



VOLATILITY IN ATM

CASES, CHALLENGES, SOLUTIONS

InterFAB Panel at World ATM Congress 2018 - FABEC OPS Theatre 6 March 2018



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Editorial



Politics. Weather. The economy. Disruptive commercial concepts. Unexpected events. The world is suddenly starting to seem less predictable, more extreme. For Europe's air navigation service providers (ANSPs) and functional airspace blocks (FABs) dealing with volatility is now a daily concern. Sudden and extreme variations in airline traffic flows is a major cause of disruption, cost and delay; in 2017 annual en route air traffic flow management (ATFM) delays in Europe increased at a higher rate (+7.1% over 2016) than flights (+4.3%) – and this new world of volatility has been the most important factor in these increases.

To reflect on some of the challenges and possible implications to ANSP operations, FABEC launched an interactive platform at the World ATM Congress 2018 to discuss traffic volatility, hosted within the FABEC Operations Theatre and attended by dozens of operational stakeholders from all sides of the industry. The initiative was part of FABEC's broader agenda to address a range of current operational issues, including new developments in air traffic flow management and free route airspace. The interFAB panel entitled: Volatility in ATM: Cases, Challenges, and Solutions provided a forum in which to exchange experiences, share information and engage with industry experts on finding solutions to the problem.

Experts from six FABs participated on the panel, including: Baltic FAB, Blue Med FAB, DANUBE FAB, FAB CE, FABEC, SW FAB, in addition to the Eurocontrol Performance Review

Unit. This brochure provides a short overview of the findings, highlights the impact that volatility is having in the different regions, and outlines some initial solutions. The panel identified many causal factors, notable in their diversity and complexity. It also found that a rigid economic regulatory system has imposed cost pressures on ANSPs and these have led to a reduction in surplus capacity and less flexibility in the way ANSPs can respond quickly to changes in demand.

When looking at potential solutions, the panel highlighted four areas: First among these is enhanced collaborative decision making among all partners in the aviation value chain. The panel also saw planning tools playing a larger part in solving crises at short notice. Panel members also called for common indicators of how to measure volatility, along with a more flexible regulatory system that recognises there are peaks and troughs in demand, and provides operational or financial buffers.

A collective effort is needed by ANSPs, airlines, planners, and regulators to ensure passengers across Europe can continue to travel in a safe and efficient way. Providing flexible and responsive air traffic services calls for new ideas which will minimise the impact of volatility on travellers while delivering the necessary capacity to meet short term and long term demand. The interFAB panel, and the experiences and findings documented in this brochure, represent the start of an industry-wide initiative involving all partners to identify and implement long lasting solutions.

Responsible air traffic management in a new age of volatility

Jenny Beechener, ATC writer



At first glance it is difficult to grasp the magnitude of the volatility challenge. ANSPs base their resource planning on traffic levels forecasts. In Europe, the Eurocontrol Network Operations Plan – the long term high-level forecast which is recommended for ANSP planning – has proved broadly accurate in its predictions of overall traffic flows. But in recent years it has failed to predict the sharp peaks in demand and sudden dips experienced by some regions. So why are some ANSPs not applying enough capacity to cope with demand?

To understand the answer is to understand how the world has changed in the last few years – with long term business models breaking down, unexpected population shifts taking place and States on the periphery of the continent suffering from political turmoil and economic uncertainty.

The long term forecasts do not take into account the sudden short-term variations in demand these factors have created – the overall 4.3% traffic increase in 2017 was accurate enough in its high level prediction of traffic levels but on a

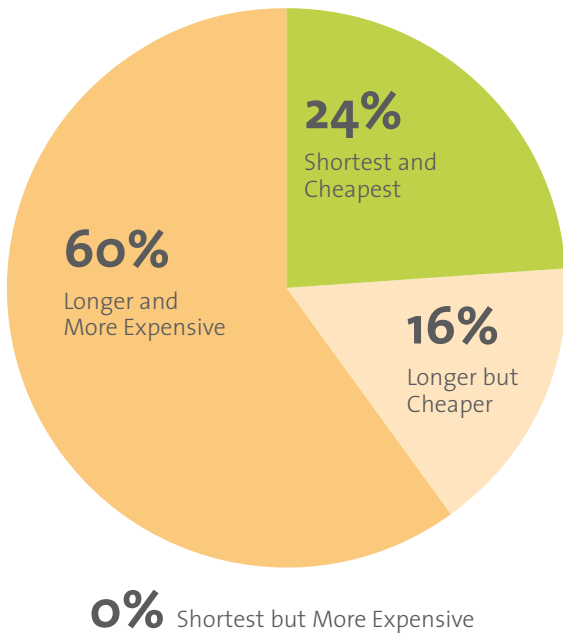
national or regional level the variations in demand for air travel have been very different. This has made it impossible for many ANSPs working in the core areas of Europe to accurately plan for future capacity demands. Forecasting an average on European, national or regional level does not help anymore.

As traffic grows and airspace sectors and airports near capacity levels, the impact of even small changes to forecast demand have meant more complex and time-consuming flow control measures have been required to safely match capacity with demand – and there is growing evidence to suggest a changing climate and political unrest are just two key issues behind a more volatile air transport system.

The causes of volatility

What causes traffic volatility? Changes in traffic demand are not a new phenomenon, but wider variations in traffic volume and routes flown in recent years call for closer review of the causes and consequences.

FAB CE STUDY: HOW AIRLINES ACTUALLY FLY



Source: Helios filed flight plan study

The number of variables makes volatility hard to predict but these are some of the main causes:

- External shocks such as the opening and closing of airspace due to political problems (such as in Ukraine)
- Seasonality
- Weather phenomena
- Sudden take-up, or closure, of city-pairs by airlines
- Impact of airport capacity
- Effects of business cycles
- Impact of changes in ATC service charges

Even small changes can have disproportionately and unforeseen effects on traffic flows. For example, air navigation service charges have a big impact on the routes that airlines choose to fly and play a part in determining route selection by airspace users. If an ANSP suddenly reduces or increases its charges the new automated airline flight plan systems which many airlines have recently introduced will respond by re-routing flights to take advantage of – or avoid – the new charging levels, suddenly sending large flows of aircraft through previously quiet airspace sectors.



But this is not a universally consistent phenomenon. A recent study conducted for FAB CE by Helios highlighted variations in airline flight profiles based on filed flight plans. While some selected the shortest, cheapest routes, a surprising number failed to do this. The results revealed 60% of the filings were on suboptimal routes, attributed in part to unavoidable factors such as weather, but also to a lack of information available to the dispatcher.

So what can ANSPs and FABs do to manage volatility?

ANSPs are responding to volatility in several ways. They have three levers they can use: personnel, procedures and system capacity.

This means recruiting new controllers and changing overtime and shift patterns to provide more staffing flexibility.

It means introducing new Air Traffic Flow Capacity Management (ATFCM) capacity enhancing procedures such as Short Term ATFCM Measures (STAM), which provide tailored capacity increases in specific centres to support as much

traffic as possible, without unduly increasing complexity. Working with the Network Manager, an ATC centre can impose restrictions on certain flights, but is still able to manage an increasing amount of traffic. Airspace redesign is also adding capacity, for example, by modifying Standard Terminal Arrival Routes (STAR) in the terminal area ANSPs can help reduce congestion without heavily impacting flight paths.

And most ANSPs are investing in major capacity-enhancing re-equipment programmes.

But every part of Europe has its own volatility challenge and there is no one-size fits all solution. As the following sections show, many ANSPs and FABs have been able to respond to sudden surges and troughs of demand while maintaining and improving safety levels and without exponentially increasing delays. Their solutions have proved effective in the short term – but as the world becomes even more unpredictable there is now a growing realisation that new ways will be needed of measuring the impact of volatility on ANSP operations.



The wild weather – new research points to stormier times ahead



There has been an increase in storms that produce severe weather conditions such as heavy rainfall, strong winds, hail, lightning and tornadoes in the last decade – and Europe is one of the most affected regions.

This is one of the conclusions of a study set up in 2014 by the World Meteorological Organisation (WMO) and the International Civil Aviation Organization (ICAO) to look at the challenges facing the aviation industry from possible climate change effects. The result can be seen in the rise in weather-related delays, and the squeeze on airspace capacity where flights re-route to avoid bad weather. The increase in the intensity of rain showers directly impacts airport operations, with increased risk of aquaplaning on the runway, adding to the risk of runway excursions associated with excess water.

Storms also bring stronger gusts of wind, typically forecast in terms of wind speed and average direction. Airports already experience difficulties in predicting crosswinds to within +/-30 degrees, prompting safety concerns. Better prediction algorithms, and better methods to communicate gust to controllers and pilots is a target area for improvement. The WMO has also found evidence of more frequent lightning strikes, and proposes more research to establish whether this is indeed a trend.

More frequent incidents of turbulence is also predicted. Warmer air in the tropics is impacting the atmospheric jet streams and contributing to increased turbulence in northern hemisphere. A study by the University of Reading predicts that turbulence will increase 1.5 times as a result of climate change, calling into question the validity of minimum vertical separation minima requirements in the future. Airbus has recorded a number of new maintenance issues associated with turbulence. The impact is noticeable in the increase in stormy weather in the northern latitudes, and the floods and droughts that alternate in the southern latitudes.

ANSPs are also reporting stormier conditions. Romania has recorded twice the number of tornadoes in the last three years, and Poland attributes over half of terminal area delay to bad weather in 2017 – continuing a trend noticeable in recent years. Munich experienced a ‘Supercell’ in August 2017 when two thunderstorms converged over the airport, resulting in complete closure for over an hour for safety reasons.

ANSPs have responded with measures to improve procedures around airports, such as the introduction of new training packages for controllers, for example focusing on convective weather in Romania, and improved situational awareness in Poland.

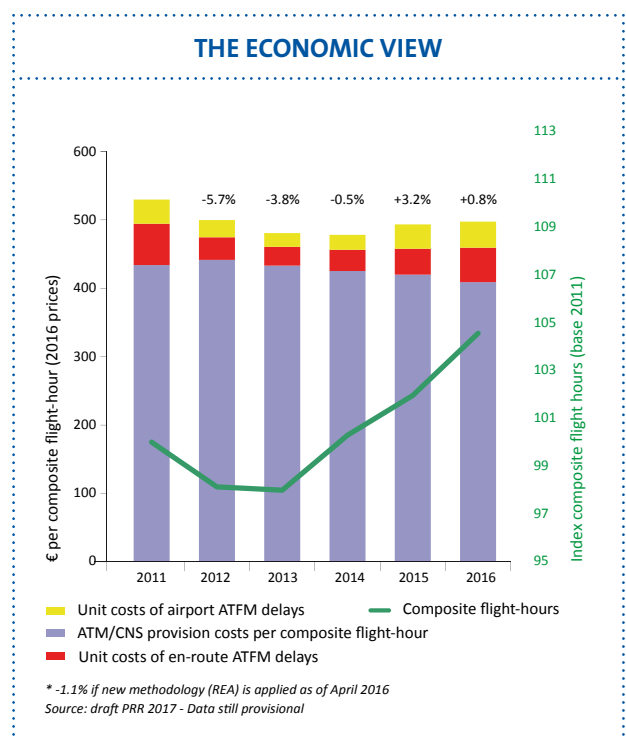
The Performance Review Unit asks: Are we really taken by surprise?



Since its creation in 1998, the Eurocontrol Performance Review Unit (PRU) has been responsible for monitoring and reviewing the performance of the European Air Traffic Management (ATM) System and supports the Eurocontrol Performance Review Commission (PRC) in carrying out its tasks and work programme. The PRU is also supporting the European Commission in the context of the Single European Sky (SES) Performance and Charging Schemes.

The introduction of binding economic and capacity performance targets by the SES Performance Scheme in 2012 contributed to a steady improvement of cost-efficiency while on the capacity side the Air Traffic Management (ATM) system still benefited from the depressed traffic levels, following the start of the economic crisis in 2008.

With traffic increasing again since 2013, the PRU concerns were confirmed that delays would increase again, unless sufficient attention was focussed on capacity planning and capacity deployment.



Despite the continuous improvement in cost-efficiency since 2012, the economic view (combining provision and delay costs) shows that in fact a large part of the cost-efficiency savings were offset by the continued increase in ATFM delay costs, meaning that there was only a limited overall performance improvement.

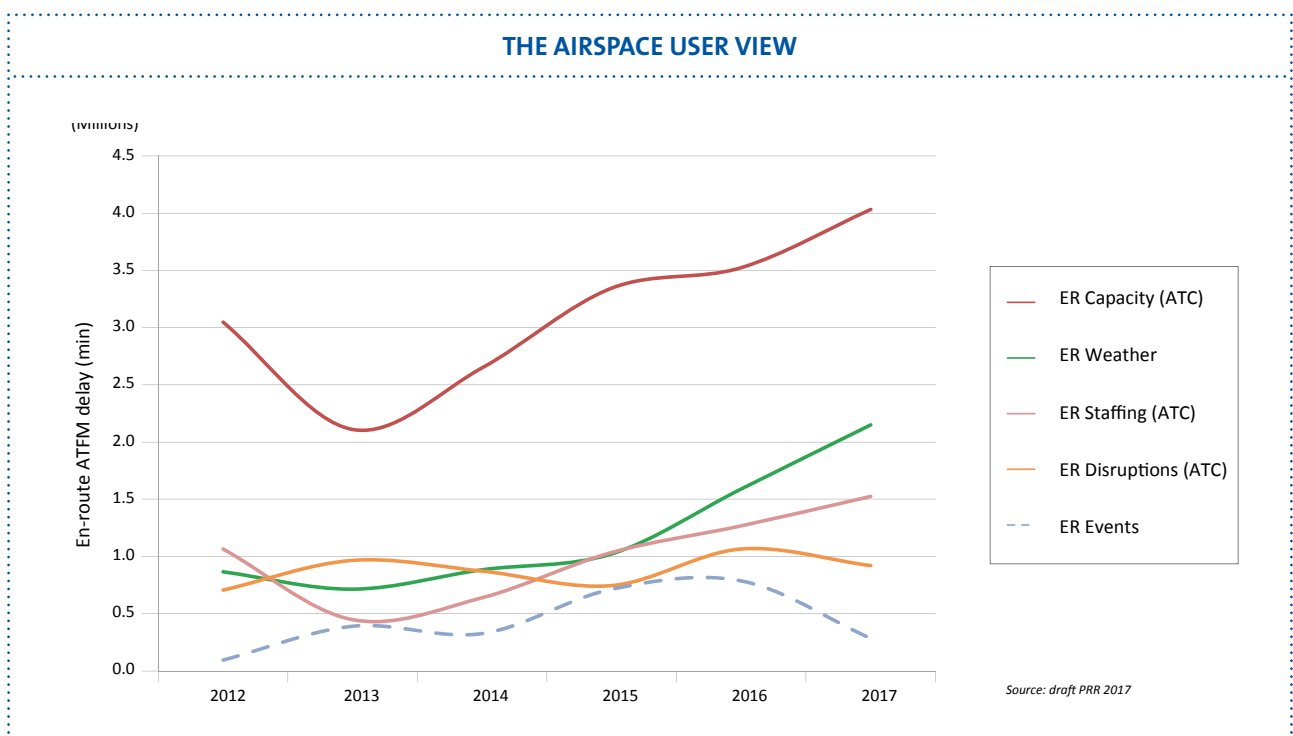
It is one of the defining characteristics of the relationship between capacity and demand in ATM that there is no symmetry regarding the impact of imbalances because of knock-on effects of delay (demand has to be shifted to later periods and/or other airspaces and might generate further imbalances). Hence, a lack of capacity has a significant disruptive potential to airspace users and the entire network. In economic terms, this generates external costs, e.g., cost of delays borne by airspace users.

As in previous years, the most important factors contributing to en-route Air Traffic Flow Management (ATFM) delays in 2017 were en-route capacity and staffing (60%), followed by en-route adverse weather (23%). The total delay costs to airspace users from the aforementioned factors are estimated to be around € 770 million in 2017.

According to ICAO, the ATM system is expected to respond to future growth by providing sufficient capacity along with corresponding efficiency and flexibility, while ensuring no adverse impact on safety or the environment.

From an ANSP perspective, the challenge is to accommodate in a safe and cost efficient manner different types of demand variability, driven by short term effects (daily traffic peaks, specific events, industrial actions, adverse weather, etc.), seasonal fluctuations throughout the year, and (cyclical) economic growth driving air traffic demand in the longer term.

In this context, a number of ANSPs claim that the world has become less predictable over the past few years and that dealing with traffic “volatility” is now a daily concern. Although there is no definition, volatility appears to be an emerging topic for debate in the ATM community. Generally the term is used to refer to traffic variations in time and space due to a wide number of possible reasons including, political crises, airspace closures, weather phenomenon, changes in served city pairs, and differences in route charges.





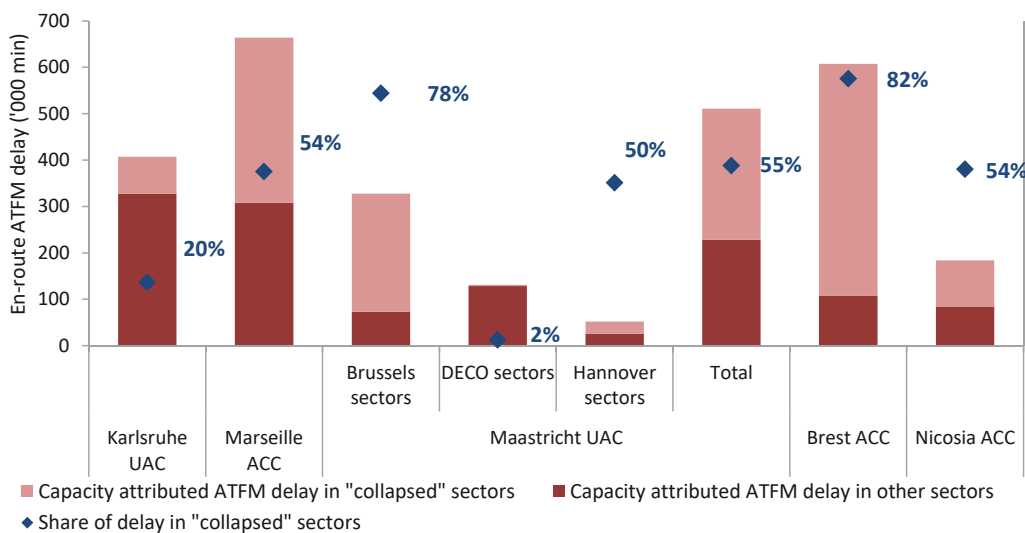
Since traffic demand and service provision are two sides of the same coin, any informed discussion should not be limited to changes in traffic demand but also consider how traffic and attached uncertainties are managed in terms of capacity provision.

The impact of traffic variability on operational performance depends on a number of factors including, inter alia, the order of magnitude of the traffic volume changes, the lead time before the change occurs, the level of predictability, associated forecasts, airspace saturation levels, and the level of flexibility in capacity deployment and planning.

In terms of capacity deployment (assignment of existing resources), the analysis of the most penalising ATFM en-route regulations in 2017 shows that a surprisingly high share of ATFM delay originated from collapsed sectors which – by being collapsed – were already limiting the available capacity for airspace users.

This suggests that the full capacity was not deployed in a number of cases and more traffic could have been accommodated by a better or more flexible deployment of resources.

ATC CAPACITY ATTRIBUTED EN-ROUTE ATFM DELAY AT THE MOST CONSTRAINING ACCS (2017)



In terms of capacity planning (system upgrades, ATCO recruitment, etc.), the analysis of one of the most constraining ANSPs in 2017 showed that capacity plans were being downgraded or postponed despite forecasts always showing traffic growth.

In view of the long lead times (ATCO recruitment, system upgrades, etc) such a behaviour leads inevitably to substantial delays and associated costs to be borne by airspace users. Instead, capacity planning requires a continuous review of the traffic situation to evaluate risks and to adjust the plans as necessary. A robust planning process consists of a baseline scenario, complemented by scenarios to ensure strategic flexibility (forecast range).

From a service provider perspective, matching capacity with demand is a dynamic process in that the cause and effect are distant in time and changes occur at many different timescales. How well capacity and demand can be balanced depends on the level of predictability but also on the level of flexibility to provide capacity.

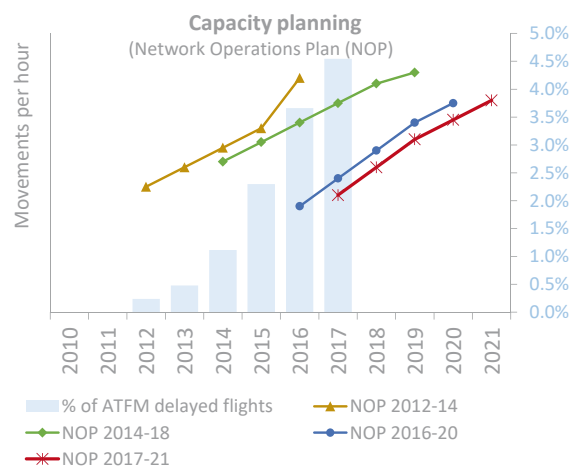
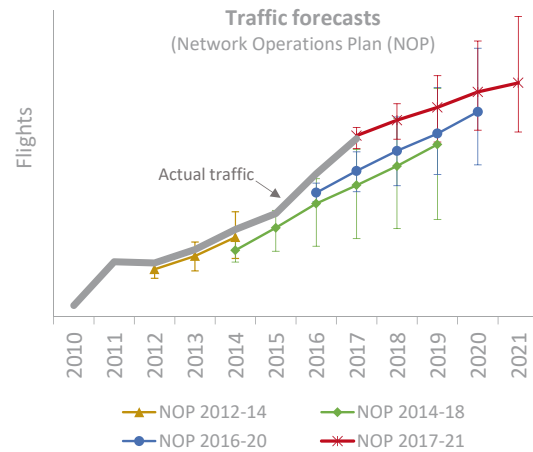
Consequently, the paradigm of capacity flexibility becomes more and more important. Flexibility is considered to be a measure of the ability of a system to adapt to changing (unforeseen) traffic demand. It represents a potential for ANSPs that can be used, but does not have to be used.

In today's performance based environment, the perishable nature of ATC capacity (i.e. deployed capacity cannot be stored for use at a later time) and the pressure to best balance service quality with cost-efficiency can affect the ANSP's decision making process with a view to capacity planning and deployment.

As traffic variability is not a new phenomenon (Yugoslavia crisis, growth of low cost carries over the past 20 years, etc.) the discussions on volatility should not be limited to variations in traffic demand but take a wider perspective and focus on:

- **Why is variability in demand more of an issue today?**
- **What makes management of capacity different today?**
- **Why are we taken by surprise?**

TRAFFIC FORECASTS & CAPACITY PLANNING



« While unit cost of ATM/CNS provision are decreasing, ATFM delay-related cost are increasing with growing traffic, resulting in increasing total unit cost. Capacity provision is falling behind demand in some areas. It appears that the flexibility to react to changes in demand is reducing. The question is: How can we make the system more flexible again? »

Dr Bernd Tiemeyer, PRU/EUROCONTROL

FABEC – Wide variations between forecast and actual traffic demand

In the core area of Europe traffic continued to increase above forecast levels in 2017, rising 3.4% across the six members that manage FABEC airspace to reach a record 5.99 million overflights. There were however, significant variations between control centres as traffic flows shifted in response to geopolitical events in other regions, increasing impact of climate change, and shifts in the business behaviour of aviation stakeholders.

The airspace includes some of Europe's most complex and busiest routes so even small hikes in demand, or changes in routes flown, can have a big impact on work flow. Airline schedules – which used to be planned months in advance – can change with very little warning as carriers respond to market forces, and even common city-pairs can deviate from standard routes for a number of reasons. Predictable traffic patterns are easier to manage than the unexpected fluctuations that have started to make sudden demands on ANSP capacity. And it is the unpredictable nature of change that is the cause of concern.

Airline flight planning systems are designed to plan optimum routes but the reality is often different. They can include sudden sharp turns to avoid regulated airspace, yoyo flights to avoid delays, or longer routes to take advantage of lower unit rates. These are flights that the pilot will never actually fly, but ANSPs have to plan for. They contribute to overloads in some sectors, while other sectors which have made provision to handle planned flights, face unused capacity. In already-busy airspace, they trigger flow restrictions to ensure safe operations, squeezing capacity elsewhere. The graph below shows how 14 extra flights caused a 43% increase in sector traffic, presenting a sudden capacity and safety challenge.

Volatility takes other forms. Forecasts usually provide average traffic demand rather than the peaks and troughs that have been witnessed recently, and an unexpected rise in demand can lead to flow management measures that the airlines then try to avoid. It is also hard to plan staffing levels when ANSPs are under increasing pressure to reduce costs. ANSPs need time to recruit and train additional controllers to meet increased demand; similarly, airspace redesign requires careful planning and consultation before it can be implemented. These factors limit the ability of ANSPs to respond as quickly as they would like to short term changes in demand.

There are other variables. Flexible use of airspace allows civil and military users to get the best use from the airspace, but there needs to be adequate warning when military zones become available for civil use, so airlines can take advantage of more direct routes. There is also scope for improvement in flight planning activity through wider adoption of integrated flight plan data processing amongst stakeholders; for example to support what-if scenarios when planning optimum routes. In addition, unit rates become a game changer when airlines opt to fly through airspace to take advantage of lower charges.

Delivering flexible airspace capacity calls for ANSPs, planners, and airspace users to all work together to achieve a balanced outcome.



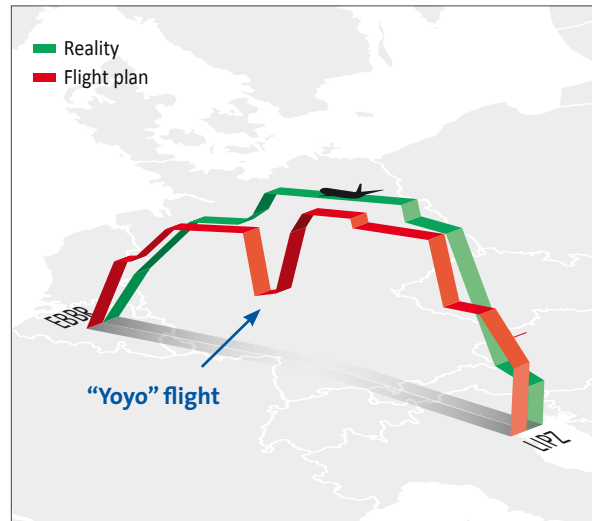
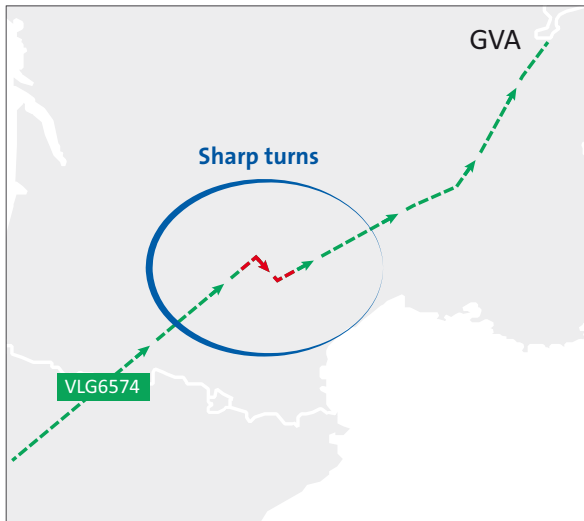
«To ensure quality of service, and as we are working at the capacity limit in several sectors, we need to find ways to balance the airspace users' normal demand for flexibility with the operational need for predictability of traffic of air navigation services. Collaborative decision making is a possible answer.»

Geoffroy Ville, FABEC / DSNA

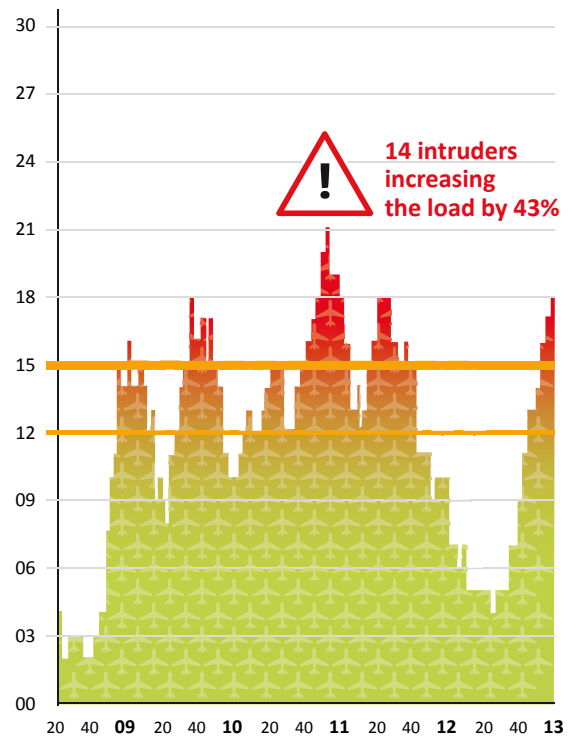
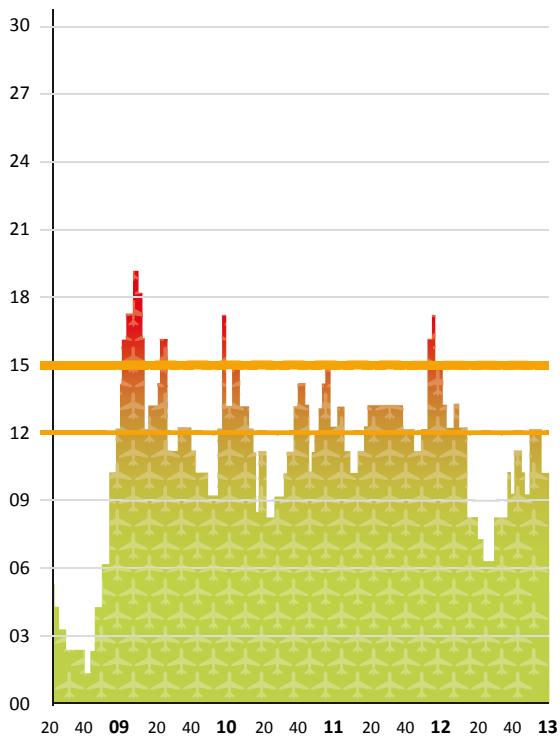
“CREATIVE” ROUTE LEADS TO SUDDEN CHANGE IN SECTOR SEQUENCE



“CREATIVE” HORIZONTAL OR VERTICAL PROFILES



SUDDEN INCREASE ON SECTOR LOAD



SW FAB – Efficient behaviour for extraordinary traffic demand



Europe's South West FAB is considered as one of the most strategic FABs due to its geographical location, serving as the European northern-southern corridor and as a natural gateway to Central and South America.

The SW FAB has been experiencing higher than forecasted traffic levels since 2015 because of the rising demand in key Iberian Peninsula tourist destinations and the Canary Islands as tourists choose eastern Mediterranean resorts over destinations in Turkey, Egypt, and North Africa, following years of political instability in the region.

This unexpected increase of air traffic in the SW FAB showed deviations from the Performance Plan of 13.3% in 2016 and 19.8% in 2017, and could reach more than 25% by the end of the second performance reference period in 2019, according to STATFOR forecasts.

This has been a very challenging phase for the SW FAB, with traffic growth well above all expectations triggering urgent measures on behalf of the SW FAB ANSPs, and in collaboration with the Network Manager, to introduce both short term and long term actions to manage the high demand.

The SW FAB performance was highly recognised by the aeronautical community due to the exceptional circumstances and the effort made by both ENAIRE and NAV Portugal to accommodate the unexpected traffic with minimum impact in delay.

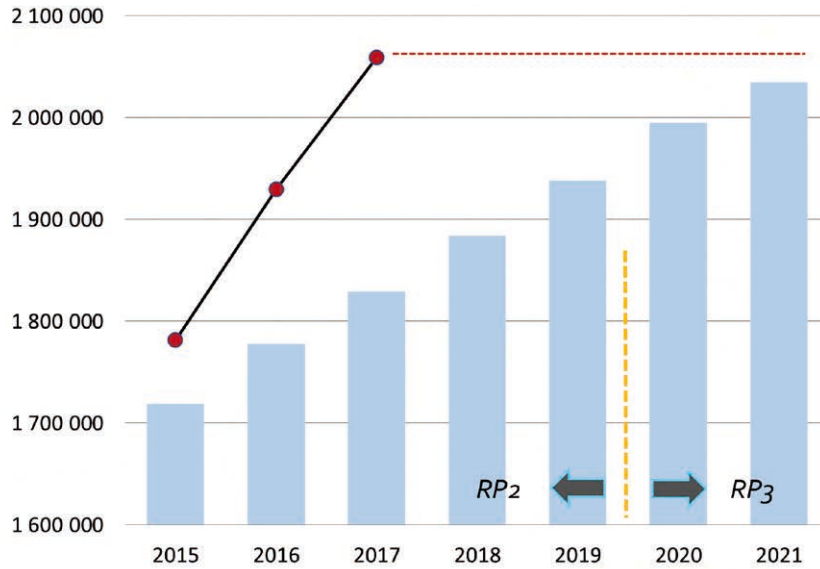
Both ANSPs are looking at long term capacity increasing plans and are committed to reach the performance targets set out for the SW FAB.



«RP2 was a very challenging phase for the SW FAB, with traffic growth well above all expectations as a result of political instability in some classical tourist destinations, which forced traffic to move into the SW Axis area.»

Patricia Ruiz Martino, SW FAB / ENAIRE

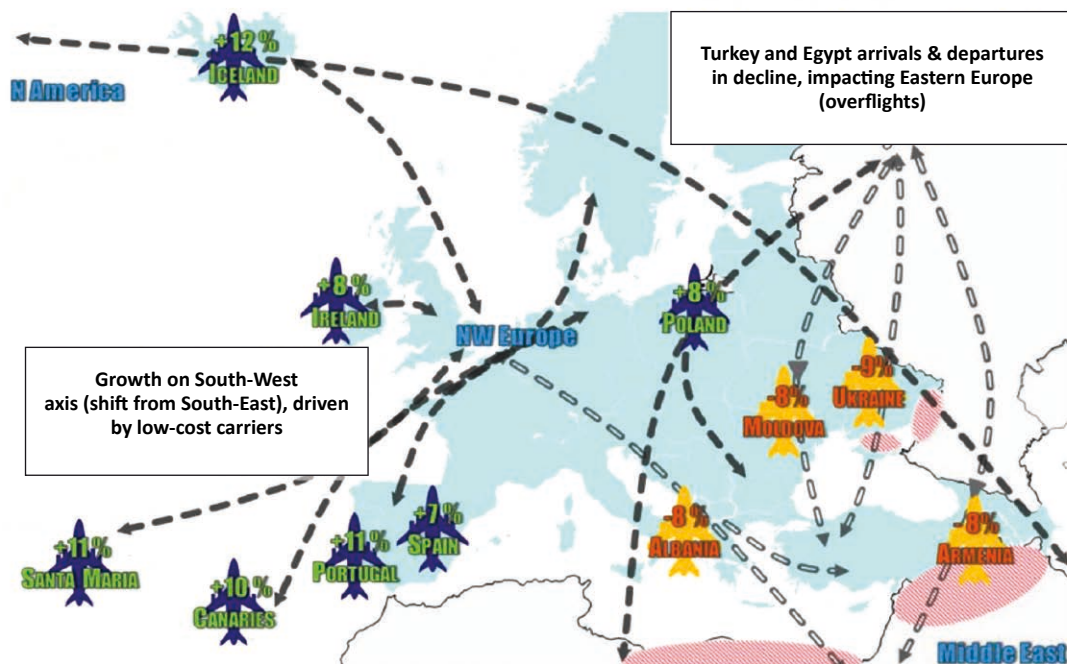
STATFOR VS ACTUAL TRAFFIC IN SW FAB AIRSPACE ALONG RP2



STATFOR seven year flights service units forecast 2015-2021 Feb2015

— STATFOR — SW FAB Traffic

TRAFFIC FLOWS SHIFT FROM NORTH AFRICA AND SE AXIS



Blue Med FAB – A loss of major routes following sanctions and political unrest



In contrast to the steep rise in traffic in SW FAB, Blue Med FAB has lost traffic as a result of conflicts in the Middle East and political unrest in North Africa. The Libyan conflict in 2011 and intervention by the NATO-led coalition closed Libyan airspace to civilian traffic. While east-west traffic was not affected, North-South traffic en route to central and southern Africa rerouted away from the central BlueMed region. Maltese controllers swiftly adjusted to handling military flights by multiple forces, refuelling over the Mediterranean.

Mediterranean traffic declined further following the bombing of Metrojet Flight 9268 over the Sinai Peninsula in 2015, and terrorist attack on tourists at a Tunisian resort in the same year, reducing overflights to and from the region.

In 2017, sanctions imposed by Bahrain, Kuwait, Oman, Saudi Arabia, and UAE on Qatari-registered aircraft resulted in the east-west flights rerouting towards Turkey and northern Italy, completely avoiding Blue Med areas apart from a small part of Italy. The sanctions have had a secondary impact as some non-Qatari registered operators also opted to route the long way round via Turkey for political reasons. Many of these are long route flights using heavy aircraft, so the financial impact is pronounced.

Meanwhile, just as Tunisia started to recover its tourist trade, the Russia-Ukraine conflict caused the air routes normally flown by Russian tourists over Greece, Italy, and Malta to the Mediterranean shifted to the west, contributing to further traffic reduction.

Fortunately, tourism in the central and western Mediterranean continues to flourish, but Malta says this is not sufficient to compensate for the traffic lost.

BLUE MED
Mediterranean FAB

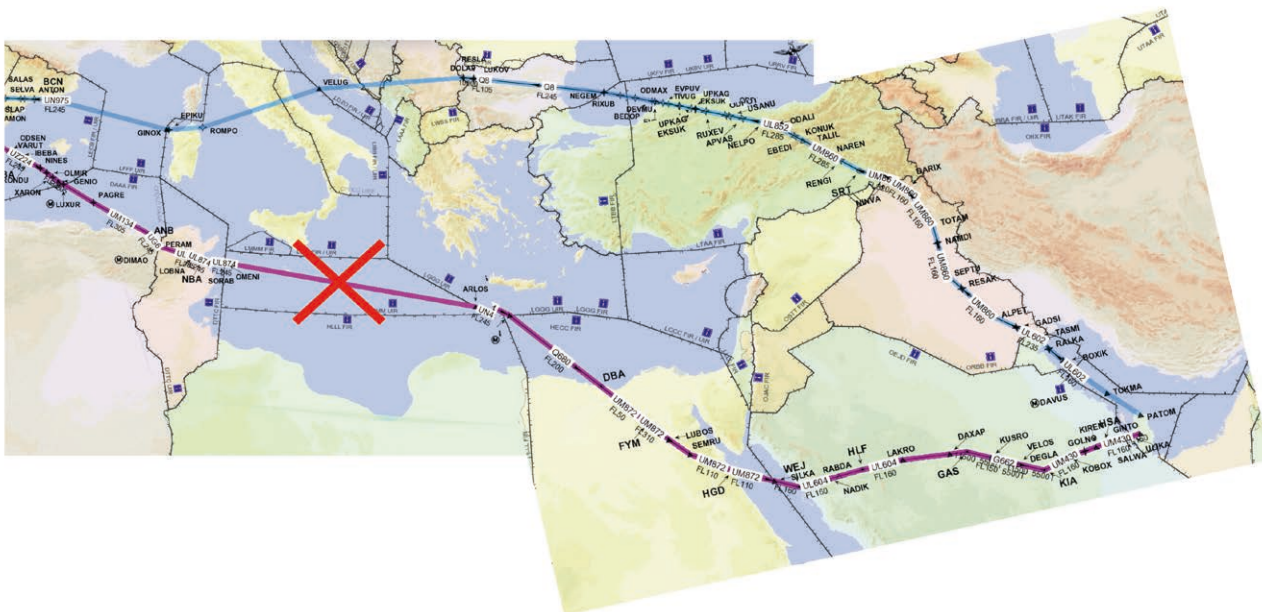
«Three geopolitical crises are affecting Blue Med airspace: The closure of Libyan airspace has led to a massive loss. The sanctions imposed by Kingdom of Saudi Arabia / Bahrain / UAE / Oman on Qatari-registered aircraft led to a huge shift of flights away from the Malta FIR. And traffic circumnavigating the Ukraine has been shifted to the west.»

Joe Degiorgio, BLUE MED FAB / MATS

UKRAINE-RUSSIA SITUATION – SIDE EFFECTS



QATARI SANCTION IMPACT ON MALTA FIR



DANUBE FAB – Sudden traffic hikes following turmoil in the Middle East



The two states that represent DANUBE FAB experienced the largest hike in traffic in 2014 as a result of geopolitical uncertainty in the Crimea as well as military activity in Syria and Iraq. The conflict between Russia and the Ukraine – which saw the downing of MH17 in July 2014 – resulted in ICAO and EASA advising airspace users to avoid overflying Simferopol FIR, causing flights to reroute over Turkey, and increasing traffic over Romania and Bulgaria. The result was a 20% increase in flights through DANUBE FAB almost overnight. Certain sectors experienced as much as 70% increase.

ANSPs BULATSA and ROMATSA took immediate action to meet the surge in demand, as well as drawing up mid-term and long-term capacity improvement plans. New staff rostering schedules were introduced, allocating more controllers to the busiest sectors. Then a review of staffing resources was carried out to determine the number and type of qualifications available. This helped identify which controllers could be retrained, and whether there were opportunities for cross-training. The review also assessed what kind of support was available from administrative staff, or staff on other duties, who had controller licenses and could play a role in the operations room.

Mid-term activities over the following 12 months included re-sectorisation along with re-organisation of the opera-

tions room. BULATSA also increased recruitment of entry level controllers and added new tools to support controllers.

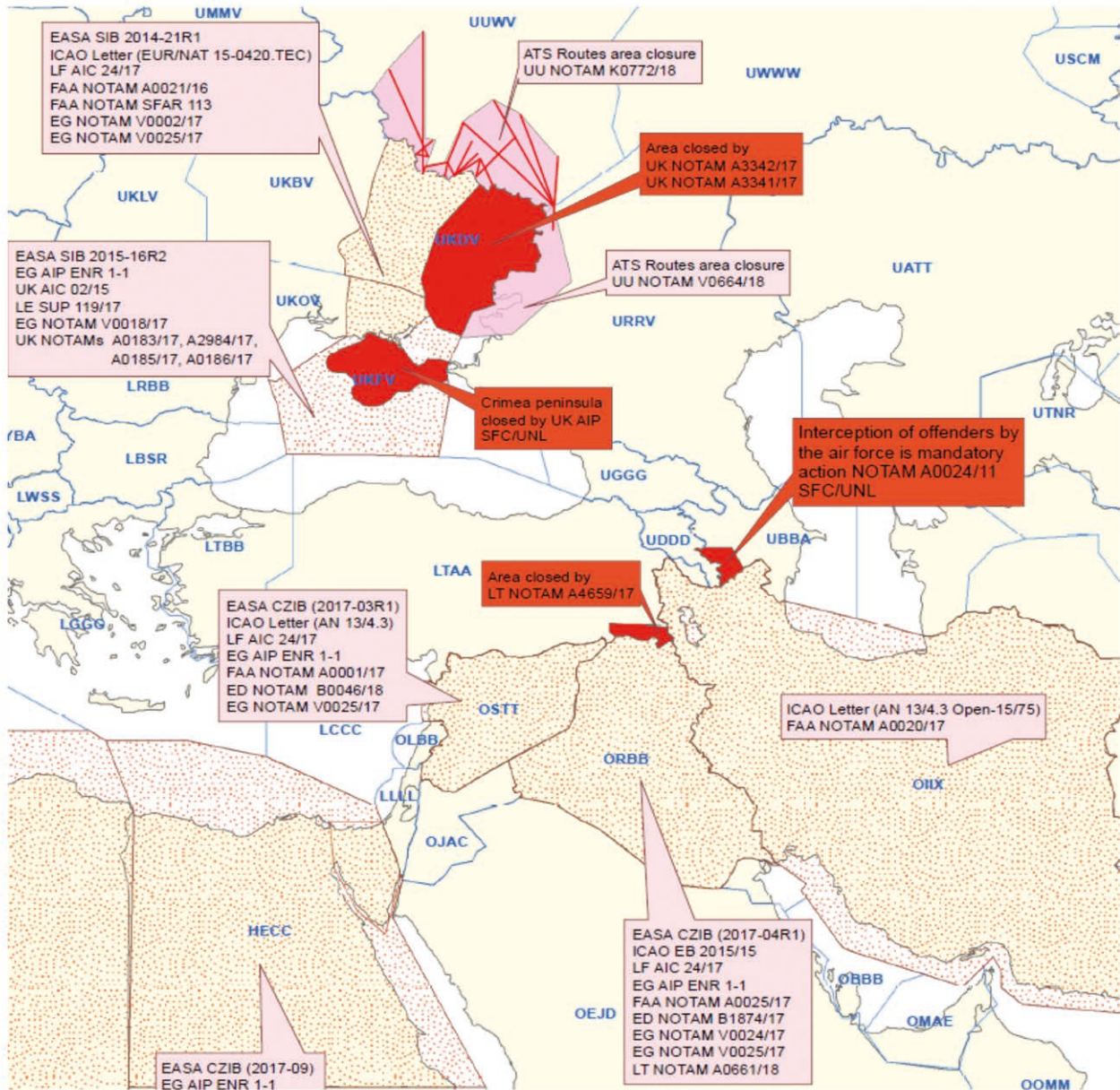
Other measures include a review of airspace design and procedures and extremely close cooperation between neighbouring states of Bulgaria, Romania and Turkey. Improved interfaces over the Black Sea, for example, meant the increased traffic flow became easier to handle, and DANUBE FAB incurred no increase in delays despite the enormous changes in traffic volume



«In 2014, DANUBE FAB had to cope without warning with a traffic increase of more than 20 % due to the closure of Ukraine airspace. To solve the situation a wide range of tactical, short- and midterm measures had to be implemented – ranging from changes in rosters, airspace design, up to new technical equipment.»

Veselin Stoyanov, DANUBE / BULATSA

GEOPLITICS & TRAFFIC



Baltic FAB – The situation in Eastern Ukraine produces surges and troughs

As a result of the downing of MH17 in July 2014, there was a sudden change in traffic flow patterns. Long haul flights that had previously transited Baltic FAB were obliged to follow more southerly routes to avoid the Simferopol airspace.

Poland lost between 100 and 150 flights a day, mainly to Bulgaria, Hungary and Romania. However, the reduction was short lived as political tension between Russia and Turkey saw Russian tourists choosing to holiday in the western – rather than eastern – Mediterranean. This brought increasing numbers of medium and short haul flights into BALTIC FAB airspace following unregulated, seasonal routes. The flights used completely different sectors, flew across only limited areas of the airspace, and demanded more air traffic control services on the part of ANSPs.

Poland experienced about 8% growth in movements, rising up to 20% at peak times, compared to about 3% growth forecast. Not only did the route length change, so did the

time spent in different sectors and MTOW, with a negative impact on revenue.

Moreover, as Poland is a boundary NATO country, PANSAs has experienced a sharp increase in military exercises since 2014. Controllers have only limited opportunity to offer direct routes.



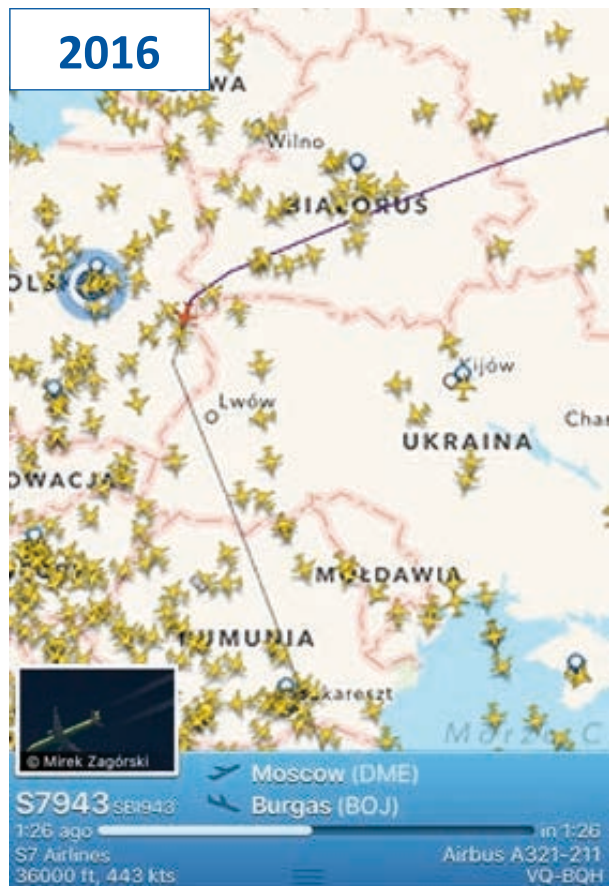
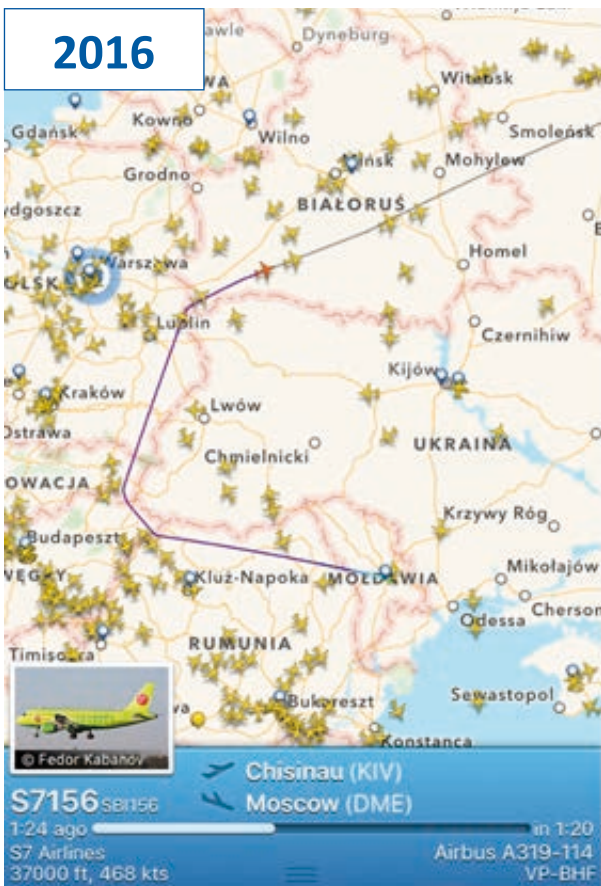
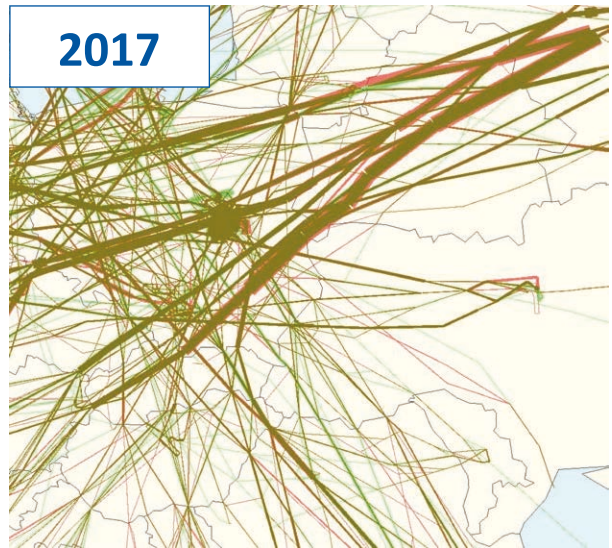
«Baltic FAB is still heavily impacted by the MH 17 case: suddenly, traffic dropped by up to 150 overflights a day, followed by unpredicted new flows in the eastern part of Poland. On top of this, the number of military exercises is increasing strongly.»

Janusz Janiszewski, BALTIC FAB / PANSAs

DIRECTION OF OVERFLYING TRAFFIC - 100/150 LOST OPERATIONS PER DAY AFTER MH17



LENGTH OF OVERFLYING TRAFFIC ROUTES RESTRICTED PART OF THE AIRSPACE
OVER UKRAINE – FLIGHTS FROM MOSCOW (B737, A320) – SUMMER 2014 VS. 2016, 2017



FAB CE – Unexpected weekly variations and unusual weather patterns



FAB Central Europe (FAB CE) also experienced higher than forecast traffic growth in 2017 due to a variety of factors, including a hike in demand as well as rerouting effects following the introduction of Free Route Airspaces. Austro Control experienced a sharp increase after the ANSP made an agreement with the airlines to use STATFOR average forecast figures for capacity planning, rather than the recommended high level forecasts. In both of the last two years Austria experienced much higher traffic than forecast and is now trying to further improve forecasting methods, but this appears to be quite tricky.

The main challenge has been the variation in traffic compared with the forecast average. In September 2017, for example, en route traffic fluctuated from 8,5% below to over 12% above the forecast average at Vienna area control centre, leading to staff planning difficulties. At sector level, the variations were even more dramatic, ranging from 30% below to more than double the traffic predicted. These were record levels of oscillation not previously experienced. Weather in particular has been more variable, with unusual weather patterns not seen before.

There have also been new airline competition factors playing a role in unpredictability. Competition has been intense between carriers in the region, with low-cost carriers competing for a share of the legacy market. Excess capacity has stimulated demand, often with very short lead times. Airline scheduling has become much more short term, with monthly changes in place of seasonal timetables, and this has made capacity

planning much harder. The challenge has been less about providing sufficient capacity, but more about providing capacity in the right place at the right time.

Analysis of long term traffic demand factors shows that every three to four years an unpredicted, disruptive event will suddenly impact demand, introducing uncertainty into forecasting and planning. A period of stagnation will then be followed by steeper growth rates, adding to planning complexity for the infrastructure provider.

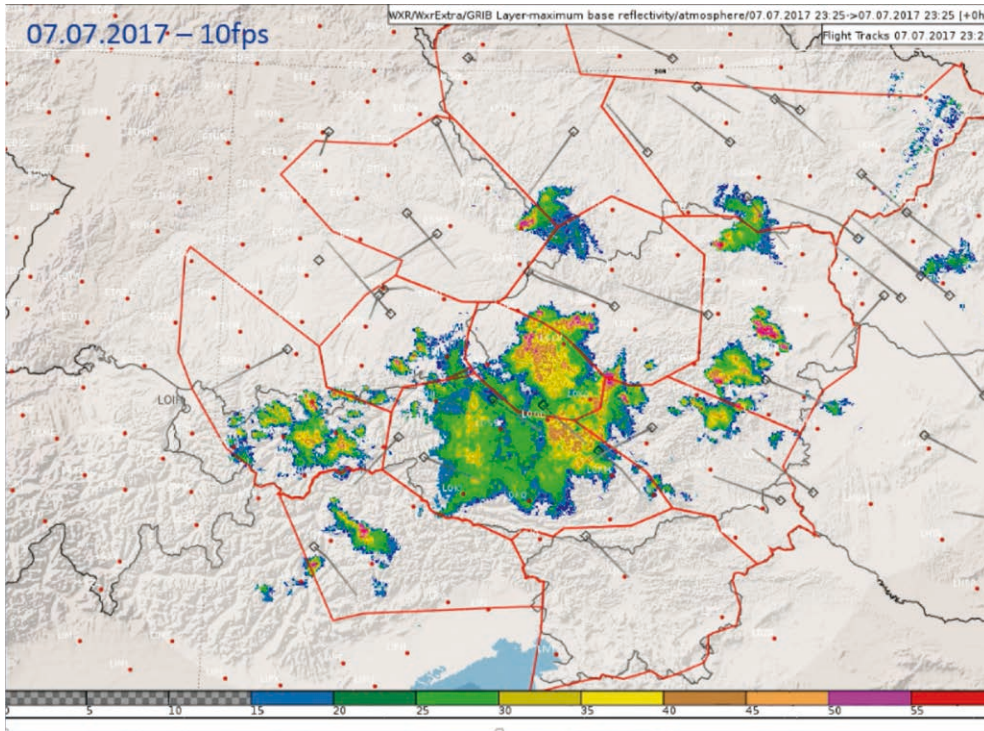
But despite unexpected high levels of traffic, there have been only minimal delay increases within FAB CE and Danube FAB airspace.



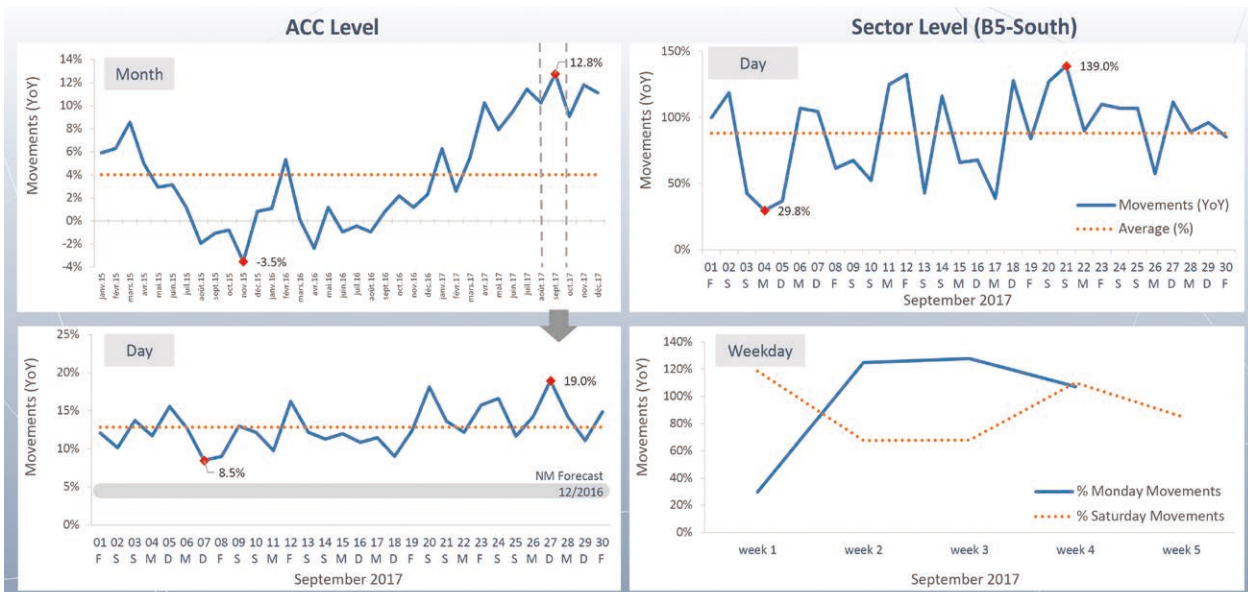
«Traffic is volatile and we have to live with volatility. While there are limits to the ATM system's flexibility, it has proved to be fairly flexible, and FABCE ANSPs have, by and large, delivered capacity way beyond what was forecasted. By contrast, the regulatory system is rather rigid. We should aim for a more dynamic management of the regulatory targets to better reflect the volatile nature of our business.»

Alexander Hanslik, FABCE / Austrocontrol

WXR PICTURES AND FLIGHT-TRACKS



TRAFFIC DEVELOPMENT IS EXTREMELY VOLATILE



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