Network Manager
nominated by
the European Commission

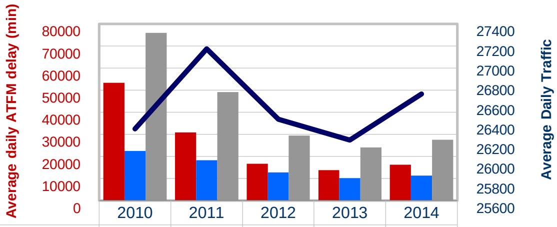
EUROCONTROL

Annual Network Operations Report 2014

June 2015

1. Executive Summary

Figure 1: Average daily traffic and ATFM delay (2010-14)

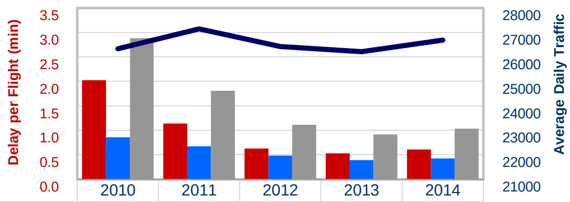


	2010	2011	2012	2013	2014
EN-ROUTE	53284	30882	16647	13818	16225
AIRPORT	22532	18213	12783	10216	11333
ATFM DELAYS	75816	49095	29431	24035	27558
AVG TRAFFIC	26329	27146	26427	26215	26685

In 2014, traffic increased by 1.8% compared to 2013 and the overall ATFM delays increased by 14.7%.

Figure 2: Average daily ATFM delay per flight (2010-14)

The European network en-route ATFM delay per flight was 0.61 min which is above the network en-route delay target of 0.5 min.



	2010	2011	2012	2013	2014
EN-ROUTE	2.02	1.14	0.63	0.53	0.61
AIRPORT	0.86	0.67	0.48	0.39	0.42
ATFM DELAYS	2.88	1.81	1.11	0.92	1.03
AVG TRAFFIC	26329	27146	26427	26215	26685

Traffic patterns changed significantly in 2014. Events in Ukraine, Libya, Syria and Iraq and the reopening of KFOR sector led to major re-routings and large changes in traffic levels for some ANSPs.

Most ACCs performed in accordance with their 2014 capacity plans (published in the European Network Operations Plan 2014-2018/19). The improved performance at Nicosia, Canarias, Madrid and Vienna ACCs made a significant contribution to reduced delays. However, chronic capacity problems continued in Nicosia ACC. High impact industrial actions in France and some critical technical failures in Zagreb and London ACCs had detrimental impact at network level. Several system upgrade and transition projects with varying degrees of ACC capacity reduction generated additional delays, and in most cases were part of the agreed Transition Plan for Major Projects in Europe. Overall, the European ATM network capacity decreased by 0.3% in 2014. The delay saving efforts of the NM Operations Centre lowered the en-route delays by 0.09 min per flight.

Adverse weather continued to impact airport operations in 2014 and was the main cause of airport delays. London Heathrow and Geneva airports reduced delays compared to 2013, although London Heathrow generated most airport ATFM delays in 2014. A further seven airports implemented A-CDM in 2014 which brought the total number of fully implemented A-CDM airports to 15, covering 24% of all departures in the Network Manager (NM) area.

By the end of 2014, 89 airports have published Continuous Descent Operations (CDO) in the relevant AIPs, with an additional 51 airports either intending (9) or indicated to have implemented (42) CDO operations.

Route extension due to airspace design reduced from 2.80% in 2013 to 2.63%, meeting the annual target of 2.70%. Improvements in airspace design delivered an average potential daily saving of 13,340 nautical miles. Route extension at the flight planning phase remained at 4.57%, which missed the annual target of 4.15%. This was due to airspace closures due to crisis situations, particularly from March onwards, and the effects of industrial action on capacity in some ACCs. This result indicates that further efforts are required with the airspace users to enhance flight planning.

2. Introduction & Scope

The purpose of this document is to provide an overview of the European ATM network performance in 2014 in the areas of traffic evolution, capacity offered by the Air Navigation Service Providers, delays and flight efficiency. Opinion of the airspace users on the network performance is also included.

The report analyses the annual results in light of the main events that took place in the course of the year.

The document structure is as follows:

- Section 1: **Executive Summary**
- Section 2: **Introduction & Scope**
- Section 3: **Network Overview** contains the annual performance of the European ATM network: traffic, capacity, delays and flight efficiency.
- Section 4: **En-Route Performance Analysis** is an analysis of network en-route performance: events and disruptions; capacity and ACC performance.
- Section 5: **Airports** is an analysis of the performance of airport operations.
- Section 6: **Flight Efficiency** is an analysis of network flight efficiency.
- Section 7: **Network Manager** contribution to achieved performance results.
- Section 8: **ATFM Compliance** to the ATFM Implementing Rule
- Section 9: **Airspace Users' Key Points on Network Performance** is the key messages of the AO community on 2014 performance (highlights of Annex I).
- Annex I: Airspace Users View on how the network performed in 2014.
- Annex II: ACC contains a traffic and capacity evolution of each ACC in 2014.
- Annex III: Airports contains capacity, delay, arrival/departure punctuality status and a NM performance assessment of each of the significant airports in 2014.

2.1. References

EUROCONTROL Forecast of Annual Number of IFR Flights (2014 - 2020) September 2014
EUROCONTROL Forecast of Annual Number of IFR Flights (2014 - 2020) February 2014
Transition Plan for major Projects in Europe 2013-2014
Transition Plan for major Projects in Europe 2014-2015
European Network Operations Plan 2014 - 2018/19
Network Operations Report 2013

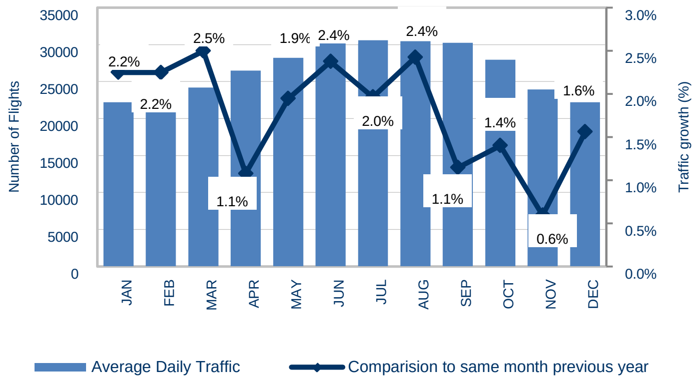
2.2. Table of Figures

2.3. Tables

3. Network Overview

3.1. 2014 In Brief

Figure 3: Average Daily Traffic in 2014



2014 started with a traffic increase in January (2.2%). Traffic took advantage of the southerly position of the jet stream, which created additional traffic complexity through the south-west axis. ATC industrial action across Europe on 29-31 January caused 70,000 min of delay and hundreds of flight cancellations. Seasonal weather impacted airport operations and accounted for 28% of ATFM delays, particularly at Oslo Gardermoen. Nicosia and Warsaw ACC had the highest en-route delays: ATM system upgrades impacted operations at both centres; ATC capacity/staffing problems impacted Nicosia ACC in particular. Oslo/Gardermoen airport became an A-CDM airport on 29 January.

Traffic increased by 2.2% in February. The Winter Olympics at Sochi generated additional demand routing through the Ukraine, Hungary and Moldova. Traffic also took advantage of the southerly position of the jet stream. Seasonal weather accounted for most ATFM delay, with London Heathrow and Istanbul Ataturk airports particularly affected. Nicosia ACC and Brest ACC generated delays due to ATC capacity and technical issues. Ankara ACC had to deal with flight Level restrictions at the Iraqi border.

Traffic increased by 2.5% in March. Events in Ukraine led to a decrease in Ukrainian traffic and a distortion of traffic flows in neighbouring countries in March. Egyptian traffic declined with traffic switching to the Canary Islands and Morocco. Industrial action in France on 17-18 March generated 100,000 min of delay; a separate action at Brest ACC on 20 March also generated delays. Military activity impacted Nicosia ACC operations further reducing capacity. Ankara ACC continued to deal with Iraqi border problems. Seasonal weather affected London Heathrow, Brussels, London City, Vienna, Amsterdam Schiphol, Zurich and Munich airports. Rome Fiumicino implemented Airport CDM on 3 March 2014.

A late Easter led to a lower traffic increase (1.1%) than expected in April. The Ukrainian situation continued to impact traffic flows with growth in excess of 10% in some neighbouring

ACCs. The opening of upper airspace over Kosovo also caused shifts of traffic flows. Egyptian traffic continued to decline with traffic switching to the Canary Islands and Morocco. Seasonal weather affected London Heathrow, Amsterdam Schiphol, Frankfurt and Barcelona airports. The Frisian Flag military exercise plus capacity ATC issues generated delays in Maastricht ACC. ATM system implementations generated delays in Warsaw ACC and Langen ACC. Technical problems impacted Marseille ACC operations between 19 and 27 April; there were reduced delays in Ankara ACC from 7 April due to removal of restrictions at the Iraqi border.

The traffic trend was back on track in May with a 1.9% increase. Ukrainian traffic continued to fall. French industrial action generated significant delays in the five French ACCs. Maastricht, Karlsruhe, Madrid, Barcelona, London and Geneva ACCs applied protective measures linked to the French strike. ATM system implementation continued in Warsaw ACC and Langen ACC. Seasonal weather affected particularly Zurich, London Heathrow, Amsterdam Schiphol, Frankfurt and Istanbul Ataturk airports. Delays at Nicosia ACC reduced by over 80% in May compared to April. There was also an Italian airspace reorganisation with no delays. Berlin Schonefeld airport fully implemented A-CDM as of 1 May.

June traffic increased 2.4% and was at its highest level for five years. The impact of Ukraine continued and Turkey continued to contribute the most growth to the European network. French and Belgian ATC industrial action caused severe network disruption: half a million min of delay, 2500 fewer flights and an extra 348,000 miles flown. With peak traffic levels, Warsaw, Maastricht, Reims and Marseille ACCs recorded capacity related delays. Weather affected particularly Istanbul Ataturk, Zurich and Frankfurt airports and Maastricht, Langen and Karlsruhe ACCs. Delays at Nicosia ACC continued to reduce in June. Delays continued at Ankara ACC due to increased traffic demand and the need to provide increased longitudinal separation in Iraqi airspace.

Traffic reached the highest July traffic level for five years with an increase of 2%. Following the MH17 crash on 17 July, existing airspace and route closures in the north east of Ukraine were extended; this shifted many traffic flows to neighbouring airspace. In addition, Libyan airspace closed. There were significant en-route capacity (ATC) shortages in Warsaw, Reims, Barcelona, Brest and Marseille ACCs. Adverse weather impacted operations in Karlsruhe, Barcelona, Maastricht, Warsaw, Langen and Paris ACCs as well as Frankfurt, London Heathrow, Amsterdam and Zurich airports. There was a two hour airspace closure due to equipment failure caused by flooding and electrical storms in Zagreb ACC on 30 July, with capacity reduction extended until mid-August. Ankara ACC experienced congestion due to increased traffic demand after Ukrainian airspace closure and the ongoing need to provide increased separation on Iraqi border. Madrid Barajas airport fully implemented A-CDM on 17 July.

Continuing a similar trend to June and July, August had its highest traffic level for five years and was above the high traffic forecast. European traffic to and from the Russian Federation decreased 7% in August in contrast to 12% growth at the beginning of the year. The closure of Libyan airspace impacted traffic flows in the region. There were significant en-route ATC capacity/staffing (ATC) delays in Barcelona, Reims, Warsaw and Athens ACCs. Adverse weather affected Karlsruhe and Zagreb ACCs, as well as Istanbul Ataturk, Frankfurt Main, London Heathrow and Sabiha Gökcen airports. Israeli military operations reduced capacity in Nicosia ACC due to airspace restrictions. Technical problems affected Madrid, Bordeaux and Stockholm ACCs. NM was on 'pre-alert' between 24 and 25 August in response to the potential eruption of the Bárðarbunga volcano.

Traffic increased by 1.1% in September. Neighbouring ACCs to Ukraine saw traffic increases in excess of 10%. Libyan airspace closure continued to influence traffic flows in the region. Delays at Nicosia ACC and Tel Aviv Ben Gurion airport reduced significantly compared to August.

Adverse weather caused most ATFM delays impacting operations at several airports and some ACCs. Industrial action by Air France and Lufthansa pilots led to significant numbers of flight cancellations. Industrial action by Italian air navigation services on Saturday 6 September impacted local operations and Karlsruhe, Maastricht and Reims ACCs.

Traffic increased by 1.4% in October, while the impact of the Ukrainian crisis continued. Adverse weather caused most ATFM delays impacting operations at several airports. There were strong winds due to remnants of Hurricane Gonzalo during the middle of month with high delays particularly at London Heathrow and Amsterdam Schiphol; airlines cancelled flights to minimise disruptions at London Heathrow. CANATO military exercise generated a significant amount of delay in Bordeaux ACC, with some impact in Marseille ACC. Delays reduced at Athens, Makedonia and Nicosia ACCs. Industrial action by Lufthansa pilots on 20 and 21 October and Germanwings pilots on 15 October resulted in the cancellation of approximately 1,650 flights. Stuttgart and Milano Malpensa airports implemented full A-CDM operations.

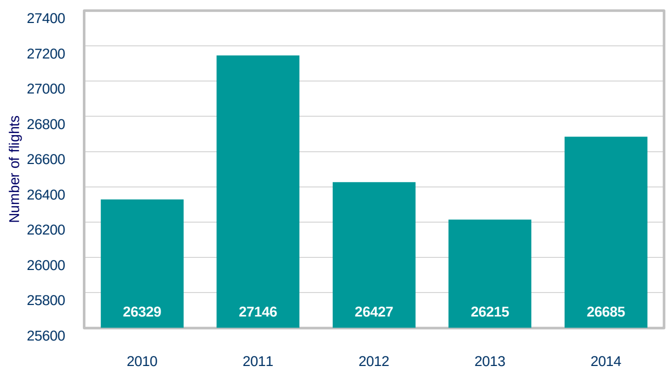
Traffic increased by 0.6% in November with some (Ukraine) neighbouring ACCs showing in excess of 20% traffic growth. Weather impacted airport operations, particularly at London Heathrow and Amsterdam Schiphol airports. Lisbon ACC operations were impacted by ATC capacity and staffing issues. Strong jetstreams and seasonal weather created additional complexity for Lisbon. A number of airspace projects started - airspace reorganisation in Tampere, Bodo and Stavanger ACCs created some ATFM delay. The new Bosnia Herzegovina ACC opened successfully with no ATFM delay due to airspace changes in the region. The final step of the Italian airspace reorganisation concluded with no delays. London Gatwick airport implemented full A-CDM operations – the 15th A-CDM airport.

Traffic in December increased by 1.6%. Technical issues impacted operations at Milan and London ACCs with high delays and a number of flight cancellations reported. There was industrial action at Lufthansa in early December resulting in around 1,500 fewer flights. Industrial actions in Belgium and Italy saw relatively low delays although it is estimated that there were hundreds of flight cancellations. Paris Orly airport successfully transitioned to ATC advanced Tower status.

3.2. Traffic

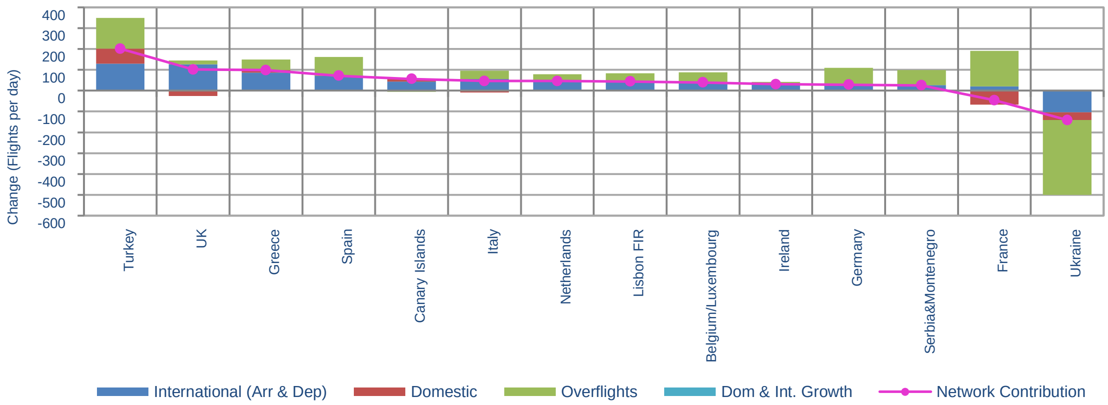
The number of flights in the NM area increased by 1.8% in 2014 compared with 2013. Summer traffic growth was at the high end of the February 2014 forecast and stronger-than-expected growth rates were recorded especially in Southern Europe. Despite a hesitant economic recovery in Europe, there were twelve consecutive months of growth for the first time since February 2008 due to restructuring for major carriers coupled with low-cost carriers' dynamism.

Figure 4: Average daily traffic per year



2014 was marked by major changes in traffic patterns in South-East Europe owing to specific events: the closure of Eastern Ukraine airspace resulted in important re-routings to avoid Ukraine, loading neighbouring States. The Libyan airspace closure (August 2014) had an adverse impact on Maltese overflights. Lastly, the conflicts in Syria, Iraq and the partial unavailability of Sinai Peninsula (November 2014) shifted some overflights through Greece and Cyprus. In addition, KFOR sector opening in April 2014 (after closure of 15 years of this portion of airspace) led to local changes in routing patterns along the Adriatic, with airlines quickly opting for more direct routes.

Figure 5: Main changes to traffic on the European Network 2013 vs 2014



Referring to local traffic[1] only, Turkey remained the main contributor (+9%) of growth in the European network, followed by Greece after exceptional growth (+11%) over the summer and UK (+2%). Ukraine lost, on average, approximately 140 flights/day (-28%) since the beginning of the year while France lost approximately 50 flights/day owing to the weakness of its internal traffic.

Outside Europe, Russia remained the number one destination from Europe in terms of number of flights with circa 900 flights per day on average in 2014. However, Russian traffic was strongly affected by the Russian economic slowdown and the tensions between Russia and the EU; Russian flow declined by 4% over the year (a loss of around 40 flights per day, on average, compared to adding around 84 flights per day in 2013). The United States traffic flow, the second largest destination from Europe, grew 3.5% on average over the same period. Traffic to/from Egypt had recovered in July 2014 to the levels before the July 2013 civil unrest.

In 2014 and for the second consecutive year, low-cost was the only market segment with continuous growth (6.6%). Traditional scheduled, the largest segment, had modest growth of 0.4%. The all-cargo segment recovered from July onwards to show an overall 1% growth on 2013. The charter segment decline throughout the year accelerated in October to show a total decrease of 6%. The business aviation segment was down 0.5% on 2013.

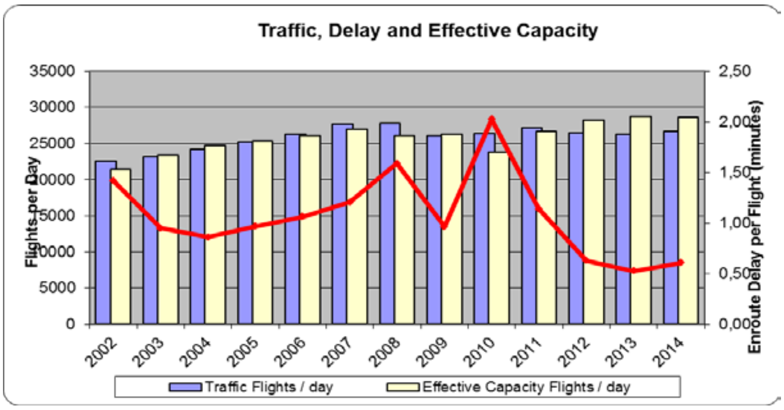
[1] Internals, international departures and arrivals, excluding overflights.

3.3. Capacity

In 2014 the effective capacity indicator decreased by 0.3% over the whole European ATM network (a decrease of 0.4% for the summer season), when compared to the corresponding period of 2013.

The capacity at European level is quantified using the “effective capacity”[2] indicator of the Performance Review Commission (PRC).

Figure 6: Traffic, Delay and Effective capacity



3.4. Delays

3.4.1. All Air Transport Delays (Airline View)

This section presents the all air transport delay situation as seen from the airlines by using the data collected by Central Office for Delay Analysis (CODA) from the airlines. Data coverage is 69% of the commercial flights in the ECAC region for 2014. ATFM delays reported by airlines may be lower than the NM calculated ATFM delays due to difference in methods: ATFM delays of NM are the (flight) planned “delays”; the airlines report the “actual” experienced ATFM delay on departure. For instance, a flight with an ATFM delay may also have a handling delay absorbed within the ATFM delay. For the airline, a part of this delay is the ATFM delay and the rest is the handling delay.

[2] The "effective capacity” indicator corresponds to the volume of traffic that could be accommodated with an average of 1 min en-route delay/flt, taking into account all causes. It is described in PRR 5, Annex 6.

Figure 7: Average departure delay per flight 2010-2014

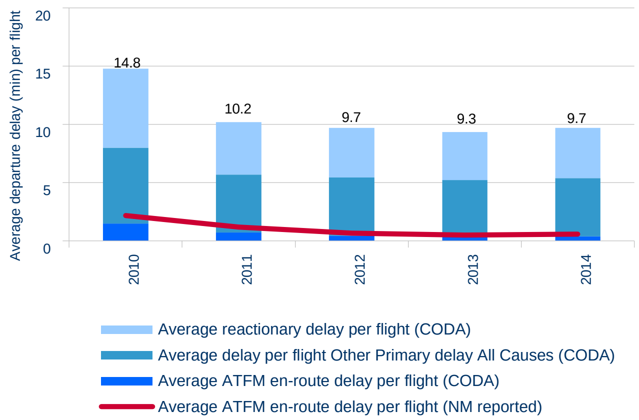
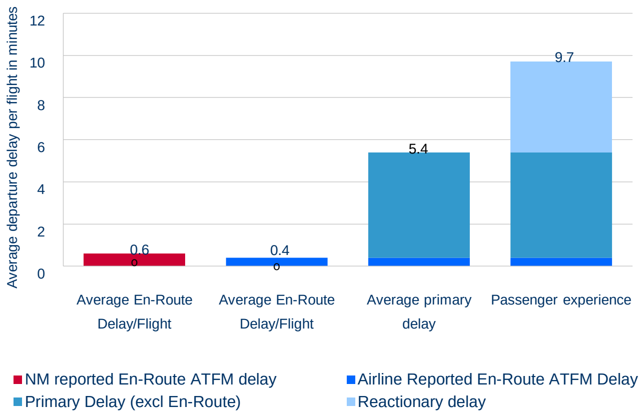
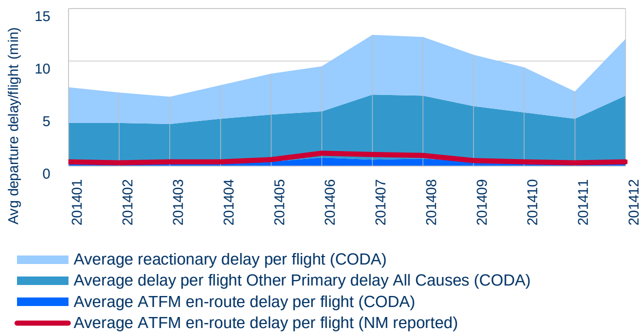


Figure 8: Breakdown average delay per flight 2014



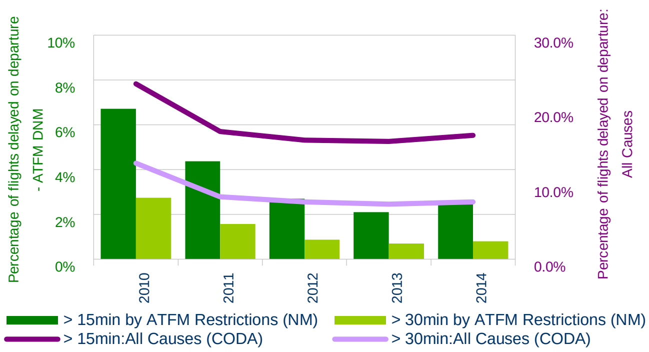
Based on airline data, the average departure delay per flight from "All-Causes" was 9.7 min per flight, this was an increase of 4% in comparison to the record low of 9.3 min per flight in 2013. Within all-causes air transport delays, en-route ATFM delays were 0.4 min/flight in 2014. Overall ATFM delays (en-route + airport) increased by 0.1 min to 1.3 min per flight. Primary delays counted for 56% (or 5.4 min/flt) of which 0.4 min/flight were attributed to en-route ATFM delays, with reactionary delays representing the remaining share of 44% at (4.3 min/flt).

Figure 9: Average departure delay per flight 2014



Further analysis of airline data shows that the average en-route ATFM delay remained stable at 0.4 min per flight in comparison to 2013. This was below the NM reported average en-route ATFM delay of 0.61 min per flight (the difference between airline and NM reported en-route delays comes from different delay attribution methods as described above).

Figure 10: Percentage of delayed flights: ATFM & All Causes

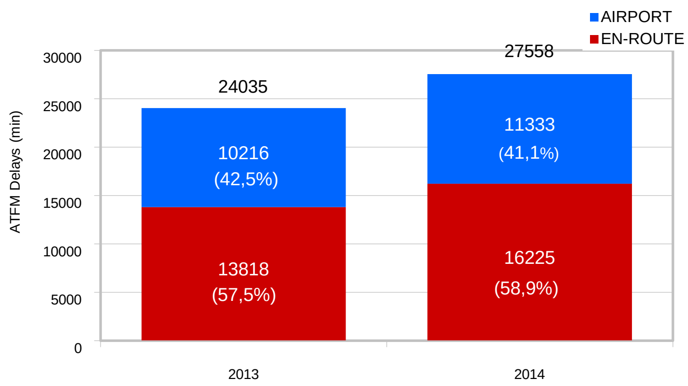


The percentage of flights subject to long ATFM restrictions (those exceeding 15 and 30 min) saw small increases. Flights with restrictions exceeding 15 min were 2.5% (the detail shows a split between 1.0% caused by airport arrival and 1.5% by en-route ATFM restrictions). The percentage of flights delayed from all-causes also increased: those exceeding 15 min increased by 0.8 percentage points to 16.6%; and those exceeding 30 min increased by 0.3 points to 7.7%.

3.4.2. ATFM Delays

Average daily ATFM delays increased by 14.7% compared to 2013.

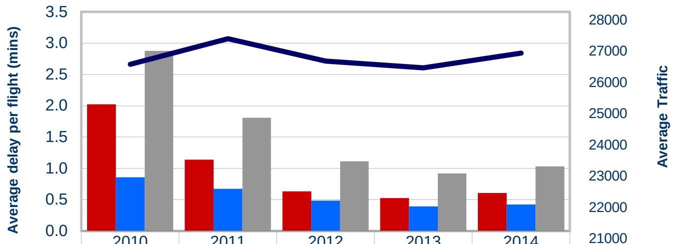
Figure 11: Average daily ATFM delays (2013 v's 2014)



Average daily en-route ATFM delays increased by 17.4%. Average daily airport ATFM delays increased by 10.9%.

The average daily ATFM delay per flight increased by 12% on 2013, with en-route ATFM delay per flight increasing by 15% and airport ATFM delay per flight increasing by 7.7%.

Figure 12: Average Daily ATFM Delay per Flight (2010-2014)



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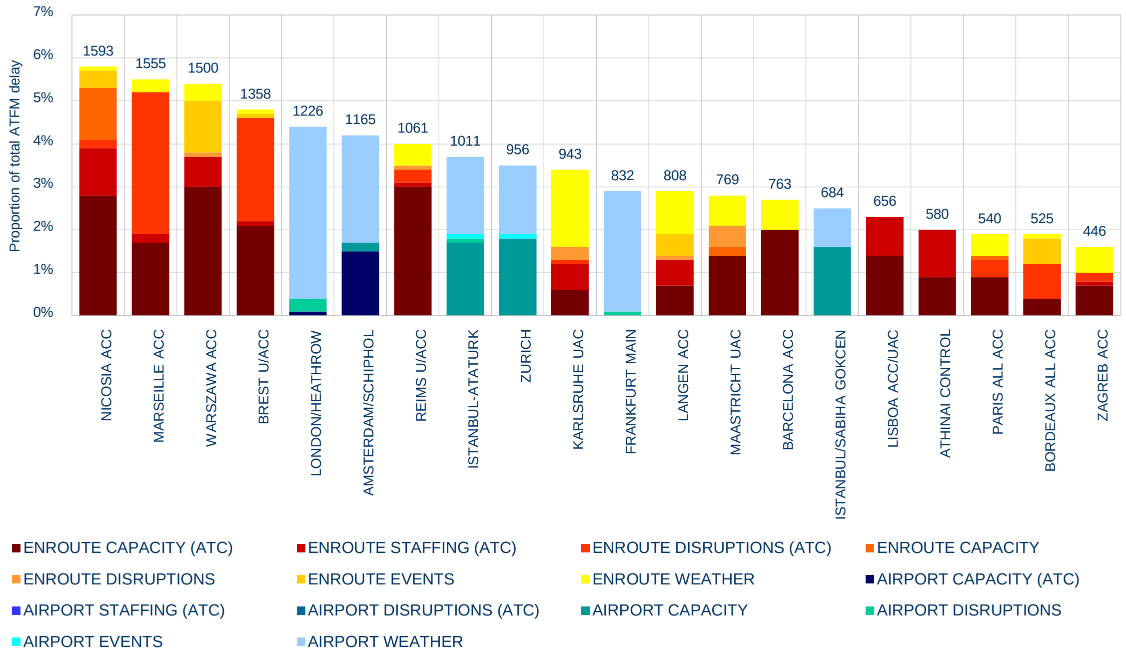
AIRPORT	0.86	0.67	0.48	0.39	0.42
ATFM DELAYS	2.88	1.81	1.11	0.92	1.03
AVG TRAFFIC	26329	27146	26427	26215	26685

The top 20 delay locations generated 68.2% of all ATFM delays in 2014.

The top five locations (Nicosia, Marseille, Warsaw and Brest ACCs, and London/Heathrow airport) generated 25.9% of the total network ATFM delay.

Nicosia, Marseille, Warsaw, Brest and Reims ACCs all generated delays due to en-route ATC capacity issues, with Nicosia and Warsaw ACCs also affected by staffing issues. Nicosia ACC experienced ATC capacity shortages due to military activity, particularly in July and August 2014.

Figure 13: Top 20 delay locations for ATFM delays in 2014



Industrial action during the summer particularly affected Marseille and Brest ACCs and, to a lesser extent, Reims, Paris and Bordeaux ACCs. Karlsruhe and Maastricht ACCs generated additional en-route disruptions delay due to the application of ATFM protective measures.

All of the airports in Figure 13 (London Heathrow, Amsterdam Schiphol, Istanbul Ataturk, Zurich, Frankfurt Main and Istanbul Sabiha Gökcen) generated significant airport ATFM delays due to adverse weather conditions. Airport ATC capacity constraints affected significantly Amsterdam Schiphol airport. Istanbul Ataturk, Zurich and Istanbul Sabiha Gökcen airports all generated delays due to airport capacity issues.

Adverse summer weather particularly impacted Karlsruhe, Langen, Maastricht, Barcelona, Paris, Brest and Zagreb ACCs.

Bordeaux, Marseille and, to a lesser extent, Paris ACCs all generated delays in October due to the CANATO military exercise, and Maastricht ACC in April due to Frisian Flag.

ATM system improvements were implemented in Nicosia, Warsaw, Brest (training for ERATO), Langen, Sevilla, Geneva Zagreb and Baku ACCs during the year, with some significant delays being generated by some of the projects. See Section 4.1.1 Planned Events for more information.

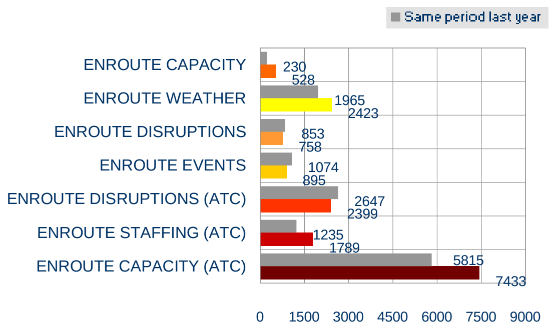
There were significant technical issues at Marseille ACC during May 2014, Zagreb ACC at the end of July and beginning of August, Madrid ACC at the end of August, Milan, London and Bremen ACCs in December. See Section 4.1.2 Disruptions for more information.

3.4.3. En-Route ATFM Delays

The 17.4% increase in the average daily en-route ATFM delays is mainly due to increased en-route ATC capacity (+27.8%), en-route ATC staffing (+44.9%) and en-route weather (+23%) delays.

En-route delays due to disruptions decreased, as did delays due to en-route events (mainly ATM system improvements).

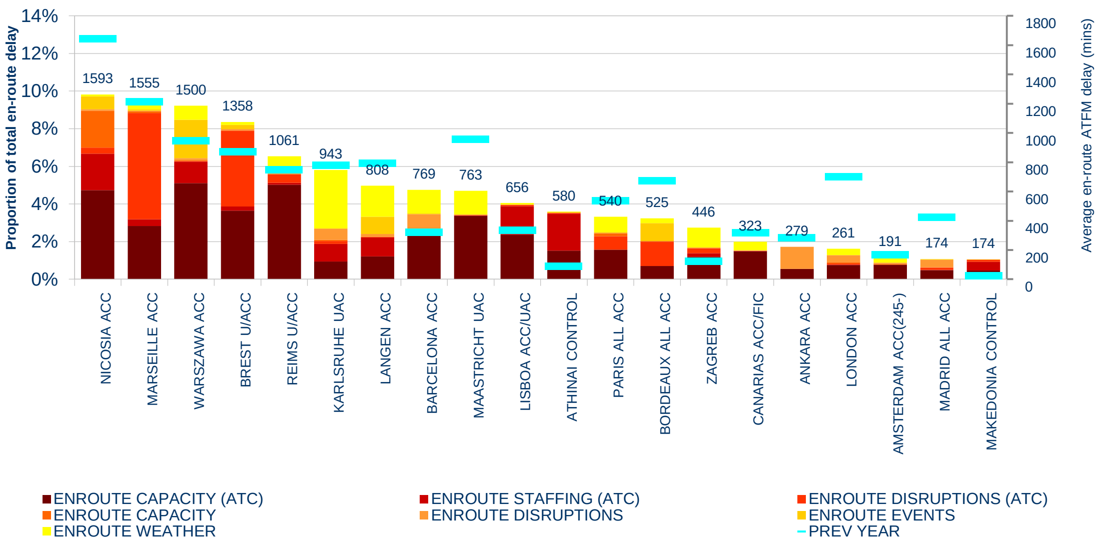
Figure 14: 2014 average daily en-route delays



The Top 20 delay locations generated 71.4% of all en-route delay in 2014.

The top five locations Nicosia, Marseille, Barcelona, Warsaw and Brest ACCs generated 38.2% of all delay.

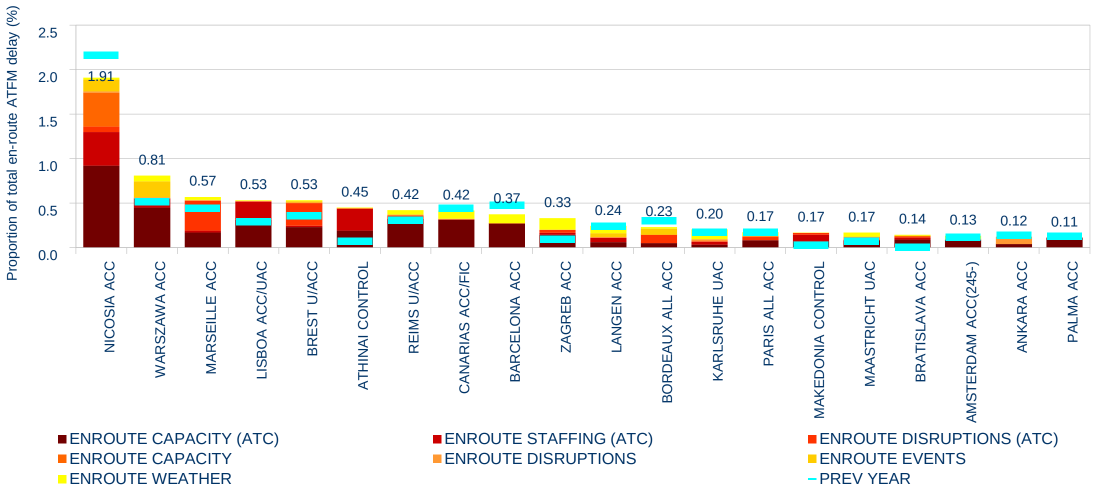
Figure 15: Top 20 en-route ATFM delay locations during 2014



Nicosia ACC was the only one of the top five ACCs to reduce the average en-route ATFM delay per flight in 2014 compared to 2013. The remaining four ACCs (Warsaw, Marseille, Lisbon and Brest) all generated higher en-route delay per flight than in 2013.

Only one ACC (Nicosia) had delays of more than 1 min per flight, with a further seven ACCs (Warsaw, Marseille, Lisbon, Brest, Athens, Reims and Canarias) recording delays of between 0.4 and 1 min per flight.

Figure 16: Top 20 en-route delay per flight locations during 2014



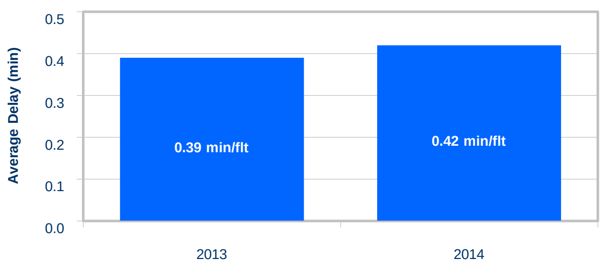
Of the remaining ACCs in the top 20, Canarias, Barcelona, Bordeaux, Ankara and Palma ACCs all reduced the average delay per flight compared to 2013. Athens, Reims, Zagreb, Langen, Karlsruhe, Paris, Makedonia, Maastricht and Bratislava ACCs all generated a higher en-route delay per flight than their 2013 levels. Langen, Paris and Amsterdam ACCs maintained the same average en-route delay per flight as 2013.

An overview and information on individual ACCs can be found in Section 4 En-Route Performance Analysis and in Annex II.

3.4.4. Airport/TMA ATFM Delays

The average airport ATFM delay per flight for 2014 increased to 0.42min per flight compared to 2013 (0.39 min/flight).

Figure 17: Average daily Airport ATFM delay/flight (min)



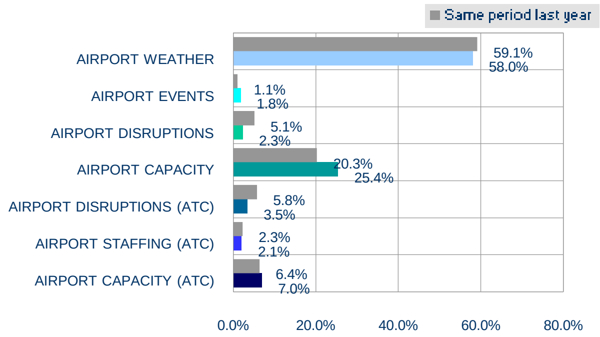
During 2014 NM continuously provided support and recommendations to major airports facing local capacity challenges and/or high delay levels. NM gave special attention to some regions and airports; NM focussed especially on continuous implementation of the Greek Islands Action Plan (see Section 5.2 Greek Islands – Summer 2014). As the high traffic growth in Turkey severely impacted the airports, NM is identifying actions to mitigate delays in collaboration with local stakeholders.

An overview and information on individual airports (see **Figure 20: Top 20 airport delay per**

flight locations during 2014) can be found in **Section 5 Airports** and in Annex III.

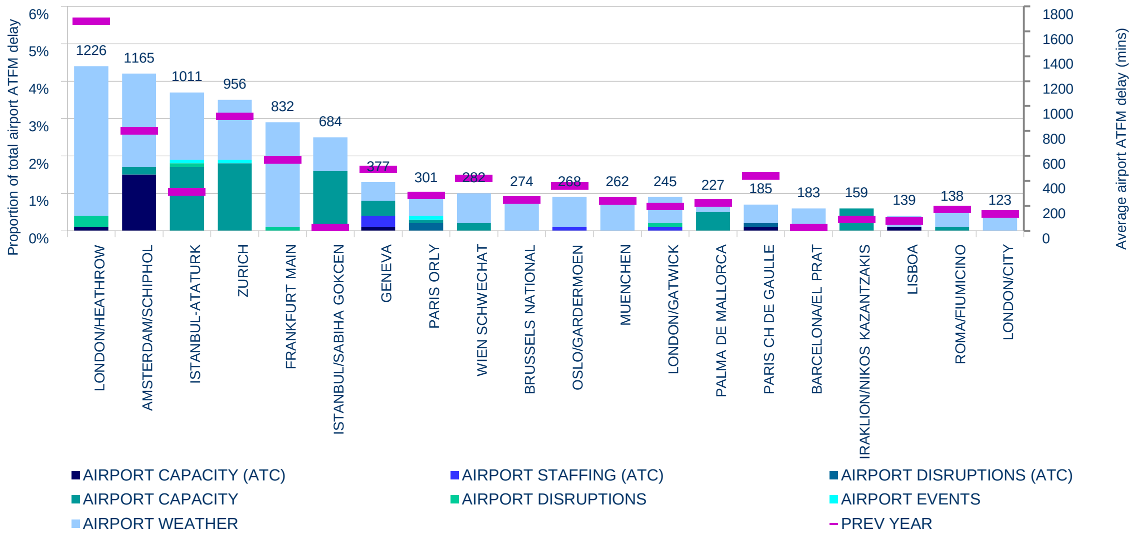
Adverse weather was the main reason of delays in 2014 (particularly convective weather and strong winds). Compared to the previous year, the adverse weather delays (average daily) increased by more than 500 min. Airport capacity issues at some airports were the second main reason of delays. Airport capacity delays increased by about 800 min (average daily) in 2014 compared to 2013. This means that the percentage of adverse weather delays out of the overall airport/TMA delays decreased by 1.1% while the percentage of airport capacity delays increased by 5.1% compared to 2013.

Figure 18: Average daily airport/TMA ATFM delay



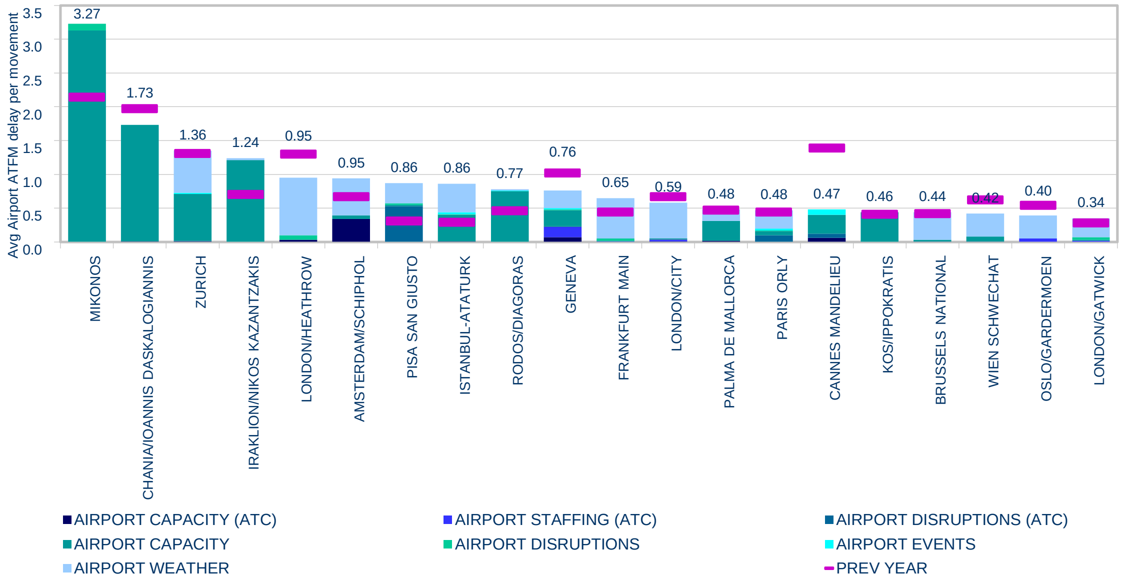
London Heathrow was the only airport in the first five of Figure 19 with fewer delays in 2014. The two Istanbul airports had significantly more delays than in 2013. Weather was the primary cause of delays for the first five airports.

Figure 19: Top 20 airport delay locations during 2014



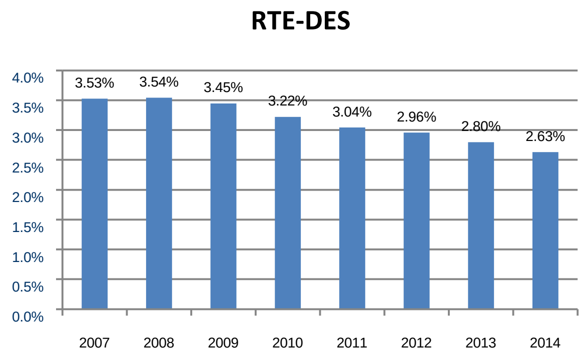
There were four airports with ATFM delay per flight over 1 min. Three of these were Greek island airports with capacity issues and high traffic growth.

Figure 20: Top 20 airport delay per flight locations during 2014



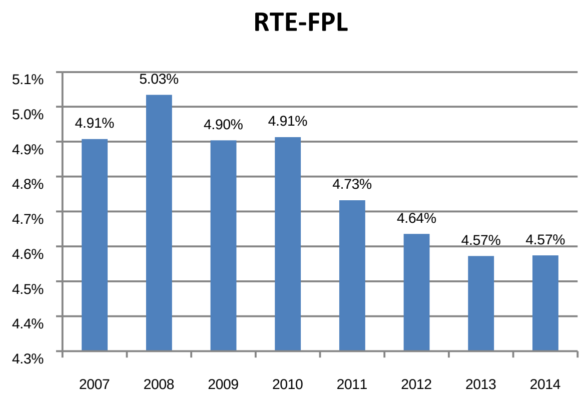
3.5. Flight Efficiency

Figure 21: average route extension due to airspace design



The average route extension due to airspace design decreased from 2.80% in 2013 to 2.63% in 2014, meeting the annual target of 2.70%. It reached a historically low level in December 2014 and allowed potential average savings of nearly 13,340 nautical miles per day.

Figure 22: average route extension based on the latest filed flight plan



The average route extension based on the latest filed flight plan remained at 4.57% in 2014, the same level as in 2013. The annual target of 4.15% was missed by 0.42%, equivalent to an extra 2.92 million nautical miles (flight planned) per year. The lowest level ever was reached in December 2014 with 4.43%.

The 2014 route extension performance target was missed mainly due to the capacity shortfalls during the ATC strikes or airspace avoidance/closure due to crisis situations.

4. En-Route Performance Analysis

4.1. Planned Events and Disruptions

ATFM delays due to planned and unplanned events decreased overall in 2014 when compared to 2013 (see **Figure 14**). A summary of these events appears below.

4.1.1. Planned Events

There were a number of system upgrade/transition projects that imposed capacity reductions in several ACCs:

Table 1: system upgrade/transition projects

Geneva ACC (system upgrade), January 2014	Warsaw ACC (PEGASUS-21), January - May 2014
Zagreb ACC (COOPANS), February - April 2014	Nicosia ACC (TOPSKY / system updates), January 2014
Langen ACC (PSS), January , March – July, November – December 2014	Brindisi, Milan, Rome ACCs (airspace resectorisation), April - May 2014
NATO/KFOR - Opening of the upper airspace over Kosovo, April 2014	Bodo/Stavanger ACCs (SNAP), November 2014
Baku ACC (new ATM system) – March-July 2014	Tampere ACC (reorganisation of airspace), November - December 2014
Belgrade, Zagreb, Sarajevo ACCs (implementation of new Bosnia-Herzegovina ACC), November 2014	Brest ACC (training for ERATO stripless system), September 2014
Seville ACC (SACTA CF2 ATM system upgrade), September 2014	Padova, Milan, Rome ACCs (airspace resectorisation), November 2014

4.1.2. Disruptions

A number of unplanned events[3] (disruptions) imposed capacity reductions in a number of ACCs:

Table 2: Unplanned Events

Date	Event	Traffic Impact	Delay Impact (total ATFM)
26 January 2014	Karlsruhe ACC radar failure	none	8,417 min
29-31 January 2014	Europe wide ATC industrial action	750 flights fewer flights [4]	70,683 min
9 and 10 January 2014	Tunis ACC local industrial action	none	11,331 min
6 February 2014	Nicosia ACC technical problems	none	11,273 min
9, 15 - 17 February 2014	Radar and frequency problems in Brest ACC	none	8,437 min
28 February 2014	Closure of Crimean peninsula NOTAM A0277/14	Temporary restricted area as of 28 February	none
11 March 2014	Transfer of responsibility from Simferopol ACC to Dnipropetrovsk and Odessa ACCs	Route closures on 28 March 2014 affect traffic in the region	none
17-18 March 2014	ATC Industrial action in France	1,300 flts cancelled flights on 18 March	100,000 min
20 March 2014	ATC Industrial action in Brest ACC	514 cancelled flights	16,789 min
1 - 7 April 2014	Ankara ACC - flight level restrictions imposed at the Iraqi border		
2 - 4 April 2014	Deutsche Lufthansa and Germanwings industrial action	3,800 cancelled flights	none
19 and 25 - 27 April 2014	Operational ACC display problems in Marseille ACC	none	7,818 min
May 2014	Extension of PEGASUS 21 ATM system transition in Warsaw ACC	450 fewer flights, 5 % of the NW traffic	42,022 min (63.8% of total Warsaw ACC delay in May)
14 -16 May 2014	Industrial action in France	9% traffic reduction in France [5]	126,145 min direct ATFM delay.
3 -29 May 2014	Radar screen outage in Marseille ACC	none	22,936 min
27 May 2014	Weather system failure in Karlsruhe ACC	none	5,688 min
24-26 June 2014	ATC industrial action in France and Belgium[6]	Reduction of 2,500-3,000 flights	401,575 min direct ATFM delay. 98,709 min of indirect delay due to onloading of surrounding airspace.
7 July 2014	Barcelona TMA radar antennae struck by lightning during thunderstorm	none	21, 154 min
Mid-July 2014	Closure of Libyan airspace		

[3] The main source for the event description is the Regulation (ANM) remark.

[4] Source: DSNA

[5] NM estimation

[6] The French action lasted for the whole period, the Belgian action was three periods of two hours or less.

Date	Event	Traffic Impact	Delay Impact (total ATFM)
17 July 2014	Closure of eastern part of the Dnepropetrovsk airspace	Traffic onload to Istanbul, Ankara, Bratislava, Budapest and Warsaw ACCs, with shifting of existing traffic flows in Sofia and Bucharest ACCs	
30 July 2014	Severe flooding, lightning strike and power failure of Zagreb ACC operations facility	Airspace closed for 2hrs, with traffic onloaded to surrounding ACCs. Capacity reduction thereafter until mid-August 2014.	15,337 min
26 August 2014	Bordeaux ACC frequency problems prevented use of optimum sector configuration		9,924 min
29 August 2014	Industrial action by Germanwings pilots	26% of flights cancelled	none
30 August 2014	Madrid ACC FDPS failure and frequency problems	Brest and Barcelona ACCs experienced significantly higher than expected levels of traffic when the regulations were cancelled.	7,300 min direct ATFM delay. Brest and Barcelona ACCs generated an estimated additional 8,000 min of indirect delay.
5, 10, 16 and 30 September 2014	Industrial action by Lufthansa pilots.	Approximately 410 flights did not operate, this represents a 27% reduction of traffic;	none
6 September 2014	Industrial action by Italian air navigation services impacted en-route and airport operations		12,000 min
15 - 28 September 2014	Industrial action by Air France pilots	Approximately 8,500 Air France flights did not operate, this represents a 59% reduction of traffic.	none
20 September 2014	Voice communication problems between Makedonia ACC and Istanbul ACC		5,889 min
15 October 2014	Industrial action by Germanwings pilots	146 flights cancelled.	none
20 - 21 October 2014	Industrial action by Lufthansa pilots	Approximately 1,500 flights cancelled.	none
11, 19 November 2014	Upgrade of Nicosia ACC ATM system, followed by additional system upgrades	none	6,928 min
26 - 27 November 2014	Industrial action in Greece	460 flights cancelled	minimal
1-2 and 4 December 2014	Industrial action by Lufthansa pilots	Reduction of approximately 1,500 flights	
8 December 2014	Milan ACC radar failure		18,222 min
8 and 15 December 2014	Industrial action in Belgium	Reduction of approximately 290 flights on 8 December, 830 flights on 15 December	Amsterdam ACC recorded 2,438 min of indirect ATFM delay due to traffic onload.
12 December 2014	Flight data server failure in London ACC, protective measures applied in Brest and Paris ACCs	number of flight cancellations	16,169 min of direct ATFM delay. Brest (3,849 min) and Paris (297 min) ACCs generated indirect ATFM delay.
12 December 2014	Industrial action in Italy	1,000 flights did not fly	1,173 min of en-route ATFM delay generated by Milano, Padova and Brindisi ACCs
19 - 30 December 2014	Bremen new software ATCAS implementation.		7,457 min

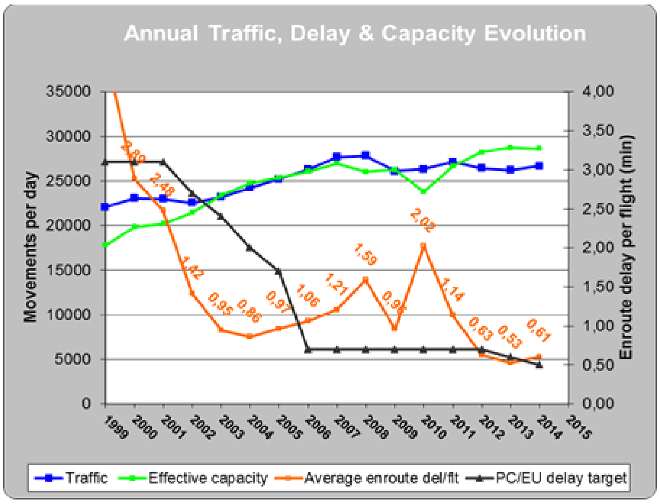
4.2. Capacity Evolution

The capacity at European level is quantified using the "effective capacity"[2] indicator of the Performance Review Commission (PRC) that takes into account traffic and delay evolution.

Between 1999 and 2014, traffic increased by 21%, the “effective capacity” of the network increased by 61% and the average en-route ATFM delay per flight decreased by 87%.

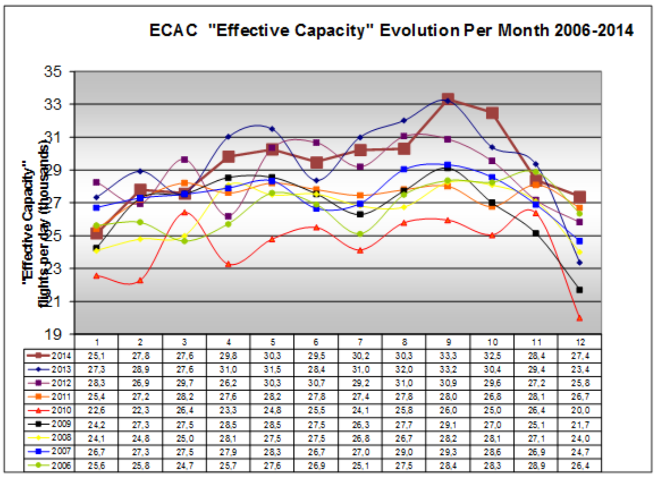
In 2014 the effective capacity indicator decreased by 0.3% over the whole European ATM network when compared to 2013. Actual delay for summer 2014 was 0.81 min per flight en-route, which is a deterioration over 2013, despite improved NM and ANSP capacity planning and proactive network management.

Figure 23: Annual Traffic, delay and capacity evolution



The "effective capacity” indicator takes into account en-route ATFM delays, for all reasons, including weather, disruptions and significant events: system failures, industrial action, implementation of new ATM systems. [Figure 24](#) shows the monthly evolution of the “effective capacity” of the European ATM system since 2006 (when traffic had similar levels to 2013). This indicator was at its highest level ever in September 2014.

Figure 24: ECAC ‘Effective Capacity Evolution per Month 2006-2014



	1	2	3	4	5	6	7	8	9	10	11	12
2014	25,1	27,8	27,6	29,8	30,3	29,5	30,2	30,3	33,3	32,5	28,4	27,4
2013	27,3	28,9	27,6	31,0	31,5	28,4	31,0	32,0	33,2	30,4	29,4	23,4
2012	28,3	26,9	29,7	26,2	30,3	30,7	29,2	31,0	30,9	29,6	27,2	25,8
2011	25,4	27,2	28,2	27,6	28,2	27,8	27,4	27,8	28,0	26,8	28,1	26,7
2010	22,6	22,3	26,4	23,3	24,8	25,5	24,1	25,8	26,0	25,0	26,4	20,0
2009	24,2	27,3	27,5	28,5	28,5	27,5	26,3	27,7	29,1	27,0	25,1	21,7
2008	24,1	24,8	25,0	28,1	27,5	27,5	26,8	26,7	28,2	28,1	27,1	24,0
2007	26,7	27,3	27,5	27,9	28,3	26,7	27,0	29,0	29,3	28,6	26,9	24,7
2006	25,6	25,8	24,7	25,7	27,6	26,9	25,1	27,5	28,4	28,3	28,9	26,4

4.3. ACC

In the European Network Operations Plan 2014 - 2018/19, there are two delay values for each ACC:

- The required en-route delay/flight performance to achieve annual network delay target in 2014 (0.5 min/flight). Also known as "delay breakdown".
- The forecast delay based on 2014 NOP capacity planning excluding disruptions such as industrial action and technical failures.

An overview of the ACC performances in 2014 is in Section 3.4.3 En-Route ATFM Delays.

shows the traffic growth, capacity and delay for each ACC. The ACCs where the actual delay exceeded both (Breakdown and Forecast) delay values are highlighted in "red" in the Actual column. Those ACCs that exceeded either of the Breakdown or Forecast values are highlighted in "amber".

Table 3: ACC Performance

COUNTRY	ACC	ACC Code	EN-ROUTE DELAY			TRAFFIC			CAPACITY	
			Breakdown [7]	Forecast [8]	Actual	Forecast [9]	Summer	Annual	NOP Plan	Actual
NETWORK	NETWORK	ALL_DNM	0.5	0.51	0.61	1.20%	1.90%	1.80%	2.60%	-0.38%
ALBANIA	TIRANA ACC	LAAAACC	0.2	0.05	0	0.70%	-1.70%	-1.20%	5%	0%
ARMENIA	YEREVAN ACC	UDDDACC	0.06	0	0	9.40%	-7.10%	-6.10%	suff	60%
AUSTRIA	WIEN ACC	LOVVACC	0.23	0.16	0.03	0.30%	9.10%	7.30%	7%	5%
AZERBAIJAN	BAKU ACC	UBBAACC	0.23	0	0	3.80%			suff	63%
BELGIUM	BRUSSELS ACC	EBBUACC	0.21	0.03	0.02	0.80%	3.50%	2.90%	0%	0%
BULGARIA	SOFIA ACC	LBSRACC	0.12	0	0	3.50%	25.90%	24.80%	suff	15%
CROATIA	ZAGREB ACC	LDZOACC	0.21	0.25	0.33	0.80%	6.50%	5.80%	1%	1%
CYPRUS	NICOSIA ACC	LCCCACC	0.3	2.37	1.91	9.70%	11.80%	9.80%	6%	15%
CZECH REPUB-LIC	PRAGUE ACC	LKAAACC	0.15	0.04	0.01	0.00%	2.80%	2.50%	1%	1%
DENMARK	COPENHAGEN ACC	EKDKACC	0.07	0.02	0	0.40%	-0.60%	0.30%	1%	0%
ESTONIA	TALLINN ACC	EETTACC	0.22	0	0.03	0.10%	5.60%	4.70%	suff	2%
EUROCONTROL	MAASTRICHT UAC	EDYYUAC	0.22	0.08	0.17	-0.10%	2.10%	2.40%	2%	-2%
FINLAND	TAMPERE ACC	EFESACC	0.16	0.06	0.16	-0.60%	3.00%	1.80%	suff	0%
FRANCE	BORDEAUX ACC	LFBBALL	0.13	0.06	0.23	0.70%	2.00%	2.00%	0%	0%
FRANCE	BREST ACC	LFRRACC	0.08	0.44	0.53	2.20%	4.60%	4.20%	2%	1%
FRANCE	MARSEILLE ACC	LFMMACC	0.1	0.21	0.57	-0.80%	-0.10%	-0.60%	3%	0%
FRANCE	PARIS ACC	LFFFALL	0.2	0.06	0.17	1.00%	1.30%	0.60%	3%	0%

[7] Required en-route delay/flight performance to achieve annual network delay target in 2014 (0.5 min/flight). Also known as "delay breakdown".

[8] Forecast delay based on 2014 NOP capacity planning excluding disruptions such as industrial action and technical failures.

[9] Base traffic forecast used for NOP capacity planning, variation in % compared to 2013.

COUNTRY	ACC	ACC Code	EN-ROUTE DELAY			TRAFFIC			CAPACITY	
FRANCE	REIMS ACC	LFEEACC	0.14	0.2	0.42	0.40%	4.20%	3.80%	3%	-3%
FYROM	SKOPJE ACC	LWSSACC	0.14	0.08	0	5.30%	33.40%	29.50%	10%	0%
GEORGIA	TBILISI ACC	UGGGACC	0.01	0	0	6.20%			suff	0%
GERMANY	BREMEN ACC	EDWWACC	0.1	0.02	0.09	-0.90%	3.40%	3.40%	0%	0%
GERMANY	KARLSRUHE UAC	EDUUUAC	0.2	0.19	0.2	-0.70%	3.10%	2.90%	1%	4%
GERMANY	LANGEN ACC	EDGGALL	0.17	0.21	0.24	-1.50%	0.10%	0.00%	0%	0%
GERMANY	MUNCHEN ACC	EDMMACC	0.21	0.11	0.02	-1.20%	-0.90%	-1.10%	0%	0%
GREECE	ATHINAI ACC	LGGGACC	0.2	0.2	0.45	2.10%	10.20%	8.00%	1%	-4%
GREECE	MAKEDONIA ACC	LGMDACC	0.21	0.21	0.17	3.70%	11.80%	9.80%	1%	2%
HUNGARY	BUDAPEST ACC	LHCCACC	0.07	0.01	0	2.50%	12.70%	12.00%	2.50%	7%
IRELAND	DUBLIN ACC	EIDWACC	0.23	0.01	0	0.70%	4.80%	5.40%	0%	0%
IRELAND	SHANNON ACC	EISNACC	0.08	0	0	1.00%	4.30%	1.10%	2%	0%
ITALY	BRINDISI ACC	LIBBACC	0.03	0.01	0.01	2.3% (-14%)	-8.00%	-7.10%	*N/A*	*N/A*
ITALY	MILAN ACC	LIMMACC	0.09	0.12	0.03	-0.2% (+32%)	39.20%	25.90%	*N/A*	*N/A*
ITALY	PADOVA ACC	LIPPACC	0.1	0.1	0.01	0.20%	2.60%	1.80%	2%	3%
ITALY	ROME ACC	LIRRACC	0.06	0.07	0	-0.5% (-19%)	-18.90%	-12.70%	*N/A*	*N/A*
LATVIA	RIGA ACC	EVRRACC	0.05	0	0	0.40%	3.30%	2.60%	suff	0%
LITHUANIA	VILNIUS ACC	EYVCACC	0.06	0	0	3.00%	6.10%	5.70%	suff	0%
MALTA	MALTA ACC	LMMMACC	0.05	0	0	4.40%	-10.40%	-7.10%	suff	0%
MOLDOVA	CHISINAU ACC	LUUUACC	0	0	0	2.10%	-31.70%	-24.80%	suff	0%
MOROCCO	CASABLANCA ACC	GMMMACC	*N/A*	*N/A*	0		6.80%	7.60%	N/A[10]	*N/A*
NETHERLANDS	AMSTERDAM ACC	EHAAACC	0.18	0.05	0.13	-0.10%	2.00%	2.30%	0%	0%
NORWAY	BODO ACC	ENBDACC	0.02	0.01	0.02	1.40%	3.60%	4.10%	suff	0%
NORWAY	OSLO ACC	ENOSACC	0.01	0.01	0.01	3.20%	0.70%	1.20%	suff	6%
NORWAY	STAVANGER ACC	ENSVACC	0.09	0.13	0.05	3.00%	1.60%	2.00%	0%	9%
POLAND	WARSAW ACC	EPWWACC	0.26	0.71	0.81	0.20%	2.10%	1.20%	0%	-4%
PORTUGAL	LISBON ACC	LPPCACC	0.16	0.19	0.53	5.10%	8.20%	6.90%	8%	7%
ROMANIA	BUCHAREST ACC	LRBBACC	0	0	0	2.70%	17.90%	16.90%	suff	0%
SERBIA&MONT.	BELGRADE ACC	LYBAACC	0.13	0.01	0	2.70%	7.70%	7.00%	1%	1%
SLOVAKIA	BRATISLAVA ACC	LZBBACC	0.19	0.02	0.14	2.50%	11.20%	10.00%	2%	8%
SLOVENIA	LJUBLJANA ACC	LJLAACC	0.22	0.08	0	-0.80%	8.00%	5.70%	5%	0%
SPAIN	BARCELONA ACC	LECBACC	0.13	0.24	0.37	0.70%	2.60%	1.80%	2%	4%
SPAIN	CANARIAS ACC	GCCCACC	0.28	0.71	0.42	10.80%	8.50%	6.90%	0%	5%
SPAIN	MADRID ACC	LECMALL	0.22	0.23	0.07	2.40%	5.50%	5.00%	1%	9%
SPAIN	PALMA ACC	LECPACC	0.14	0.1	0.11	-0.40%	4.80%	3.10%	1%	0%
SPAIN	SEVILLA ACC	LECSACC	0.29	0.05	0.03	3.30%	1.20%	2.50%	0%	0%

[10] Morocco is not included in the NOP capacity planning process.

COUNTRY	ACC	ACC Code	EN-ROUTE DELAY			TRAFFIC			CAPACITY	
SWEDEN	MALMO ACC	ESMMACC	0.07	0.02	0.01	1.10%	1.10%	0.60%	1%	0%
SWEDEN	STOCKHOLM ACC	ESOSACC	0	0.02	0.05	1.20%	0.60%	0.80%	1%	0%
SWITZERLAND	GENEVA ACC	LSAGACC	0.13	0.13	0.1	-1.00%	2.10%	1.70%	2%	2%
SWITZERLAND	ZURICH ACC	LSAZACC	0.1	0.14	0.08	-2.00%	1.40%	0.50%	1%	2%
TURKEY	ANKARA ACC	LTAAACC	0.13	0.13	0.12	6.70%	13.60%	13.00%	*N/A*	*N/A*
TURKEY	ISTANBUL ACC	LTBBACC	N/A	N/A	0		11.80%	11.70%	*N/A*	*N/A*
UKRAINE	DNIPROPETROVSK ACC	UKDVACC	0.19	0	0	6.40%	-63.00%	-50.10%	suff	10%
UKRAINE	KYIV ACC	UKBVACC	0.08	0	0	5.50%	-22.80%	-18.20%	suff	1%
UKRAINE	L'VIV ACC	UKLVACC	0	0.06	0	3.60%	-34.00%	-27.70%	suff	0%
UKRAINE	ODESA ACC	UKOVACC	0	0	0	3.70%	-6.90%	-4.90%	suff	3%
UNITED KING-DOM	LONDON ACC	EGTTACC	0.14	0.05	0.05	0.40%	2.20%	2.20%	4%	3%
UNITED KING-DOM	LONDON TC	EGTTTC	0.11	0.02	0.01	1.30%	2.80%	3.00%	1%	3%
UNITED KING-DOM	PRESTWICK ACC	EGPXALL	0.2	0.01	0.02	-1.00%	-0.90%	0.20%	1%	0%

The performance of Nicosia, Canarias, Madrid and Vienna ACCs was better than had been foreseen in the NOP 2014-2018/19. However, the performance of some other ACCs did not match the capacity plan.

Warsaw ACC:
Summer traffic through Warsaw ACC was above forecast with high growth in July (3.3%) and August (6.0%). This was a direct consequence of shifting traffic flows due Ukrainian airspace closure after the MH17 accident in July.
There were high delays in summer - June to August accounted for 60% of the ATFM delay, with July alone seeing 26% of delays. Two third's (68%) of Warsaw's ATFM delay was due to ATC capacity and staffing.
22.0% of ATFM delay was due to the ATM system changes before the summer.
En-route weather (thunderstorms) also affected Warsaw ACC, generating a daily average delay of 1,090 min/day in July.

Marseille ACC:
Summer 2014 traffic through Marseille ACC was just below forecast.
Half its ATFM delay was due to ATC industrial action; action in January, March, May and June generated a total ATFM delay of 287,000 min.
The action between 24 and 26 June generated 194,377 min of en-route ATFM delay (34.2% of Marseille ACCs total en-route ATFM delay for 2014).
There was no increase in ACC capacity compared to 2013 with en-route ATC capacity contributing to 29.5% of the ACCs ATFM delay.
ATC equipment issues generated 8.4% of the delay particularly in April (operational ACC display, 7818 min), May (radar screens, 22,936 min) and June (radar screens, 16,673 min).

Brest ACC:
With the increase of traffic routing from northwest Europe to the Canaries and Morocco during the first half of the year, traffic growth for Brest ACC remained positive throughout the year at over 4%. The industrial actions in March and May reduced traffic growth in those particular months. ATC industrial action caused 45.7% of Brest ACCs ATFM delay. The actions in January, March, May and June generated a total ATFM delay of 227,000 min. Significantly, the action between 24 and 26 June generated 145,629 min of en-route ATFM delay, which was 29.4 % of Brest ACCs total en-route ATFM delay for 2014. Although there was a 1% increase in capacity,

en-route ATC capacity accounted for 43.6% of delays. Brest ACC recorded a total of 11,393 minutes of delays in October due to reduction in staffing due to training (ERATO implementation stripless system environment), delays was recorded as special event, ERATO started the 1st October.

Lisbon ACC:
Traffic routing to the Canaries and Morocco had an even greater impact on Lisbon ACC than with Brest ACC. Growth was in excess of 5% in January and March, in excess of 7% for the other months until September and with the highest increases seen in April (+12.1%), May (+9.4%) and June (+9.1%). Jetstreams during November also generated additional demand in Lisbon ACC. The ACC capacity increased by 7% but with higher traffic levels, en-route ATC capacity (59%) and ATC staffing (37.2%) delays increased significantly compared to 2013. November saw the highest en-route ATFM delay (42%, daily average of 3,246 min) mainly due to en-route ATC staffing (1,998 min/day) and en-route ATC capacity (1,210 min/day).

Athens ACC:
Turkey and Greece added the most flights to the European network in 2014. This, together with the opening of the KFOR sector airspace in April, impacted traffic growth for Athens ACC. Growth swung from a decrease of -6% in March to positive growth of 3.7% in April. Traffic continued to grow before peaking at 19.6% in November and finishing with a positive growth of 15.8% in December.
Prior to the switch from negative to positive traffic growth in April, Athens ACC recorded only 321 min of en-route delay.
From April to November, Athens ACC ATFM delays were due mainly to en-route ATC staffing (54.4%) and en-route ATC capacity (42.4%).
August was particularly difficult with 51.1% of en-route ATFM delay, with significant amounts also generated in July (17.4%) and September (12%).
This can be correlated to a traffic variation of +11.4% in August, +7.8% in July and +14% in September.

5. Airports

The integration of airports into the network progressed significantly in 2014:

- There was major progress towards A-CDM implementation in Europe: seven airports fully implemented A-CDM making fifteen airports in total. The fifteen account for about 24% of the departures in the NM area which is a large increase compared to 2013 (15.3% - 8 airports). In 2014 one additional airport has joined the group of six already fully implemented ATC Advanced Tower airports. The seven account for about 2.3% of the departures in the NM area, making a total of 26% of departure traffic predicted via DPI messages (refer to sections 5.3 and 5.4).
- Greek Islands arrival traffic growth between 2014 and 2013 was huge (+17%). Without the cooperation of NM and HANSP, delays would have been much worse (see **Section 5.2 Greek Islands – Summer 2014**)
- General partnership with airports has improved. Airports started expressing interest in the implementation of SESAR concepts (e.g. AOP, APOC, NOP, TBS, RECAT-EU) creating the foundation to achieve future SESAR targets (See **Sections 5.5 RECAT-EU** and **5.6 Time Based Separation for Arrival (TBS)**).
- Airports recognize the value of the airport information exchange trial, therefore NM has decided to extend its scope and expand the trials to more airports (see **Section 5.7 Extension of Enhanced Information Exchange**).
- There was good collaboration from airports on the provision of strategic information to NM (Airport Corner) (see **Section 5.8 Airports Strategic Information Provision**).

- NM achieved a closer and more effective collaboration with airports thanks to a number of NM airport benefiting activities. This was accomplished through a number of bilateral meetings, visits and exchanges organized by the ACI Liaison officer and the organization of a NM User Forum particularly dedicated to airports.

Traffic recovered during 2014. Most of the airports had more traffic in 2014 compared to 2013. Among the top 10 airports for average daily departure traffic in 2014 (see **Table 4: Top 50 airports for average daily departure traffic in 2014**), Istanbul Ataturk recorded the highest growth. All the others had increased traffic (Amsterdam Schiphol, Madrid Barajas, Rome Fiumicino, Barcelona El Prat, London Gatwick) or remained at a similar level as 2013 (Frankfurt Main, London Heathrow, Paris Ch. De Gaulle, Munich).

Airports with the highest growth in traffic among the top 50 were the Istanbul airports: Sabiha Gökcen (23.6%) and Ataturk (8.5%), alongside Athens E. Venizelos (9.7%), Tel Aviv Ben Gurion (9.5%) and London Stansted (9.2%) airports.

Airports with the highest drop in traffic were the French airports: Lyon St. Exupery (-6.9%), Marseille Provence (-5.7%), Toulouse Blagnac (-3.2%) and Nice Cote D'Azur (-2.6%), together with Praha Ruzyne (-2.9%) and Warszawa Chopin (-2.6%) airports.

Kyiv Boryspil airport is no longer in the top 50 airports list due to significant drop in traffic triggered by the Ukraine crisis.

Table 4: Top 50 airports for average daily departure traffic in 2014

Nº	ICAO ID	AIRPORT NAME	TFC	%	Nº	ICAO ID	AIRPORT NAME	TFC	%
1	EGLL	LONDON/HEATHROW	648	0.3%	26	EFHK	HELSINKI-VANTAA	230	0.0%
2	LFPG	PARIS CH DE GAULLE	646	-1.4%	27	LIMC	MILANO MALPENSA	228	0.9%
3	EDDF	FRANKFURT MAIN	642	-0.9%	28	EGSS	LONDON/STANSTED	214	9.2%
4	EHAM	AMSTERDAM / SCHIPHOL	615	3.0%	29	LPPT	LISBOA	214	7.0%
5	LTBA	ISTANBUL-ATATURK	588	8.5%	30	LGAV	ATHINAI /ELEFTHERIOS VENIZELOS	204	9.7%
6	EDDM	MUENCHEN	513	-1.2%	31	EDDH	HAMBURG	201	7.5%
7	LEMD	ADOLFO SUAREZ MA-DRID-BARAJAS	469	2.9%	32	EPWA	CHOPINA W WAR-SZAWIE	190	-2.6%
8	LIRF	ROMA/FIUMICINO	428	3.4%	33	LFMN	NICE-COTE D'AZUR	187	-2.6%
9	LEBL	BARCELONA/EL PRAT	389	2.6%	34	LKPR	PRAHA RUZYNE	166	-2.9%
10	EGKK	LONDON/GATWICK	356	3.8%	35	EDDK	KOELN-BONN	165	3.1%
11	LSZH	ZURICH	353	0.9%	36	EDDS	STUTTGART	156	0.0%
12	EKCH	KOBENHAVN/KASTRUP	345	2.7%	37	LIML	MILANO LINATE	153	0.0%
13	ENGM	OSLO/GARDERMOEN	339	2.7%	38	EGPH	EDINBURGH	148	-2.0%
14	LOWW	WIEN SCHWECHAT	339	0.0%	39	LFLL	LYON SAINT-EXUPERY	148	-6.9%
15	LFPO	PARIS ORLY	316	-1.3%	40	LEMG	MALAGA/COSTA DEL SOL	145	5.1%
16	ESSA	STOCKHOLM-ARLANDA	313	4.0%	41	EGGW	LONDON/LUTON	142	6.8%
17	EBBR	BRUSSELS NATIONAL	309	6.9%	42	LLBG	TEL AVIV/BEN GURION	139	9.5%
18	EDDL	DUESSELDORF	288	0.0%	43	GCLP	GRAN CANARIA	137	6.2%
19	LSGG	GENEVA	248	2.1%	44	ENBR	BERGEN/FLESLAND	134	-2.2%
20	EDDT	BERLIN-TEGEL	247	4.2%	45	LFML	MARSEILLE PROVENCE	133	-5.7%
21	LTFJ	ISTANBUL/SABIHA GOKCEN	246	23.6%	46	EGBB	BIRMINGHAM	131	4.8%
22	EIDW	DUBLIN	245	5.6%	47	LROP	BUCURESTI/HENRI COANDA	125	4.2%
23	LEPA	PALMA DE MALLORCA	236	1.7%	48	LFBO	TOULOUSE BLAGNAC	122	-3.2%
24	LTAI	ANTALYA	236	4.0%	49	LTAC	ANKARA-ESENBOGA	122	-2.4%
25	EGCC	MANCHESTER	233	0.9%	50	LHBP	BUDAPEST LISZT FERENC INT.	118	3.5%

5.1. Hot spots

Figure 25: Top 20 Airport delay locations during 2014

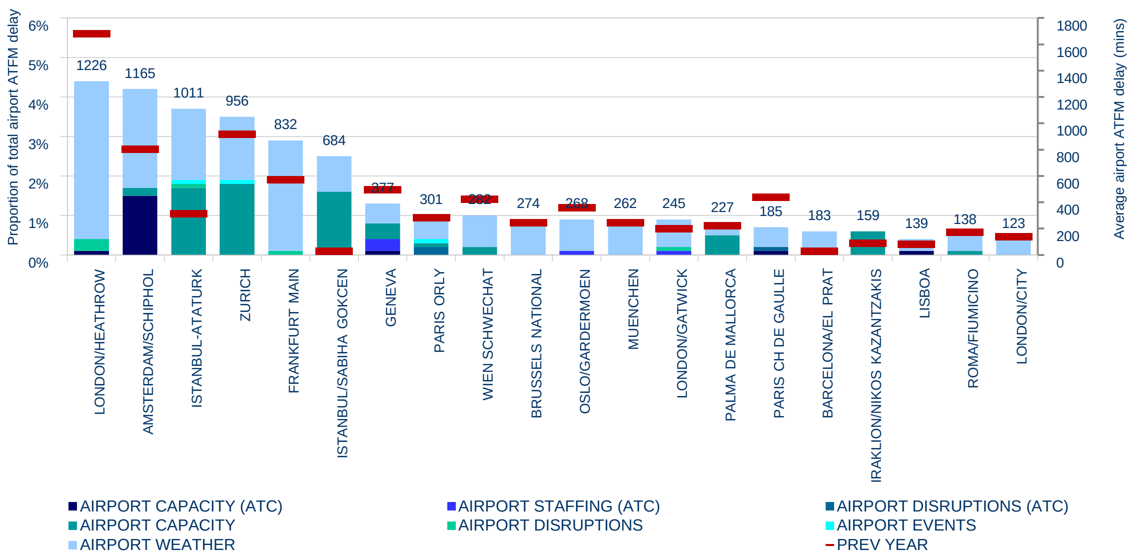
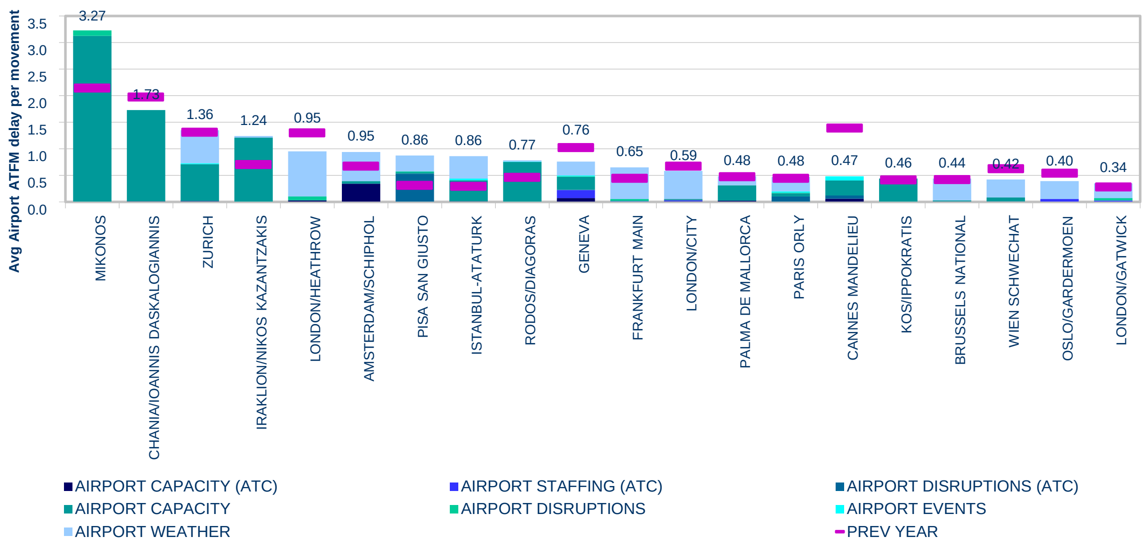


Figure 26: Top 20 airport delay per flight locations during 2014



- London Heathrow airport remained first on the top 20 airports average daily delay list but with delays significantly decreased compared to 2013. Delays per flight also decreased compared to 2013 and were mainly due to adverse weather conditions.
- Amsterdam Schiphol airport delays were higher compared to 2013. Adverse weather conditions remained the main reason for delays, but ATC capacity had also a high impact on total airport delays per flight.
- Istanbul Ataturk airport continued recording high traffic growth, but also delays significantly increased compared to 2013. This was mainly due to adverse weather conditions and limited availability of the optimum runway configuration.
- Zurich airport delays remained almost at the same level as 2013. Adverse weather conditions and limited availability of the optimum runway configuration due to environmental constraints were the main delay causes.
- Frankfurt Main airport delays increased compared to 2013. The main reason for delays was adverse weather conditions.

- Istanbul Sabiha Gökcen airport continued recording very high traffic growth, but also delays significantly increased compared to 2013. This was mainly due to airport capacity issues.
- Greek airports remained on the peak of the top 20 airports delay per flight list, again with airport capacity as the main delay cause. Mikonos, Iraklion N. Kazantzakis and Rhodos Diagoras airports delays per flight increased while Chania D. Daskalogiannis airport delays per flight decreased compared to 2013. Kos Ippocratis airport remained almost on the same level as 2013.
- Pisa San Giusto airport delay per flight increased compared to 2013 mainly due to several disruptions during the year.
- Geneva airport delays decreased compared to 2013. Adverse weather conditions, airport capacity and airport staffing caused most of the delays.
- Paris Charles de Gaulle airport delays significantly decreased compared to 2013. Adverse weather conditions were the main delay cause.
- Cannes Mandelieu airport delay per flight decreased significantly compared to 2013, but it remained in the top 20 airports delay per flight list.
- Palma de Mallorca airport remained almost on the same level as in 2013 with airport capacity as a main delay cause.
- Paris Orly, Vienna, Brussels Zaventem, Oslo Gardermoen, Munich, London Gatwick and London City airports delays slightly decreased or remained almost on the same level as in 2013. Adverse weather conditions were the main delay cause.
- Dusseldorf, Berlin Tegel and Nice Cote D'Azur airports are not anymore on top 20 airports average daily delay list while Barcelona El Prat and Lisboa airports appeared on the list. Both airports recorded the delays mainly because of adverse weather conditions.
- Chambery airport is not anymore on top 20 airports delay per flight list due to significant decrease of delays compared to 2013.

5.2. Greek Islands – Summer 2014

Traffic to the Greek Islands summer destinations continued to grow with an increase of 17% in 2014. The Greek airports of the summer destinations are already operating at the limit of their current declared capacity. Summer 2014 was extremely challenging due to the combined effect of the shifting traffic flows (see Section 3. Traffic), adding to the long-standing problems at these airports. The problems relate to: airport layout, terminal buildings capacity, poor airport slots scheduling (static hour scheduling with too large a tolerance window of +/- 30 min and exemption of the significant BA/GA traffic from the slot allocation), insufficient staff employed and lack of radar that in consequence requires the application of procedural approach at certain destinations. These long standing problems are unlikely to find resolution before the privatization of the airports which supposedly may provide sufficient funding for the airport infrastructure and technological modernization.

Previous years' actions were enhanced in 2014. Preparation for the summer season was in February 2014 in close collaboration between NM and airlines to highlight the busiest days and busiest airports. NM re-iterated the importance of fair play by sticking to the allocated airport slot.

Greek Island airports ATFM delays for April-September 2014 increased from 144.160 min to 211.945 min compared to 2013, but were well below 2011 when NM and HANSP cooperation started. Delays would have been much worse without the joint action. Some 50 % of the delays can be attributed to GA/BA traffic that, without the need for an airport slot, caused significant over demand at some islands (i.e. Santorini, Mikonos and Rhodes).

The summer 2014 experience led to further 2014 actions in preparation for 2015:

- In October 2014 the Director Network Manager reiterated Hellenic CAA that in summer 2015, GA/BA traffic must become part of the full Airport Slot Coordination process (at least for the June to September period). If this is not done, summer 2015 risks to be even worse than summer 2014 given that airline carriers are trying to increase their flights to Greece.
- In coordination with EUROCONTROL, IATA and EUACA, the HSCA proposed the replacement of the allocation system with a new system that is more robust and more capable of handling the rolling hour allocation. This was implemented by HSCA in November 2014, which will be fully utilised for summer 2015 planning.
- In September 2014, it was agreed that IACA will provide airline schedules for summer 2015. NM will recommend schedule changes aimed at delivering flights regularly at 10 min intervals at the initial approach fix. The intention is to optimise runway throughput with the given approach separations. NMOC is investigating this and actions will be coordinated with the specific Greek island airports where the measure is to apply.

NM undertook a capacity study at Kos airport during the summer period 2014 under the umbrella of the NM Greek Island Action Plan. NM will use the outcome as a case study and basis for deciding upon similar studies for other airports.

5.3. Airport CDM implementation

During the course of 2014, a further seven airports fully implemented A-CDM. These airports are Oslo/Gardermoen on 29 January, Rome/Fiumicino on 3 March, Berlin/Schönefeld on 1 May, Madrid/Barajas on 17 July, Stuttgart on 6 October, Milan/Malpensa on 7 October and London/Gatwick on 7 November. This brings the total number of fully implemented airports to fifteen, covering almost 24% of departures in the NM area.

Throughout 2014 a number of airports took significant steps towards full A-CDM implementation. NM anticipates that Venice, Prague and Stockholm/Arlanda will be connected to the network in the first quarter of 2015 with further three or four airports to follow by the end of 2015.

In 2012 the European Commission, through the TEN-T Agency, made available a first tranche of funding (up to 20% of eligible costs) to assist airports in implementing A-CDM. Participation implies a commitment to implement A-CDM. Eleven airports benefitted from this tranche, which finished at the end of 2014.

EUROCONTROL, as co-ordinating body, submitted a new proposal in early 2014 for a second tranche of funding. This proposal was accepted and a further eight airports are now benefitting from it.
More and more airports are implementing A-CDM bringing benefits not only for the airports themselves but also neighbouring ACCs thanks to increased predictability.

Overview and information on individual airports which implemented A-CDM in 2014 can be found in Annex III.

5.4. Advanced ATC Tower implementation

Airports that have no plans to implement the A-CDM process but still wish to integrate with the ATM network may do so as an Advanced ATC Tower airport. A number of airports are also considering this option as a first step towards full A-CDM implementation. Such airports provide a reduced set of DPI messages with a reduced set of advantages (compared to CDM airports). An Advanced ATC TWR airport provides Target Take-Off-Time (TTOT) estimations as well as Variable Taxi-Times (VTTs) and SIDs to the NMOC. These are provided from the moment that the aircraft leaves the blocks.

On 16 December 2014, Paris Orly took the first step towards full A-CDM implementation by becoming the seventh airport connected to the Network as an Advanced ATC Tower airport. These seven airports represent 2.3% of departures in the NM area.

In 2015 a further eight airports are expected to be connected as Advanced ATC Tower airports. The fifteen A-CDM airports together with the seven Advanced ATC Tower airports mean that NM is now being provided with Departure Planning Information (DPI) messages for more than 26% of departures in the NM area.

Overview and information on individual airports which implemented Advanced ATC Tower in 2014 can be found in Annex III.

5.5. RECAT-EU

The RECAT-EU wake turbulence scheme is a re-categorization of ICAO wake turbulence (WT) longitudinal separation minima on approach and departure. It is based on a set of principles, comparing the wake generation and wake resistance between aircraft types, and splitting ICAO Heavy and Medium categories into 'Upper' and 'Lower' part. This allows reduction of separation minima by 1 or 2 nautical miles for followers behind weaker wake generator types, and/or for followers with higher wake resistance including behind A380.

In 2014, EASA approved the safety case report providing the assurance that the RECAT-EU wake turbulence scheme can be used by States and Air Navigation Service Providers as a basis to update their current schemes.

RECAT-EU will have a positive effect on safety and capacity and could significantly reduce airport delays.

- More accurate and efficient spacing will be delivered, gained from re-categorization logic.
- RECAT-EU brings potential runway capacity benefits of 5% or more during peak periods depending on individual airport configuration, by reducing space between a pair of aircraft.
- Gain in capacity could grow up to 8% at 5 years' time horizon due to evolution of traffic mix.
- All airports can benefit from RECAT-EU, especially those with significant (at least 7% in a peak) "heavy" category traffic.
- Better protection against wake turbulence risk of very small ICAO Medium aircraft (<15T).

Paris CDG has started implementation in summer 2014 and deployment is now planned in 2015.

Preliminary analysis has been conducted to evaluate performance benefits of RECAT-EU scheme at two other major European airports in view of possible deployment.

5.6. Time Based Separation for Arrival (TBS)

Within the scope of SESAR, the TBS project has developed new operating methods for spacing aircraft by time during strong headwind conditions, instead of applying distance separations.

By reducing space between a pair of aircraft, TBS aims to decrease the gap between the landing rate in light headwind conditions and with strong wind, maintaining high efficiency and capacity levels in all wind conditions (major gains expected at busy airports). As the wake strength impacting the aircraft is lower with heavy winds, safety levels will be maintained even if the distance between the pair of aircraft is reduced.
The following benefits are expected from TBS:

- A gain in efficiency, due to a space reduction between aircraft in strong headwinds conditions (simulations have shown that up to 50% of loss of arrival throughput due to strong headwind could be recovered).
- A reduction of delays and cancellations.
- TBS concept decreases overall flight times.
- Separation is more easily and efficiently delivered, thanks to new Human-Machine Interface (HMI) deployment (even when TBS is not used) which provides the separation to apply and how to intercept the localiser.
- Since TBS requires measurement of wind profile on final approach area, this information is also available for the controller.
- A global reduction of workload is expected due to the new HMI.

London Heathrow started implementation in 2014 and TBS operations are planned to start at London Heathrow in spring 2015.

5.7. Extension of Enhanced Information Exchange

The enhanced information exchange processes for the pre-tactical and tactical phase between airports and the NM continues to take place, including all local stakeholders and the relevant flow managers. The activity started as a trial at the beginning of the IATA Winter Scheduling Season for 2013 (27 October 2013), and is being carried on until sufficient events have been collected to allow an assessment of first benefits. Due to the warm weather in the winter season 2013/14 only two weather related events have been reported. The trial scope was extended at the start of the summer season 2014 to cover all events that potentially will impact airport capacity or demand. At D-1 from the predicted event, the affected airport submits by email the requested information to NM if it is foreseen that the predicted event may impact the airport capacity or the ability to deliver a full schedule. The following airports have been participating from the beginning: Frankfurt Main, Dusseldorf, Amsterdam Schiphol, Parsi Charles de Gaulle, London Heathrow, Munich, Geneva and Zurich. Dublin joined in 2014.

Airport feedback is that the reporting process is not user friendly enough and is another procedure to remember and follow, which is not feasible in terms of workload. NM will work towards a more efficient process in 2015.

This enhanced information exchange is an important step in the integration of airports with the network, building upon A-CDM and focusing on reinforcing coordination between Airport Operations Centre (APOC) and Network Manager Operations Centre (NMOC).

5.8. Airports Strategic Information Provision

As defined under the Network Manager Functions Implementing Regulation (677/2011) – Annex V – Appendix II – Airports, Network Manager has a task to help airports to take advantage of the 'network approach' to solve operational issues and enhance performance.

NM implemented six years ago a centralized reporting process to capture relevant airports strategic information and monitor airport operations and planning. The process supports the early identification of mitigation actions aiming to minimize any negative operational impact in the network in the short, medium and long-term.

This process is enabled by a secured web based tool, the Airport Corner, which enables quick and easy information provision from key airport stakeholders. In 2014 four airports joined this process: Sofia, Nice, Ljubljana and Belgrade resulting in 70 major European airports actively contributing to this process. Other 30 additional airports (RP2) are in the process of joining it.

5.9. Other Activities

Chambery and Annecy airport monitoring.

The airports of Chambery and Annecy were Schedules Facilitated (Airport Coordination Level 2) during IATA winter season W13 (October 2013 – March 2014) as a first action for delay mitigation. The NM has monitored the evolution of the operations at Chambery and Annecy through participation to the CODE OPALL working group and SKI-axis Briefings. (DGAC-DTA has initiated an Airport Capacity Study focusing on interaction between airport and TMA).

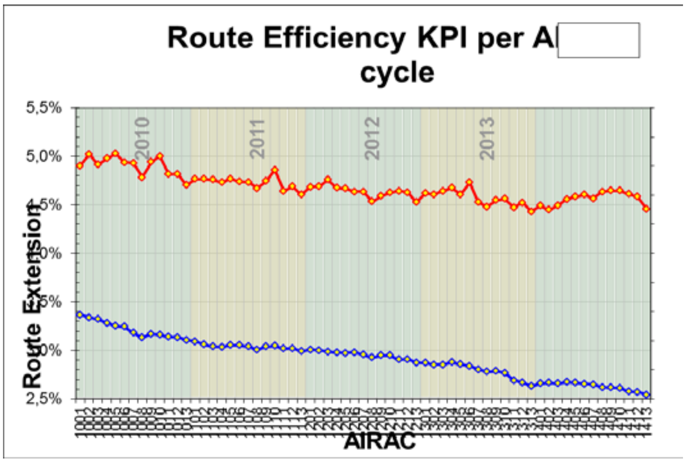
Flight plan suspension requests.

NM supports requests of individual States when introducing flight plan suspension plans locally at airports on request of the mandated decision making authority. In 2014, the French DGAC started such a process for Nice Cote D'Azur airport and extended it to Lyon for 2015 onwards. Italy is applying a similar process for Venice airport during the summer season.

6. Flight Efficiency

This chapter provides a summary of the progress made on the implementation of the actions agreed in the joint IATA/CANSO/EUROCONTROL Flight Efficiency Plan, drawn up in 2008, and responds to the requirements of the SES performance scheme. The Performance Scheme for air navigation services and network functions, adopted in the context of the Single European Sky II Regulations includes an operational requirement of the European ATM network for an improvement of 0.75 percentage points of the average horizontal en-route flight efficiency indicator in 2014, as compared to the situation in 2010.

Figure 27: Route efficiency KPI per AIRAC cycle



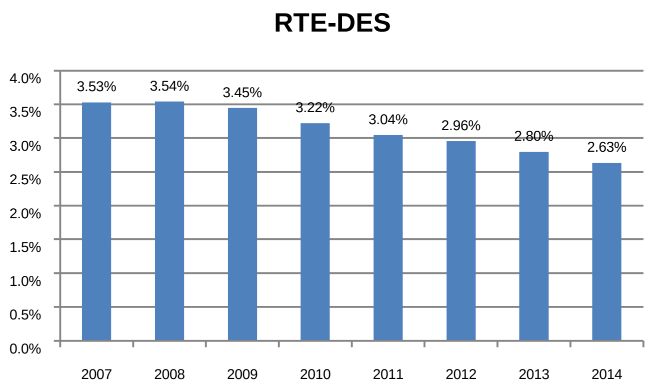
Flight efficiency indicators are monitored for pure airspace design and for flight planning. The evolution of those indicators since the beginning of 2010 is shown on the chart, showing a downward trend over the whole period. While the airspace design target was met for 2014, the last filed flight plan target was missed by 0.42 percentage points.

The evolution recorded on the route extension based on the last filed flight plan during the year 2014 was heavily impacted by industrial actions, social issues that led to reduced capacities and re-routings to avoid capacity constrained and avoided/closed areas due to crisis situation. Those events had a detrimental effect on the flight planning indicator and thus on the overall flight efficiency, which led to significant losses recorded during the AIRAC cycles of March to June and August to October 2014. This evolution continues to demonstrate the necessity to provide sufficient capacity constantly to further improve the flight planning indicator and to reduce the gap with the airspace design indicator.

6.1. Airspace Design

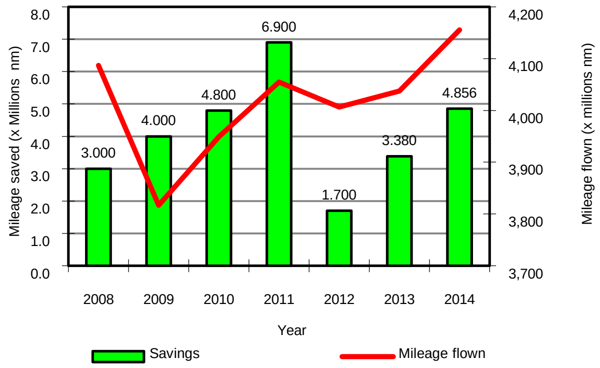
As part of Flight Efficiency Plan, intensive work has been undertaken by States and ANSPs in close cooperation with NM to develop and implement enhanced airspace design solutions, with some 250 airspace improvement packages being developed and implemented in the 12 months preceding summer 2014. As a result, the route extension due to airspace design continued its downward trend throughout the year, reaching its lowest level ever in December 2014 at 2.57%.

Figure 28: yearly evolution of airspace design indicator



The average route extension due to airspace design decreased from 2.80% in 2013 to 2.63% in 2014, an average potential daily saving of nearly 13340 nautical miles.

Figure 29: Potential Yearly savings due to airspace design

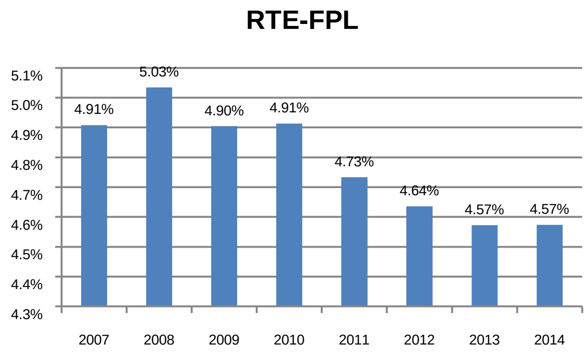


Over the reporting year, this represents a potential saving of 4.85 million nautical miles, approximately 29 kilotons of fuel, reduced emissions of 97 kilotons, or 24.3 million Euros.

6.2. Airspace Changes vs. Flight Planning

The flight planning indicator measures how much longer is the flight-planned trajectory than the great circle. It reflects inefficiencies in the use of the airspace (due to RAD restrictions, CDR availability, inefficient flight-planning etc.), but also user preferences for cheaper rather than shorter routes.

Figure 30:Yearly evolution of flight-planning indicator

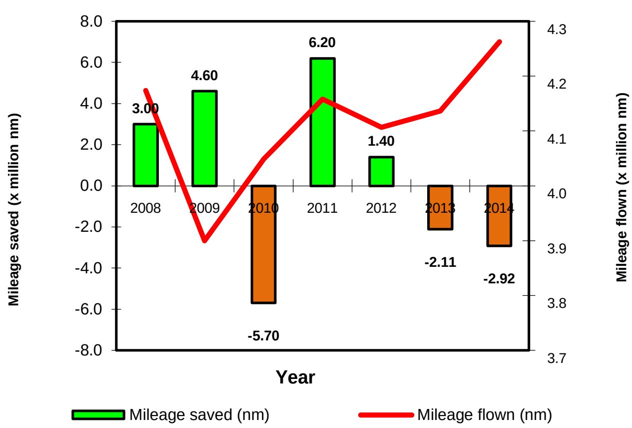


The average route extension based on the latest filed flight plan remained at 4.57% in 2014, the same level as in 2013. After an increase due to several industrial actions and airspace avoidance/closure due to crisis situation during March to June and August to October, the route extension based on the last filed flight plan reduced again in November and December.

The average flight-planned distance increased when compared to 2013, resulting in some 2.92 million nautical miles losses over the whole year. This means an average daily increase of nearly 8022 nautical miles. Over the year this represents losses of approximately 17 kilotons of fuel, increased emissions of 58 kilotons, or 14.6 million Euros losses.

Figure 31 shows the corresponding yearly savings and the relationship with the mileage flown over the past five years:

Figure 31: Yearly savings per nautical mile (nm) flown due to improved flight planning efficiency



The trend reflects the combined effect of: adverse weather, industrial actions (between March to June, and August to October), special events (e.g. Ukraine crisis situation, Libyan airspace closure, etc.) and technical problems on the network. These affected the network performance, despite NM efforts made during the year to facilitate efficient airline operator flight-planning through the first steps of the Flight Efficiency Initiative.

This situation emphasises yet again that more efforts must be made to improve the efficiency of the airspace utilisation and to constantly provide sufficient capacity thus ensuring that the indicator based on the latest filed flight plan follows a similar trend to the airspace design indicator.

6.3. Conditional Routes (CDR)

CDR availability is an important element when considering the ASM in the Network Operations context. The chart below shows little changes in absolute figures for the evolution of CDR development as elements of the network in 2014 compared to 2013. This is due to mainly to changes in CDR categories with many CDR1/2 to permit night routes opened and to the continuous network improvement process (covered by ERNIP).

Figure 32: Evolution of CDR availability

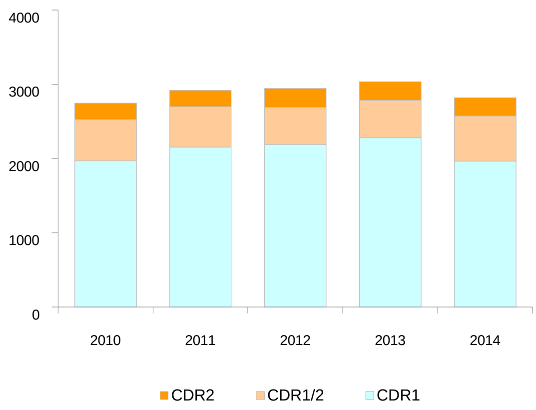
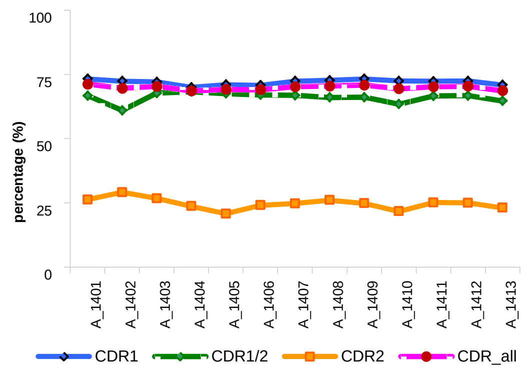


Figure 33: Rate of CDR availability (RoCA) in 2014



RoCA for all CDR categories is relatively constant over the entire year.

Figure 34: RAI (%) 2014 per AIRAC cycle

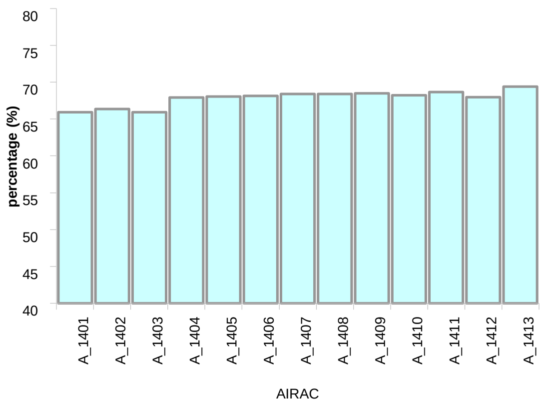
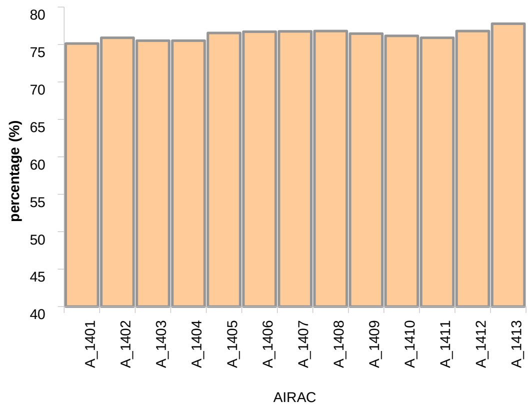


Figure 35: RAU (%) 2014 per AIRAC cycle



The Rate of Aircraft Interested (RAI) that planned the available CDR is relatively constant at a value of approx. 67.8% for the entire year 2014.

The Rate of Aircraft actually Using (RAU) CDR is higher (76.3%). This is the result of ATC intervention for various reasons (expedite traffic, weather, etc).

Figure 36: CDR availability vs. usage in 2014

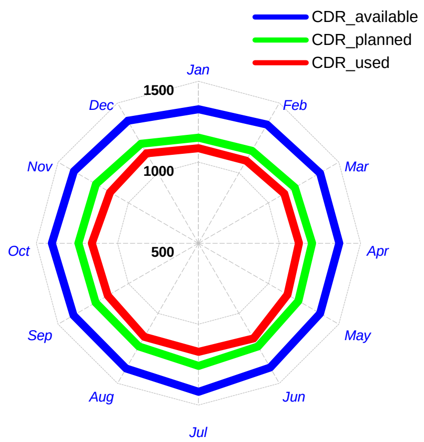


Figure 36 shows the number of CDR available for flight planning (blue line), the number that were actually flight planned (green line) and the number that were actually flown (red line).

The numbers indicating the CDR used and planned versus the CDR available show in 2014 an almost constant difference. The explanation is that the route structure is stable enough and familiar enough to aircraft operators and offers sufficient predictability for the CDR opportunities. This is also a consequence of the higher availability (RoCA) of the CDR. The graph shows the need to further enhance the utilisation of available CDRs.

Figure 37: PFE: 2014 Monthly savings per flight (nautical miles)

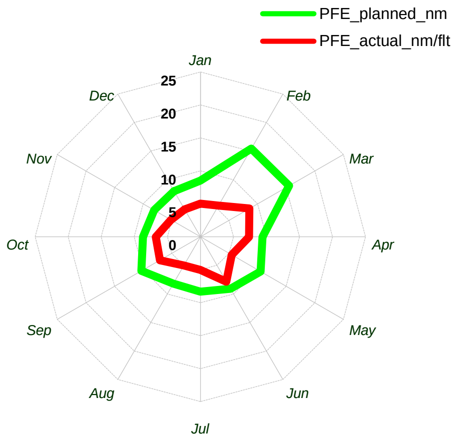
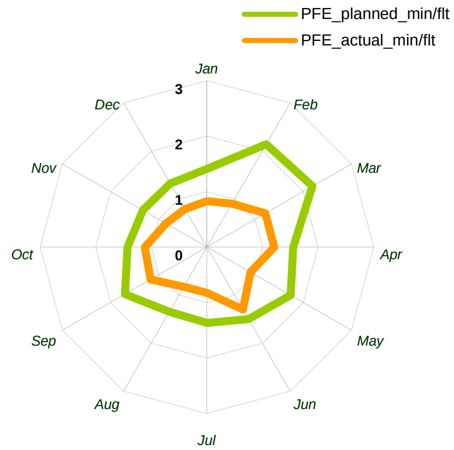


Figure 38: PFE: 2014 Monthly savings per flight (mins)



The savings per flight in distance and in time due to CDR are strongly dependent on the network opportunities offered by the CDR but in reality the actual traffic is not always able to follow the planned trajectory that would maximize the efficiency due to various causes outside the flight planning process.

Potential Flight Economy (PFE) can be realised when using the available CDRs for planning. This is influenced mainly by the CDR availability rate (RoCA) and the awareness/ability/willingness of the Aircraft Operators to consider the available CDRs in their FPL solutions. The indicator shows how far the real planned trajectories are from the optimum ones.

Concerning the actual traffic, the PFE is calculated with the actual flown CDRs from those available. The values may differ from the planned ones for a number of reasons (ATC intervention for direct/rerouting, delayed departure miss the CDR uptake and forcing to alter the initial FPL, weather, etc). When making the comparison and the values are smaller it also can signify that less potential economy is obtained when the initial trajectories are closer to optimal. The diagrams below depict the aggregated values calculated for all CDR types (CDR1, CDR1/2, CDR2) averaged by month:

Figure 39: PFE 2014 vs 2013 for planned traffic

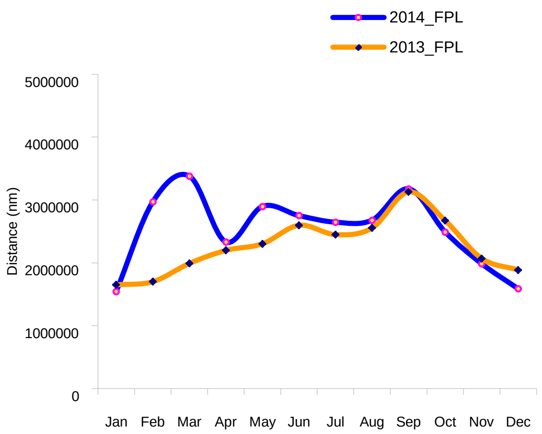
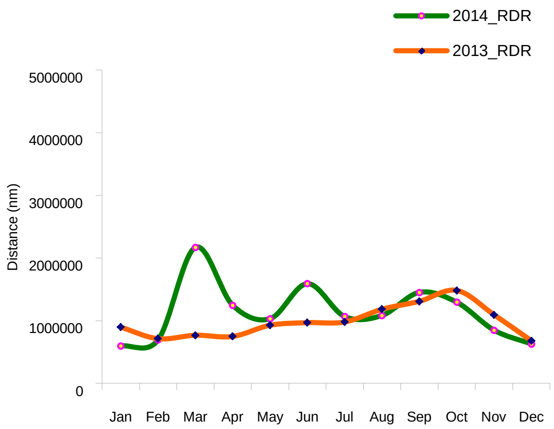
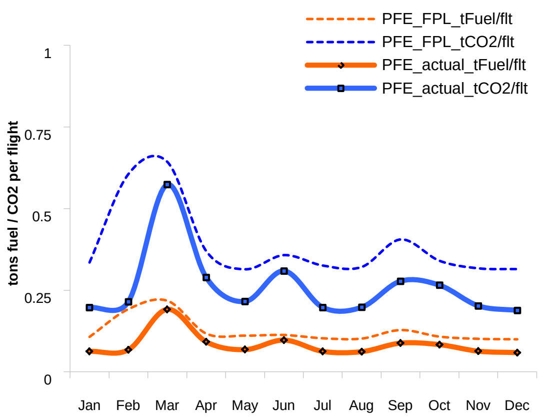


Figure 40: PFE 2014 vs 2013 for actual traffic



Comparing the Potential Flight Economy (PFE) year on year, 2014 with 2013, one can see that the period with maximum expected gains was in March 2014 for the planned traffic.
The actual gain is following the planned trend however with lower values, but better than 2013.

Figure 41: PFE: 2014 Fuel economy and CO2 emissions



The environmental indicators of PFE translated in fuel savings and reduced CO2 emissions (Figure 41) were calculated using the ICAO methodology for fuel burned and CO2 emissions. The curves indicate that there are differences between the expected economy from flight planning and the achieved results for the actual traffic. These differences have the same causes mentioned before mainly due to trajectory changes from the initial flight plan during the flight progress.

6.4. Free Route Operations

The NM Performance Plan target for 2014 was to implement fully or partially Free Route Airspace within 25 ACCs within the ECAC area. This target was met with 29 ACCs.

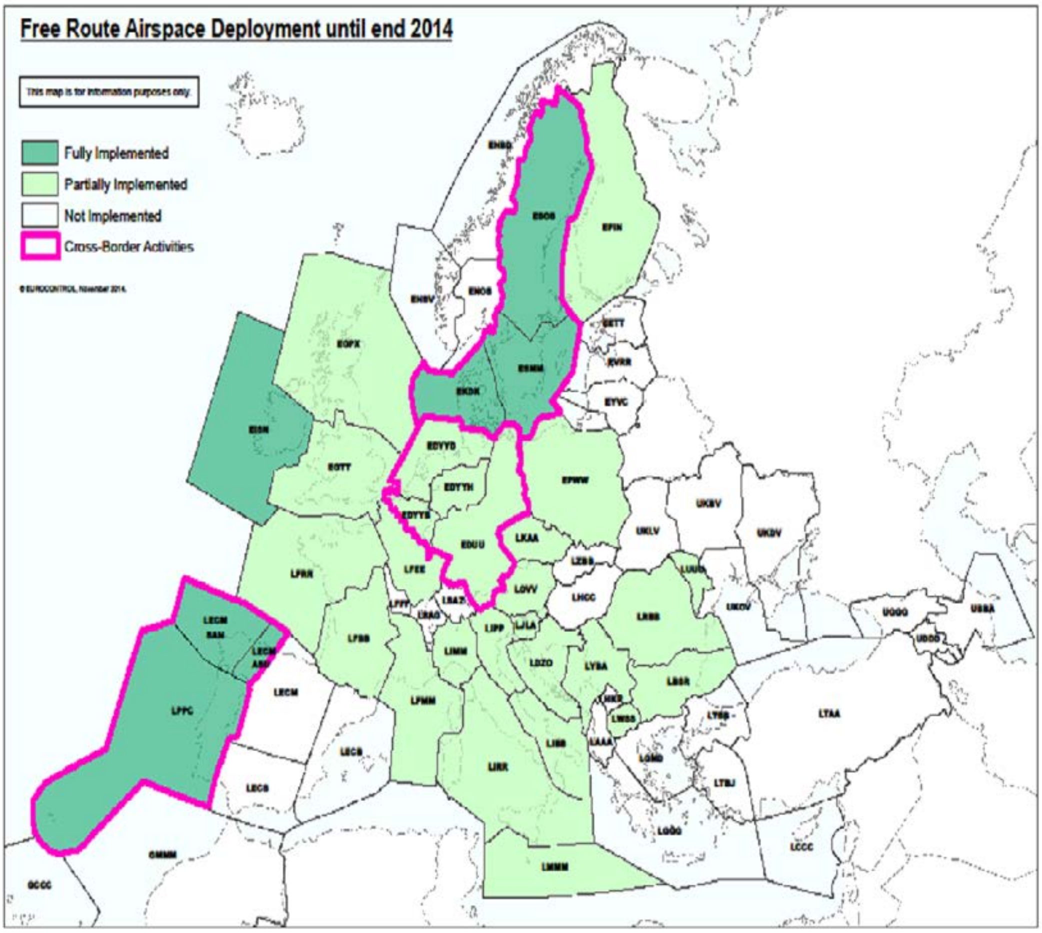
By the end of 2014, the following ACCs have either fully or partially implemented Free Route Airspace operations:

Table 5: ACCs which have either fully or partially implemented Free Route Airspace operations

Full Free Route Airspace implementation	Within Lisbon ACC
	Within Copenhagen ACC, Malmo ACC and Stockholm ACC as part of SWE/DNK FAB
	Within Shannon ACC/UAC as part of the ENSURE - EN-route Shannon Upper Airspace Redesign project
Full Night Free Route Airspace implementation	Within Sofia ACC
	Within Chisinau ACC
	Within Bucuresti ACC
	Within Tampere ACC
Comprehensive DCT implementation (Night-, Weekend-, H24 DCTs)	Within Maastricht UAC as part of FRAM – Free Route Airspace Maastricht
	Within Karlsruhe UAC as part of FRAK – Free Route Airspace Karlsruhe
	Between Maastricht UAC and Karlsruhe UAC as part of FRAMaK – Free Route Airspace Maastricht and Karlsruhe (cross-border)
	Within Wien ACC
	Within Zagreb, Beograde ACC AoR (including Montenegro and Bosnia & Herzegovina)
	Within Skopje ACC
	Within Ljubljana ACC
	Within Madrid ACC (SAN and ASI sectors) as part of the FRASAI project
	Within Malta ACC
Comprehensive DCT implementation (Night DCTs)	Within Milano, Padova, Rome, Brindisi and Prague ACCs
Limited DCT implementation (Night DCTs)	Within Reims, Brest, Bordeaux, Marseille ACCs and Warsaw ACCs
	New Night Time Fuel Saving Routes within London, Prestwick, Part Milano, Rome and Brindisi ACCs

The following map shows the European Free Route Airspace deployment status as of end 2014:

Figure 42: Map – Free Route Airspace Deployment until end 2014



6.5. 50 Most Penalised City Pairs (50MPCP)

The activity aims to achieve the Flight Efficiency (FE) targets of the European Route Network through analysing 50 MPCP in order to offer more efficient route options to AOs. It is carried out in full partnership with all the aeronautical stakeholders and uses all the different possibilities currently available in the fields of airspace design and airspace management: support to FRA and DCTs initiatives, RAD review, CDRs usage and preparation of specific proposals/projects for the implementation of new route segments and for a more efficient organisation of the network.

The 50 MPCP list evolved, with 24 city pairs resolved or removed from the list in 2014 as no longer needing a flight efficiency solution, and new city pairs added. In September 2014, new calculations were carried out resulting in an updated list of 50 MPCP. New city pairs appeared mostly due to effects and impacts of full or partial airspace closure for overflights in Ukraine, Libya and Syria.

The effort carried out by ANSPs to offer an always increasing number of flexible and more efficient route options added new results to those already achieved in the past.

The 50MPCP improvements in 2014 with significant contribution to the FE are:

- The KFOR reopening, in combination with the very efficient routes/DCTs currently

available in the region of the south-east axis and inside FABEC airspace, produced immediate results. It improved the FE of the City Pair (CP) LTBS - EGKK, whose current route is 45.4 nautical miles shorter than the route available in 2008, and of the CP LTAI - EDDM which is now 8.3 nautical miles shorter than in 2008.
- The implementation of Free Route Airspace Italy, phase 1, produced positive effects also on LFPG - LIRF, EGLL - LIRF and LFPO - LIRF city pairs which can now plan the UQ223 (segment KALMO - TINKU) or the new DCT GEN - TINKU, including RAD LS2364 change.
- The DCT NETEX - FAMEN, impacting flights between EDDL and LEPA.
- Implementation of the ATS routes UQ237 and UQ343 and the review of RAD restriction LF3120.

The other 50 MPCP improvements in 2014 included the following aspects (not exhaustive):
- CP LTBA - LFPG via UY9 ROTAR - SUXAN during weekend (FL365+);
- CP LIRF - EHAM and LSZH - EHAM via UQ248 EPL - KUDIN during weekend (FL315+);
- CP LFPG - EDDM: new ATS route LASIV - OBORN;
- CP LIRF - EGKK and CP LIRN - EGKK via IBODI - GOTED (RAD LF3120 change);
- CP LTBS - EGKK: via Kosovo and new DCTs ERKIR - EDISA - LIMGO;
- CP LTAI - EDDM: via Kosovo and new DCT GORPA - KFT;
- CP UUEE - LIRF: new DCT VEBAL - VELUG.

While significant achievements can be reported under this initiative, there is a need to further intensify efforts to consolidate the results already achieved, to maximize them and to look for additional possibilities to further improve the efficiency of the route network. A major effort needs to be deployed to ensure the utilisation of the proposed solutions.

6.6. Route Availability Document (RAD)

The Route Availability Document (RAD) is a tool that addresses how the European network airspace may be used. According to the Commission Regulation (EU) No 255/2010 the scope of the RAD is to be a common reference document containing the policies, procedures and description for route and traffic orientation.

The Network Manager Implementing Rule (Commission Regulation (EU) No 677/2011) makes a clear reference that the European Route Network Improvement Plan shall include route network and free route airspace utilisation rules and availability.

This highlights a clear need for the airspace design and airspace utilisation aspects to be brought closer and be addressed as one single activity. In this context, the Network Manager has drafted new terms of reference for the RAD Management Group and established a multi-disciplinary RAD oversight team.

These actions have facilitated a pragmatic refinement of the RAD during 2014, with full cooperation of Operational Stakeholders, aiming to overcome weaknesses in airspace design and ATM system functionality and to ensure application of the remaining restrictions only where and when required.

The major RAD evolutions and developments in 2014 focusing particularly at Network level and covering the entire NM area of responsibility were as follows:
- The creation of the Network wide European RAD Annex merging all existing State / ANSP / FAB Annexes. This Annex contains in one single document all the data in regard to restrictions imposed;
- The production of the Network wide DCT Chart containing all available allowed direct options;

- The approval of harmonized text in regard to promulgation of RAD via the State AIPs.

The other RAD evolutions and developments in 2014 included the following aspects (not exhaustive):

- Continuation of harmonisation of terminology and definitions;
- Continuation of improvements in data structure and format, and change management;
- Continuation of improvements in RAD availability (publication) to users;
- Continuation of rationalisation of restrictions expression;
- Update of RAD time availability expression by revising the RAD Harmonization Rule (RHR-1);
- Establishment of clear identification rule for all “Yes” DCT in Appendix 4;
- Re-naming of column “Time Availability” as “Restriction Applicability” in Appendixes 3, 4 and 6 to better express the content purpose;
- Clarification of the use in RAD of expression “flying above the airspace” or “RFL above the airspace”;
- Use of Regional / FAB naming convention (examples DS - Denmark / Sweden FAB, YX - Maastricht UAC);
- Publication of Airspace Restrictions in new Appendix 7 - FUA restrictions;
- Finalization the purpose of use and existence of word “Shall” in RAD restriction description;
- Clarification of the use of Increment File;
- Continuation of the pdf RAD publication.

Further RAD improvement measures have been proposed for implementation in 2015 such as:

- Appendix 5 swap from “word” to “xls” format.
- Creation of a single Network wide European Airport Connectivity containing all general arrival / departure information, arrival procedures and departure procedures.
- Finalization of RAD Terms and Definitions used in a common document;
- Further development of the RAD DCT Chart;
- Further NM Release development related to Airspace Utilisation Rules and Availability (AURA) interactive process via the NOP and use of the NOP Portal as a collaborative platform to build the RAD.

6.7. Continuous Climb/Descent Operations (CCO/CDO)

Environmental restrictions are now in place at most European airports. It is likely that the number of restrictions will continue to grow, resulting in a negative impact on the optimum network performance. One major mitigation measure is the implementation of the Continuous Climb/Descent Operation (CCO/CDO) technique which offers an early opportunity to minimise the environmental impact of aircraft operations.

The rapid deployment of CDO throughout Europe, even on a limited basis (limited by hours of operation and commencement height), will empower the network to respond to the environmental challenges. This response will be enhanced by evolving CDO to be enabled with more frequency and from higher levels (the ultimate aim being from Top of Descent). This will be achieved by changes to the airspace architecture and the widespread availability of harmonised support tools for controllers, which will ensure lateral and/or vertical segregation without impeding the optimum profile.

In addition, the European ATM Master plan states that amongst the Deployment Baseline changes, CCO/CDO are key contributors to performance.

By the end of 2014, 89 airports have published Continuous Descent Operations in the relevant

AIPs during some part of the day or night and mainly from intermediate levels at this stage. Several airports have CDOs from 'top of descent' if traffic permits and a number of airports continue to look at extending times and levels for CDOs within their airspace reorganisation plans. Moreover, 51 airports either intend (9) or indicated to have implemented (42) CDO operations. Trials have been conducted successfully and have led to the introduction of CDO procedures.

During 2015 work will continue to support deployment (albeit to a more limited extent than previously), with a focus being placed on addressing matters such as CDO monitoring, definitions, phraseology and charting. The community and NM increasingly recognise the contribution of CCO/CDO in the context of overall flight efficiency.

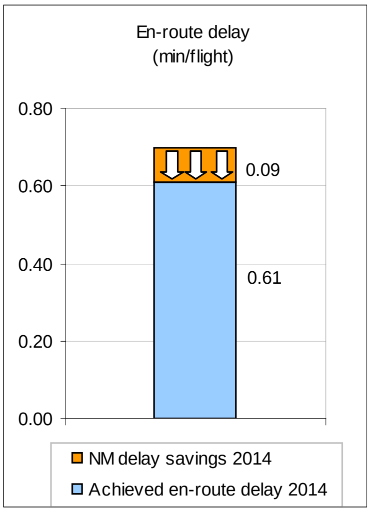
7. Network Manager

In addition to the network targets defined for 2014, NM Performance Plan defines a set of internal NM performance objectives/targets, to measure NM's contribution to the ATM network performance. In the Capacity performance area NM has the target to reduce the en-route ATFM delays by 10%.
NM Operations Centre (NMOC) looks for opportunities to reduce the delays by means of proposing alternative routes (RRPs) to the airlines, manually optimising the calculated take-off times (CTOT) or by excluding the flight from a regulation where possible (these are the direct delay reduction actions). The manual CTOT changes are performed in conjunction with the FMPs/AOs and are therefore regarded as confirmed delay reductions. Re-route proposals can only deliver delay benefit if the AO accepts the proposal - this is monitored in post-ops. These techniques reduce delays at individual flight level and deliver further delay reductions at network level through the CASA optimisation algorithm (indirect 'snowball' effect). While it is currently possible to measure the direct delay reductions initiated by NMOC, it is not possible to quantify the indirect delay reduction effect of the direct actions. The amount of delay reduced by NMOC pre-tactical planning process and the applied scenarios cannot be quantified either.
In the Flight Efficiency (FE) area, there were no specific objectives/targets in RP1, however, in order to support the official FE performance targets for RP1, NMOC initiated a flight efficiency initiative that started in May 2013 with tangible FE benefit. These indicators are explained below.

7.1. Capacity (Delay Reductions)

In 2014, NMOC actions saved 1,233,487 min of ATFM delay on 40,651 flights. 74% of all savings were on En-route and 26% on Airport delays.

Figure 43: NMOC Delay Savings - 2014



The en-route savings of 910,229 min represents 13.3% of the en-route ATFM delays over the

year (better than the target of 10%) and also represents a reduction of 0.09 min of en-route delay per flight. Reduction of the airport ATFM delays per flight was 0.03 min (7.3% of the total airport ATFM delay).
Overall delay reduction by accepted re-routing proposals was 2.5% of the annual en-route delay (151,000 min).

7.2. Environment (Flight Efficiency)

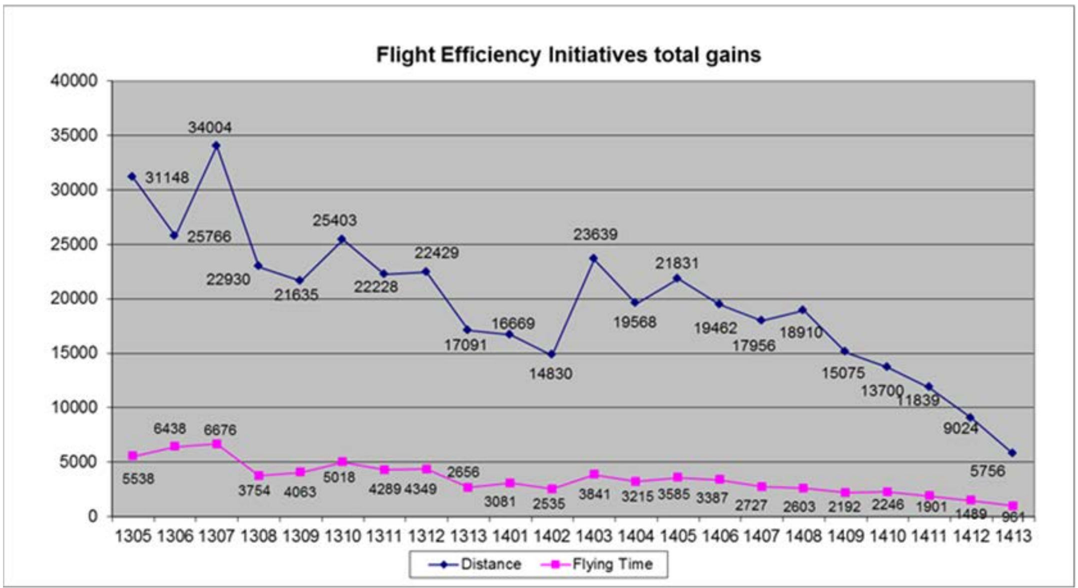
The results offered by the implementation of Flight Efficiency improvement measures have to be strengthened and maximized by means of their integration into some important projects that have been started and that are in an advanced phase of development, with an implementation date expected in the short/medium term:

- Specific Proposals tabled in ERNIP Database;
- Swap UN852 / UN853;
- WE FREE;
- DCT and FRA initiatives (France, Turkey, Italy, FABEC, FABCE, DANUBE FAB);
- SESAR Large Scale Demonstration Activities - FREE Solutions - Free Route Environmental and Efficient Solutions.

With a support of FE Cell (set up to help AOs and Flight Planning Service Providers to optimize the utilisation of the opportunities) new available routing solutions were offered to airspace users, taking into the account different rerouting need for shorter and cheaper flights resulting in significant NM savings.

The graph below shows the evolution of the flight efficiency improvements since the initiative started in 2013 (AIRAC 1305).

Figure 44: Flight efficiency initiative total gains



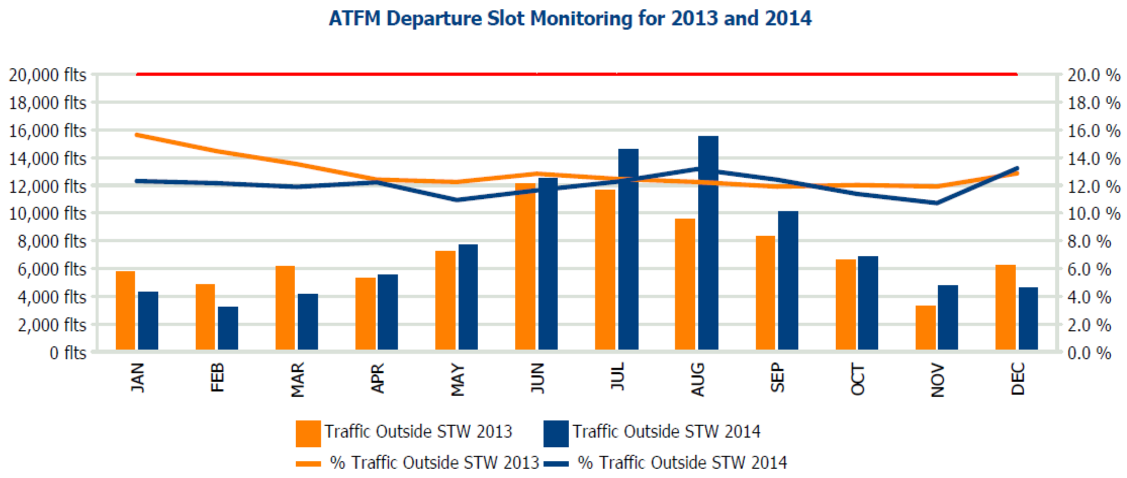
The effective savings since the beginning of the flight efficiency initiative in May 2013 have resulted in 395,932 nautical miles flown less than flight planned. This translates into a total gain of 2,376 tons of fuel, or 7,919 tons of CO2 less and €1,979,660 savings.

8. ATFM Compliance

8.1. ATFM Departure Slots

The overall percentage of traffic departing within their Slot Tolerance Window (STW) was 87.9% in 2014, meeting the target of 80%. However, many airports did not meet the target. It is an improvement over 2013 where the compliance percentage was 87.3%. Except August and December, the monthly compliance was better in 2014. NM is working with the ANSPs for improving the level of adherence.

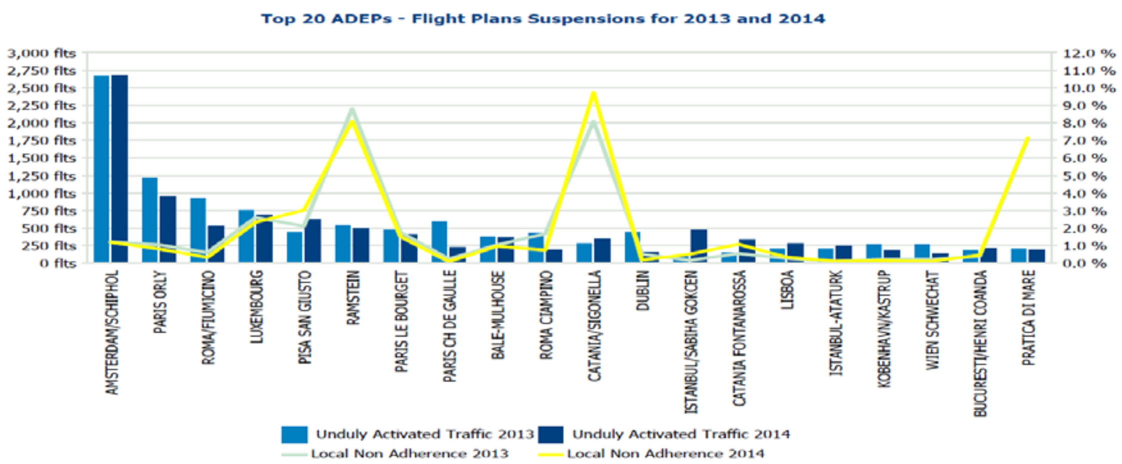
Figure 45: ATFM Departure slot monitoring 2014



8.2. Adherence to Flight Plan Suspensions

The percentage of flights suspended by FAM (Flight Activation Monitoring) but which were activated by airborne data received whilst the flight was temporarily suspended decreased in 2014 in comparison with 2013 (0.26% vs 0.29%). Figure 46 shows the top airports where such situations occurred, as well as the percentage of these flights within the total number of flights at that airport. The introduction of Airport CDM has proven to be the most effective measures in bringing down the number of such flights.

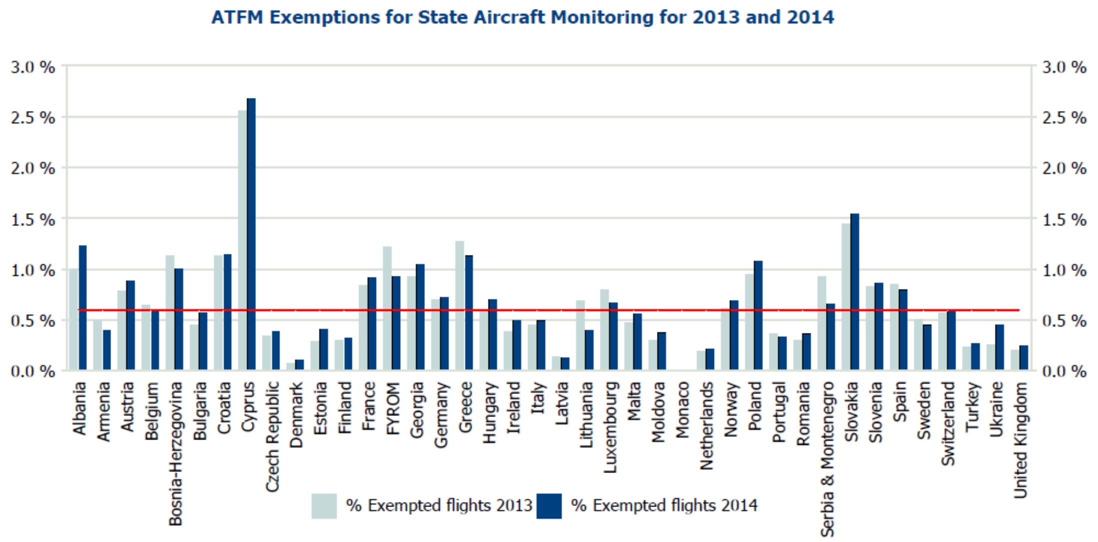
Figure 46: Flight Plan Suspension Monitoring top 20 ADEPs



8.3. ATFM Exemptions

The overall European 2014 percentage increased in 2014 to 0.59% just below the target of 0.6% (the percentage was 0.56% in 2013). However, there are nineteen EUROCONTROL Member States in 2014 that granted exemptions in excess of 0.6% of the State's annual departures (EU Member States will be formally notified). NM will discuss any network considerations with the State and service provider concerned.

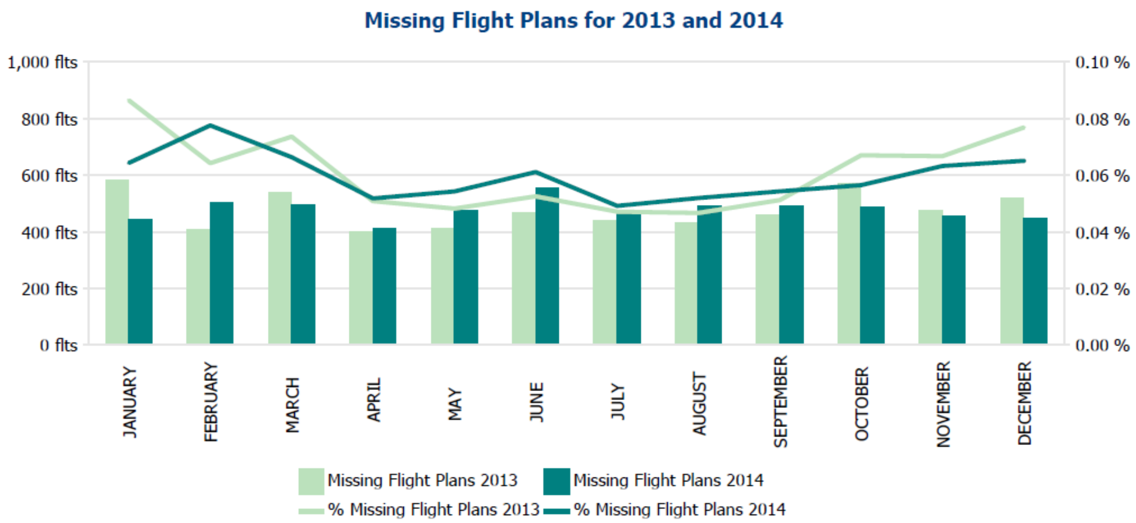
Figure 47: ATFM granted suspensions in 2014



8.4. Missing flight plans

The graph presents the evolution of the number and percentage of Missing Flight Plans – APL Flights identifying those flights that entered the European airspace without a flight plan (i.e. no initial flight plan was successfully filed in IFPS) and an ATS Unit filed the Flight Plan. The percentage of such FPs in the total remained stable in 2014 at 0.06%.

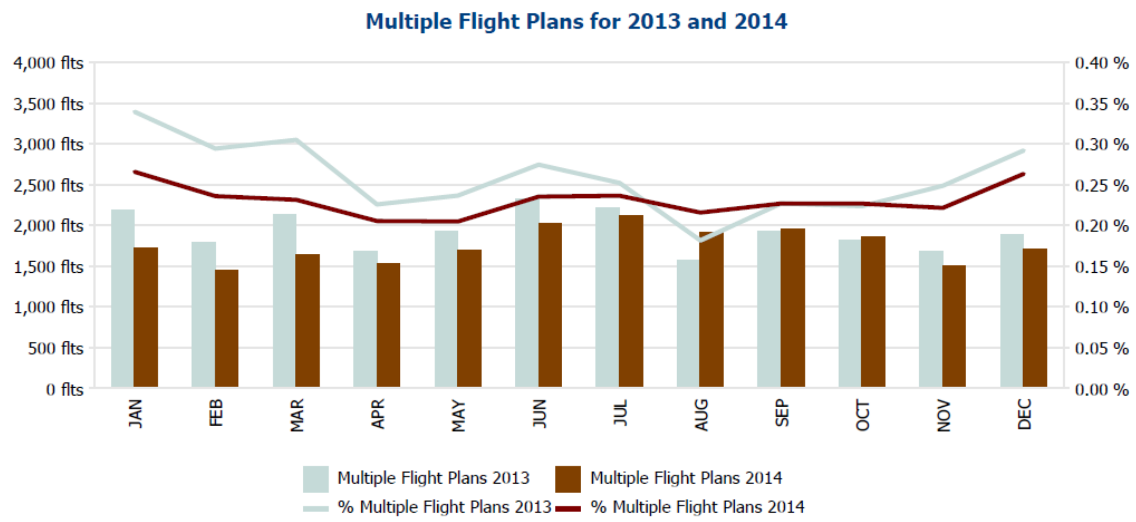
Figure 48: Missing Flight Plans



8.5. Multiple flights

NM is using the data from Flight Activation Monitoring to identify possible multiple flight plans by measuring the number of flight plans received for which no subsequent activation or airborne information is received. Figure 49 presents the evolution of numbers and proportion of these flights within the total traffic. The number and percentage of these flights slightly decreased again in 2014. NM is reviewing the causes and the network impact of such cases and contacts the airlines or FP originators when necessary.

Figure 49: Multiple Flight Plans



9. Airspace Users' Key Points on Network Performance

Summary of Airspace Users' views on Network Operations (RNDSG/83/IP1, IP2, IP3) – cf. WP10 of NETOPS/10. See Annex I for the full set of views.

All the airspace users' organisations have presented their views with respect to the summer 2014 operational performance.

Even though delays were higher compared to 2013, the airspace users highlighted that it is fair to say that a good job has been done by the Network Manager and ANSPs when it comes to the reduction of delay min. A comparison with 2011, the year with the second highest summer traffic over the past 5 years (2014 has the highest), learns that the percentage of delayed flights has improved by 35%, and that the average delay per delayed flight, the average en-route delay, and the average airport delay have all improved. When it comes to the reduction of the network route extension, it is clear that a good job was done. The operational implementation by the Network Manager of the Group Re-Routing Tool (GRRT), also known as the route opportunity tool, has been a step in the right direction.
The airspace users highlighted the fact that, in the context of the currently effective European performance scheme, there is little doubt that a good job has been done by the Network Manager and ANSPs when it comes to reducing delay min, and when it comes to reducing the network route extension.
The airspace users also highlighted that the summer 2014 period was dominated by a number of crises, not only affecting efficiency, but with the Malaysia Airlines 17 accident also affecting safety. The Network Manager handled the situations well, and through the European Aviation Crisis Coordination Cell (EACCC) as well as with ICAO, it continued to further develop the crisis management activity in Europe. For the safe and successful management of (potential) crisis situations, both AOs and the Network Manager are depending on timely and accurate availability of all relevant information, something in which ANSPs, CAAs/States, ICAO, EASA, the

military, and any other possible source of information, have a huge responsibility. Therefore, these information providers are explicitly requested to share the very latest (potential) crisis intelligence without delay. This is of the greatest importance for AOs to be able to make a reliable safety risk assessment.

The airspace users also highlighted that the most significant change to the network came in April with the opening of the KFOR sector. Many airlines took advantage of the more fuel-efficient routings that this key piece of airspace offered and all States affected by the change along with the Network Manager are to be congratulated for the successful re-integration of the airspace into the network. Increased use of Free Route Airspace or the wider use of Directs (whether permanent or during night hours) was matched by an increased uptake of more sophisticated optimised flight planning tools as airlines realised the potential that the new airspace structures had for saving fuel the fact that the Network Manager appears to be listening to the AOs when it comes to the lack of rline flight efficiency in today's network flight efficiency.

The airspace users highlighted the good performance of Turkey, Bulgaria, Romania, Austria and Slovakia in handling the unexpected additional traffic resulting from the Ukrainian crisis. Equally, the good en-route performance in Greece, Madrid and Lisbon ACC has been highlighted as well as the positive trends in Cyprus. Nevertheless, additional improvements were required for some other ACCs on the SW Axis or at some major airports.

The airspace users highlighted that continued work must be undertaken during the winter to address staffing and capacity issues. A priority for summer 2015 must be also to focus on how to reduce delay caused by adverse weather. A wider network approach must be considered to make it easier to re-route traffic tactically even where this goes against the RAD. The network must also continue its work in reducing mileage through enhanced route network development and programmes of Free Route Airspace. Whilst airspace management processes are becoming increasingly complex the airlines are equipping themselves with increasingly dynamic flight planning tools to make best use of all available route opportunities.

If you any questions on the content of this report or require further information on network performance reporting of the European ATM network, please contact us at:

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