thus with a lower uncertainty, can also be explained by a Low-cost effect that is weaker in this forecast and generates a weaker flight growth (see Section 3.4).

Figure 37 compares the February 2019 forecast (MTF19) for total Europe with the previous seven-year forecast issued in October 2018 (MTF18b). We observe

that the current forecast is -0.2 pp lower in 2019 and lower after 2022 than the October 2018 forecast, in line with the economic forecast.

As this forecast looks now at a shorter horizon than the previous forecast, the uncertainty is reduced up to 2024 (narrower low-to-high ranges) but as the Low forecast accounts for a more pessimistic outlook than the other forecasts, it remains similar to that of the previous forecast, only the High scenario is now significantly lower. This High forecast, apart from the fact it forecasts at a shorter horizon, and thus with a lower uncertainty, can also be explained by a Low-cost effect that is weaker in this forecast and generates a weaker flight growth (see Section 3.4).

Figure 37. For total Europe, current forecast is moderately lower than previous forecast (dated October 2018), with narrower short-term uncertainty.



4.4 High-Speed Train Impact

Expansion of the high-speed train network reduces flight growth by 0.1% over 7 years, though the local effects are more significant.

In the forecast model, reductions in travel time for high-speed train lead to reductions in the number of flights on the same city pair. The high-speed train (HST) improvements taken into account in this forecast are detailed in Section 0.

The number of IFR movements that are lost to rail because of improvements in the high-speed train (HST) network are summarised in Figure 38. By 2025, it is assessed that around 19,300 flights will be removed from the network. The effect is around 0.1% in total over the 7 years; which is small on the scale of the network as a whole if we compare to the impact of capacity constraints (see Section 3.7). The impact of HST is reduced compared to the results observed in absolute terms in the February 2018 forecast when such an assessment was last done (42,100 reductions in flights over 7 years) as some projects were delayed beyond the time horizon of this forecast or simply cancelled.

However, on specific city-pairs, the effect can be quite large, especially at the end of the horizon. As far as the States are concerned, Spain, Turkey and Morocco will see the largest effects in terms of flights: respectively a reduction of nearly 9,000 flights, 7,600 flights, and 900 flights lost to train in 2025, which corresponds to 0.9%, 0.8%, and 0.6% of their traffic. There is no impact on demand in 2019 for Morocco despite the new Tangier to Casablanca HST line will be operational as the HST impact model only gradually phases in the impact of a new HST line.

Figure 38. Impact of High-Speed Train. Reduction in flights when High-Speed train network development is taken into account (impact assessed on forecasts excluding capacity constraints).

	Change in IFR Movements (000s)							Percentage Change						
	2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025
High	.	1.5	3.9	8.4	15.6	19.8	20.7	.	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Base	.	1.7	4.1	8.1	14.9	18.7	19.3	.	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%
Low	.	1.6	3.4	5.7	9.4	15.9	19.1	.	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%

		Change in IFR Movements (000s)							Percentage Change						
		2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025
Base	Germany	.	.	.	0.4	0.8	0.8	0.8	.	.	.	0.0%	0.1%	0.1%	0.1%
	Italy	.	.	0.3	0.6	0.6	0.6	0.6	.	.	0.0%	0.1%	0.1%	0.1%	0.1%
	Morocco	.	0.5	0.5	0.6	0.7	0.8	0.9	.	0.4%	0.4%	0.5%	0.5%	0.5%	0.6%
	Spain	.	1.2	3.0	3.0	5.9	9.0	9.0	.	0.1%	0.3%	0.3%	0.6%	0.9%	0.9%
	Switzerland	.	.	0.2	0.4	0.4	0.4	0.3	.	.	0.1%	0.2%	0.1%	0.1%	0.1%
	Turkey	.	.	0.2	3.1	6.6	7.1	7.6	.	.	0.0%	0.4%	0.8%	0.8%	0.8%

4.5 Airport Capacity Impact

Constraints at airports mean that demand for around 152,000 flights cannot be accommodated by 2025, which is a 1.2% reduction in growth over the period.

Airports provide their capacity plans to EUROCONTROL through the Airport Unit of the Network Manager. The published forecast is constrained by these capacity plans (see Section 3.7). We calculate the effects of airport capacity constraints by comparing the published forecast with a 'what-if?' forecast that removes airport capacity constraints. The results are shown in Figure 39.

In the base scenario, by 2025 152,200 flights cannot take place because the departure or arrival airport has reached its capacity. That is 1.2% of demand that is not accommodated, and this reduction of flights grows mainly from 2023 whereas it remains relatively stable around 0.2% before. Note that the forecast with capacity constraints assumes that airports are able to fully deliver the capacity plans that they have, which has not always been the case.

Industry responds to constraints in a number of ways: airlines by up-gauging aircraft, or by growing or moving elsewhere; airports by expanding or enhancing their infrastructure; governments by investing in alternative modes, high-speed train for example. The mitigation report (Ref. 3) from Challenges of Growth 2013 considered these mitigation options in more detail, at the 2035 horizon.

Compared to the previous forecast published in October 2018, constraints have a slightly lower impact for the forecast of 2024 (1.0% and around 129,500 flights in this forecast versus 1.1% and 143,300 flights in 2024 in the previous forecast): a consequence of a combination of improved capacity plans and of a lower demand forecast.

Figure 39. Impact of airport constraints. Reduction in IFR flights when airport constraints are taken into account.

	Change in IFR Movements (000s)							Percentage Change						
	2019	2020	2021	2022	2023	2024	2025	2019	2020	2021	2022	2023	2024	2025
High	42.6	49.8	106.5	183.8	258.3	363.3	441.9	0.4%	0.4%	0.9%	1.4%	2.0%	2.7%	3.2%
Base	25.1	21.9	26.2	39.8	71.9	129.5	152.2	0.2%	0.2%	0.2%	0.3%	0.6%	1.0%	1.2%
Low	11.3	5.4	5.9	7.0	16.8	33.7	46.7	0.1%	0.0%	0.1%	0.1%	0.1%	0.3%	0.4%

5 Growth in Service Units to 2025

5.1 En-route Service Units (TSU)

The growth of en-route service units for 2019 for the CRCO16 region is in line with the previous forecast published in October 2018. Overall, TSU are expected to reach 169.3 million service units in 2019 in the CRCO16 area, thus a growth of 4.2% (±1.4 pp) compared to 2018.

Overall, TSU are expected to reach 175.6 million service units in 2020 in CRCO16, thus a growth of 3.7% (±1.3 pp). The details of en-route service units forecast per State are available in Annex 3.

Overall, service units are still growing faster than flights because of the continuing trend in increasing weight factors observed in the past years and the relative stability in average distance flown.

Figure 40. Summary of forecast of total service units in Europe.

Total service units (Thousands)		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Total growth 2018-2025	AAGR RP2 2015-2019	AAGR RP3 2020-2024
CRCO16*	H	.	.	.	.	171,490	179,875	187,180	193,760	200,181	206,988	212,988	31%	5.2%	3.8%
	B	138,505	144,274	153,194	162,512	169,302	175,616	179,909	184,459	188,522	192,691	196,267	21%	5.0%	2.6%
	L	.	.	.	.	166,944	171,099	171,815	173,685	175,272	177,110	177,930	9%	4.7%	1.2%
RP2Region†	H	.	.	.	.	141,320	147,691	153,212	158,165	162,930	167,916	172,217	29%	4.8%	3.5%
	B	115,063	120,208	126,928	134,016	139,583	144,333	147,446	150,871	153,854	156,855	159,372	19%	4.6%	2.4%
	L	.	.	.	.	137,722	140,703	140,925	142,114	143,107	144,296	144,617	8%	4.3%	0.9%
Total service units (Growth)		**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**AAGR 2019-2025**	**AAGR RP2 2015-2019**	**AAGR RP3 2020-2024**
CRCO16*	H	.	.	.	.	5.5%	4.9%	4.1%	3.5%	3.3%	3.4%	2.9%	3.9%	5.2%	3.8%
	B	4.2%	4.2%	6.2%	6.1%	4.2%	3.7%	2.4%	2.5%	2.2%	2.2%	1.9%	2.7%	5.0%	2.6%
	L	.	.	.	.	2.7%	2.5%	0.4%	1.1%	0.9%	1.0%	0.5%	1.3%	4.7%	1.2%
RP2Region†	H	.	.	.	.	5.4%	4.5%	3.7%	3.2%	3.0%	3.1%	2.6%	3.6%	4.8%	3.5%
	B	3.0%	4.5%	5.6%	5.6%	4.2%	3.4%	2.2%	2.3%	2.0%	2.0%	1.6%	2.5%	4.6%	2.4%
	L	.	.	.	.	2.8%	2.2%	0.2%	0.8%	0.7%	0.8%	0.2%	1.1%	4.3%	0.9%

* CRCO16 designates the sum over all the states participating in the Multilateral Route Charges System in 2016 of all TSU either measured or forecasted for the corresponding year.
† RP2Region stands for the sum over all the 30 states that were involved in the EU-wide performance target setting including Croatia until 2014 (28 EU member states plus Norway and Switzerland). RP2 series includes service units for flight segments performed as Operational Air Traffic (OAT) for Germany.

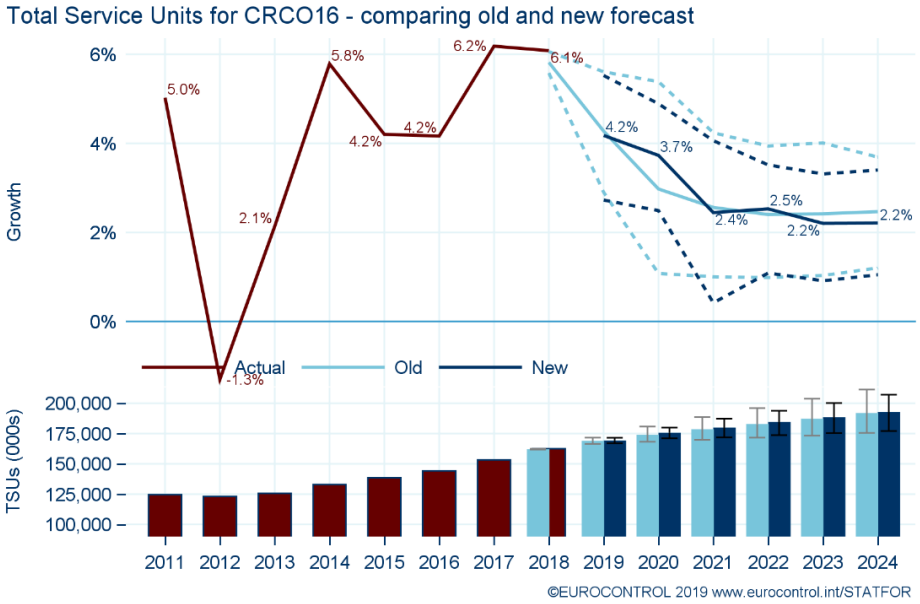
In the following years, the strong growth observed in 2019 and in 2020 should moderate due to the decelerating flight growth observed over the period 2021-2025. The service units growth should average 2.2% per year. The service units growth is still higher than the flight growth thanks to the continuing increase of aircraft size. Part of the growth observed in 2020 and 2024 is due to the extra growth from the leap year effect (this effect accounts for 0.3% of the growth).

The total en-route service units in the participating EUROCONTROL member states (CRCO16) are expected to reach 196.3 million in 2025. This represents a total growth of 21% of total en-route service units compared to 2018 and an average annual growth rate of 2.7% over the seven years period 2019-2025.

Figure 41 compares the previous forecast (published in October 2018) and this new forecast release for the CRCO16 grouping up to 2024. Following the flight forecast revision and the most recent trends in flown distance and aircraft weights, the total en-route service units (TSU) forecast has been revised

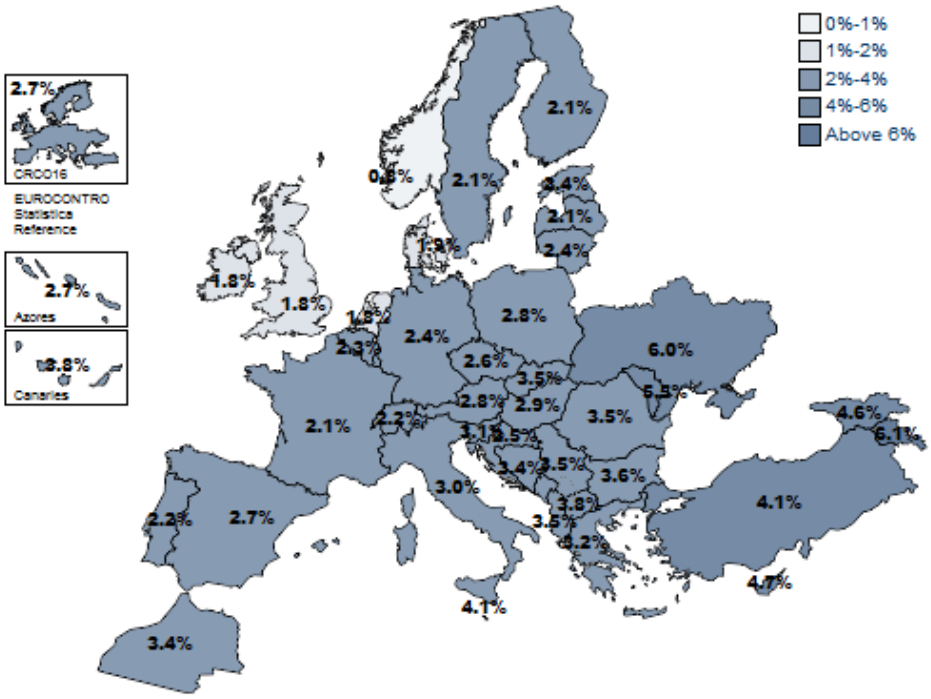
upwards in 2020 and slightly downwards towards the end of the forecast horizon. The base scenario for 2019 is aligned with the previous forecast published in October 2018.

Figure 41. Comparison 2018-2024 of the forecast between the current TSU forecast (New) and the previous forecast (Old) for CRCO16 area.



The average annual growth figures per State can be found in Figure 42. The detailed forecasts for each State are available in Annex 3.

Figure 42. Average annual growth of en-route service units between 2018 and 2025.



Any user of this seven-year forecast should consult the entire forecast range (low-growth to high-growth) as an indicator of risk. This forecast includes downside risks (e.g. the economic indicators could worsen) and upside risks (e.g. fleet growth of low-cost carriers), see Section 6.

5.2 Terminal Navigation Service Units (TNSU)

The Terminal Navigation Service Units (TNSU) are driven both by the number of departures and the aircraft weight factor of flights at airports belonging to the Terminal Charging Zones within the Performance Scheme. Compared to the previous forecast publication (October 2018), the number of departures started from a higher baseline (2018) but remained quite similar across the seven year horizon. It is to be noted that, around 40% of these airports are expected to face the effect of capacity constraints by 2024, either directly or at some partner airports. On the other hand, this forecast is also influenced by the fact the continuing increase in average weight factor recorded so far has recently weakened, which generates a lower weight growth forecast.

Hence, the forecast for the terminal navigation service units has been revised downwards compared to the previous forecast. The growth rate for TNSU generated in the Terminal Charging Zones of the participating countries in the Performance Scheme (RP2 Region) in 2019 is expected to reach 2.9% (±1.4 pp), thus 8.8 million service units.

By 2025, the TNSU for RP2 Region are expected to grow by 1.8% per year and to reach 9.6 million (Figure 43).

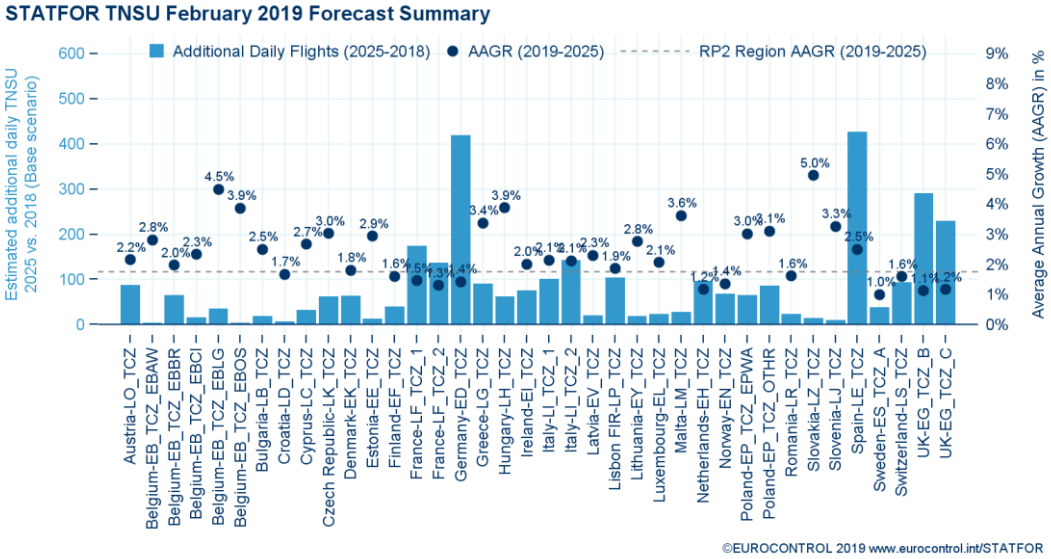
More details about the TNSU forecast method can be found in Annex 2. The definition of the terminal charging zones (TCZ) is based on the known list of airports per TCZ for RP2 provided by States as available in their RP2 performance plans submitted at the end of 2017 (see Annex 1 for RP2 region definition and TCZ list).

The TNSU detailed results per TCZ are available in Annex 3 and summarised in Figure 44.

Figure 43. Total Terminal Navigation Service Units generated in the RP2Region area as defined.

Total Terminal Navigation service units (RP2 Region)		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	AAGR 2019-2025	AAGR RP2 2015-2019	AAGR RP3 2020-2024
TNSU Total (Thousands))	H	.	.	.	.	8,878.4	9,218.0	9,483.1	9,722.5	9,937.9	10,157.1	10,341.8	2.8%	4.1%	2.7%
	B	7,484.2	7,854.9	8,195.3	8,532.6	8,781.1	9,022.4	9,153.9	9,308.7	9,430.5	9,552.8	9,643.8	1.8%	3.9%	1.7%
	L	.	.	.	.	8,655.3	8,775.7	8,715.9	8,734.5	8,736.5	8,748.6	8,709.0	0.3%	3.6%	0.2%
TNSU (Growth)	H	.	.	.	.	4.1%	3.8%	2.9%	2.5%	2.2%	2.2%	1.8%	2.8%	4.1%	2.7%
	B	3.0%	5.0%	4.3%	4.1%	2.9%	2.7%	1.5%	1.7%	1.3%	1.3%	1.0%	1.8%	3.9%	1.7%
	L	.	.	.	.	1.4%	1.4%	-0.7%	0.2%	0.0%	0.1%	-0.5%	0.3%	3.6%	0.2%

Figure 44. Average annual growth and estimated additional daily TNSU generated in 2025 compared to 2018 per TCZ (Baseline Forecast).



6 Risks to the forecast growth

Users of the forecasts are strongly advised to use the forecast range (low-growth to high-growth) as an aid to managing their own business risks. These flight forecasts are prepared in conditions of large changes in traffic routings. For many individual States, these are the biggest risks for traffic growth.

The main sources of uncertainty in the forecast are as follows.

In percentage terms for individual States, the biggest risks concern the **route choices** of airlines, which are generally downside risks for some States and simultaneously upside risks for others, balancing out across Europe as a whole:

- During Summer 2018, four Air Navigation Service Providers (ANSPs) and the EUROCONTROL Network Manager have joined forces to tackle the delay issue via a **series of measures to make the best use of available capacity** through the centres' airspace ("NM/4 ACCs"). A similar joint initiative "eNM/ANSPs Summer 2019" is planned, with more ANSPs involved, but is in preparation at the time of writing. The implementation of the re-routing measures (new routes, route availability restrictions, or any other measure…) is therefore not taken into account in this forecast. There are risks both downside and upside that could change the overflight traffic growth in the different States affected by the series of measures. Besides, such initiatives are likely to be extended to Summer 2020.
- More generally, future **network changes** (e.g. new routes) and airlines' changing choice of routes are not modelled by the forecast.
- Previous years have seen persistent reduction in *en route* capacity as a result of the introduction of **new ATC systems**. This results in tactical and strategic re-routing of traffic, sometimes enough to affect annual totals. More changes are on the way, presenting further risks.
- The **jet stream** influences airlines' route choice of where to leave (or enter) North-Atlantic oceanic airspace and enter (or leave) Irish and UK airspace. We have explored the variability of these choices over the last 12 years: there can be considerable change from day to day, let alone from month to month. UK, Ireland and the Azores are the most exposed to this risk.
- In December 2018, a new performance and charging regulation has been adopted by the EU Member States which includes—amongst others—that route charges will be calculated in accordance with the **actual route flown** ("Model 3" data) as from 1 January 2020. Aircraft operators might route differently in response to this change in charging. There is therefore a high risk that actual TSU may diverge from this forecast from 2020 onwards as this service unit forecast is still based on **filed flight plan** ("Model 2" data) and therefore does not take into account the new regulation.
- **Unit rates** are one of the many factors that influence an airline's choice of route. Further large changes in rates, as seen in the recent past, could lead to low single-figure percentage changes in flight counts.

- By 2025, there is a probability that *some* flights through **Ukraine** will be restored. The past drop in Ukraine overflights generated a significant reduction in both distances and weights of flights there, which has generated a greater en-route service units decline than that of the flights for Ukraine. More generally, the situation has also increased the number of overflights in many surrounding states. The restoration of some flights over Ukraine might produce the reverse impact and is likely to represent a downside risk for the number of IFR movements in the region with an additional upward risk for the growth of Ukraine en-route service units.
- Closure of **Libyan airspace** has reduced Maltese overflights as well as re-routed traffic to Southern Africa. It is not clear when normal patterns will be restored. For Malta, this has been partly offset by strong growth between Russia and Tunisia.
- Currently, the **Syrian conflict** is having an important impact on overflights across South-East Europe. We have not included an end to this in our scenario nor intensification, though clearly at some point this network disruption will clear and the overflight changes reverse. Avoidance of Iraq and to a lesser extent Sinai is less significant for the forecast.
- Over the recent years, **oil prices** swung considerably from lows to highs. This volatility, and its impact on airlines route choices, leads to fuel accounting for shares between 20% and 40% of operating costs, this can have an effect on fares and cost of travel for customer. A surge in oil prices could lead in an increase of fuel cost, hence an increase of the ticket prices which is a downside risk.

The **economic forecasts** used here were updated in January 2019. The economic outlook remains fragile: as the forecast was being prepared, there were several significant downward revisions to economic forecasts, such as for Germany, Italy, France and the UK. This uncertain outlook presents a mix of upside and downside risks. Economic risks are to some extent synchronised, so do not balance out across Europe as routing risks do.

Related to the uncertainty surrounding the UK economic forecast, this forecast anticipates a range of possible **Brexit** outcomes: from an “orderly” withdrawal of UK from the European Union in the base scenario to a “harder” Brexit (no-deal) the low scenario. As the UK continues to negotiate with the EU, the aviation industry remains in an uncertain situation: the risk of a no-deal Brexit, which is high, could cause major problems to the aviation sector related to air services agreements, safety framework, security, and border management. Moreover, the impact would radiate beyond UK borders.

The recent **airline failures** (Air Berlin, Monarch, Primera, Germania) have been taken into account for this forecast. However, the recovery, as other airlines pick up the slack, could either be faster or slower than assumed, representing both

an upside and downside risk. Moreover, some airlines are showing signs of weakening, the challenges of offering new business models with new aircraft across the Atlantic is affecting Norwegian and WOW, for example.

Load factors remain very high. As traffic begins to grow again, this means that load factors might be able to absorb less of the passenger growth than they have in past years. From the present position, the recovery would then come more rapidly than anticipated. This is therefore an upside risk.

Tourism trends are quite variable. The forecast does not identify which will be the new holiday 'destination of preference' in a given year. Terrorist attacks have led to more variability in tourism destinations. This is more likely a downside risk for the concerned countries and a likely upside risk for the countries that would benefit from the changes. However, all states overflights in Europe are likely to be affected, either upwards and downwards, by these changes.

Terrorist attacks, bans of one country on another one, wars and natural disasters. These are impossible to predict. Their impact on air traffic could however be a temporary one, or more significant. Overall, this is a downside risk for the country impacted by the event.

7 Abbreviations

Abbreviations and acronyms used in this document are available in the EUROCONTROL Air Navigation Inter-site Acronym List (AIRIAL) which may be found here:

http://www.eurocontrol.int/airial/definitionListInit.do?skipLogon=true&glossaryUid=AIRIAL

8 References

[1] Update of the Seven-Year IFR Flight Movements and Service Units Forecast: 2018-2024, STATFOR Document 635, EUROCONTROL, October 2018.
[2] Methods of the STATFOR 7-year Forecast, STATFOR Document 518, Draft v0.8, EUROCONTROL, July 2016.
[3] Task 5: Mitigation of the Challenges, Challenges of Growth 2013, EUROCONTROL June 2013.

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