
NAT TRAFFIC AND FLEET FORECAST

NAT TRAFFIC DEMAND FORECAST METHODOLOGY AND PROJECTION 2017-2037

1. INTRODUCTION

1.1 BACKGROUND ON NORTH ATLANTIC FORECAST

In the past, the NAT traffic forecast was unconstrained and driven by economic variables and forecasts. The results of the unconstrained forecast produced a traffic growth forecast that was unbounded, while most major European airports and a few U.S. international airports have slots or scheduling limits. In addition, the ten different route group forecasts did not provide explicit forecasts for the seven Flight Information Regions (FIR) in the North Atlantic. Also noteworthy, the forecast only had a two-year update cycle and did not capture variations in the business cycles. To address these issues with the NAT traffic forecast, the new forecast methodology recognizes that the number of air carrier operations over the next several years has already been determined by air carrier fleet planning. Any carrier's key strategic activity involves projecting the expected demand for travel in different markets in both the geographical and consumer sense, determining which of those identified markets the carrier will attempt to serve, and what type of aircraft fleet it will use to serve those markets. Air carriers then match the identified markets opportunities to their existing capacity, enter into binding agreements to either acquire the needed aircraft and crew, or enter into contractual agreements through joint ventures with partner airlines. These agreements typically cannot be discharged absent bankruptcy or some other force majeure event.

The previous forecasting methodology relied on economic models of passenger demand, aircraft gauge, load factors, etc. In contrast, this new forecast methodology relies on the decisions already made by the air carriers of how the markets should be served. In addition, most economic forecasting methodologies rely on generic fleet assumptions, which do not reflect the various business models that different carriers may be pursuing. The new methodology reflects airline business models, as they are the foundation for the fleet plans developed by the individual carriers. A key limitation of this approach, however, is how far in advance airlines plan their fleets. Therefore, the projection is segmented at the five-year forecast horizon. Beyond five years, a macroeconomic-based forecast is used. The macroeconomic forecast is a composite of forecasts from different sources including ICAO, Boeing and Airbus, defining low, medium and high growth forecasts beyond the five-year point.

1.2 SUBJECT

The NAT forecast methodology is implemented in two phases:

- Phase 1 – The near-term forecast (first five years) is based on detailed projections for individual carriers, each of which is based on publicly available information about their individual fleet and network plans. Sources include public announcements (press releases and investment community presentations and discussions), official financial statements, and news reports. The current collection of 44 individual carriers includes only scheduled commercial passenger airlines and makes up about 80 percent of the total NAT scheduled traffic. The selected 44 carriers include the largest operators, fastest growing carriers, low-cost carriers (LCC) and other carriers of special interest, like the group of Middle East carriers. The remainder of the traffic is assumed to remain constant and categorized as “other”. In a previous release of the forecast, the total count of specifically analysed carriers was 45. Thompson Air is now excluded because of irregular reporting due to it flying scheduled and unscheduled charter flights. However, Thompson Air scheduled flights are included in the “other” category
- Phase 2 – the long-term forecast uses the end of the near-term forecast as its starting point and uses a macroeconomic forecast to determine low, baseline, and high growth rates. The macroeconomic

forecast is a composite of forecasts from different sources including IATA, ICAO (FESG CAEP), Boeing and Airbus, defining low, medium and high growth forecasts beyond the five-year point.

1.3 PURPOSE

The purpose of this forecast is to help the North Atlantic Air Navigation Service Providers (ANSP) and other stakeholders develop traffic growth expectations for the NAT. This is particularly important for the ANSPs because they use the traffic forecast to set rates or route charges and staffing requirements. In addition, this forecast will help support analysis related to NAT region operational requirements and mandates.

2. METHODS AND ASSUMPTIONS

2.1 SCOPE

Geographic Scope

As described in the Summary of Discussions of the North Atlantic Economic, Financial and Forecast Group Traffic Forecast Workshop (Lisbon, Portugal, 25 February to 26 February 2016), this work currently addresses the forecast requirements for seven of the north Atlantic flight information regions (FIR), Shanwick, Gander, Santa Maria, New York, Reykjavik, Bodo, and Sondrestrom (Figure 1).



Figure 1: North Atlantic Flight Information Regions

Carriers Identified for Individual Analysis

For the purpose of the analysis, the following individual carriers were identified of particular interest:

Table 1: Select airlines for which individual NAT forecasts are developed.

Delta Airlines	Ryan Air	TAP Portugal
United Airlines	Turkish Air	Avianca
American Airlines	Air Berlin	Aeroflot
British Airways	Scandinavian Airlines	Polish Airlines
Icelandair*	Swiss Air	EasyJet
Air Canada*	Thompson	SATA International
Lufthansa	Thomas Cook Airlines	Air India
Air France	Condor	Royal Air Maroc
Virgin Atlantic	Norwegian Air*	Air Greenland
KLM	Alitalia	Qatar Airways
Aer Lingus	Air Europa	Finnair
Air Transat	Jet2	Atlantic Airways
Iberia Airlines	Etihad Air	TAM Airlines
United Emirates	WestJet	jetBlue
WOW Air	Air Caraibes	Southwest Airlines
<p>*Air Canada is combined with Rouge; Icelandair is combined with Air Iceland; Norwegian Air is a combination of Norwegian Air Shuttle and Norwegian Air International ^Thompson Air removed from the list of carriers whose fleet plans were analyzed in detail</p>		

These carriers have been identified as being in one or more of the following categories: Middle East, LCC, fastest growing, large legacy, or are of particular interest to at least one ANSP. To support the NAT forecast, individual NAT forecasts are developed for each of these carriers, which represent more than 80 percent of the total scheduled NAT air traffic. The remaining 20 percent of the scheduled NAT air traffic is made up of flights operated by smaller carriers.

2.2 DATA SOURCES

Scheduled data

To develop a baseline for the analysis, scheduled flight data is acquired from FlightGlobal/INNOVATA for one week in each year. The representative week was selected to be from July 15 to July 21 for 2013 – 2017. The scheduled data is processed through a trajectory model to extract only city-pairs with flights that would traverse through NAT airspace based on a great circle distance flight path. This assures that all flights that flew through the NAT are counted regardless of wind variations and other unpredictable factors. Generating a baseline through this method allows consistency between successive forecasts.

ANSP provided historic data

To determine the traffic within individual FIRs, each of the participating ANSPs have provided actual flown data for air traffic that traversed their particular NAT FIR for the same week the schedule data covered. The following table lists the participating NAT FIRs that are currently included in the forecast and the ANSPs that support them:

Table 2: FIRs and corresponding ANSP

FIR	ANSP
Gander	Nav Canada
New York	FAA
Reykjavik	Isavia
Santa Maria	NAV Portugal
Shanwick	IAA and NATS
Bodo	Avinor
Sondrestrom	Isavia

Eurocontrol also provided flight data for various FIRs, which was extremely useful for crosschecking between data sets. The data sets provided by the ANSPs included the following fields for each of their respective FIRs for the historic data for the representative week for each year including 2013 - 2017:

Table 3: Historic Data Fields

Year: 2013 - 2017	ANSP Name
FIR Name	Flight Call Sign
Carrier three letter ICAO code	Aircraft type (later standardized across reported data sets)
Tail Number	Flight type: Passenger, Cargo, Private
Departure Date (Z)	Departure time (Z)
Departure Airport	Departure Country
Arrival Airport	Arrival Country
Arrival Date (Z)	Arrival Time (Z)
Carrier Name	

Flight data was not specifically provided for Sondrestrom FIR, however, scheduled flights were identified as flying through the FIR by computing the great circle distance of city-pairs.

Fleet Data

Fleet data and fleet plan information was collected from various public sources, including individual carrier web sites, financial reports, manufacturer order books, and crowd source websites like planespotters.net

Forecasts for Categories of Special Interest

The FAA commissioned two separate studies to support forecasts for two categories of carriers of special interest. The two categories are LCCs that are flying or are expected to begin flying transatlantic operations, and the Middle East carriers. For each of these two cases, GRA Incorporated, a strategic and economic consulting firm with expertise in the global aviation industry, provided a comprehensive analysis. Their forecasts are incorporated in this work and a copy of their work is attached as a separate file.

2.3 KEY ASSUMPTIONS

The forecast is based on a few key assumptions. First, this methodology assumes that airline fleet plans are relatively fixed for the near future, out to approximately five years. This assumption is based on the observation that airlines are bound by contractual obligations from which they can be released only under special circumstances, like bankruptcy or by mutual agreement with the other parties. These contracts include aircraft purchase and lease agreements, and capacity purchase agreements with regional carriers. There are both upside and downside risks to this assumption. On the downside, carriers may reject these agreements in bankruptcy, as has happened with most of the major U.S. carriers in the past decade. On the upside, carriers have the ability to opportunistically acquire aircraft when demand warrants. In practice, relatively few aircraft have been removed during the industry's recent bankruptcies, while the upside risk

often involves transferring assets between carriers, rather than adding new aircraft to the system. (The transfer of Boeing 717s from Southwest to Delta is an example of the latter effect [Mutzabaugh, 2013b].)

A second key assumption is that the mission profile for a particular aircraft type does not change over time. For example, in 2015 Air France's 747s had an average stage length of 7,000 kilometres and utilization of 12 departures per week. The forecast methodology assumes that the mission profile of a particular aircraft type will continue to be the same through the next five years. In general, all aircraft in the forecast are considered to be trans-oceanic capable; however, some aircraft types have shorter ranges than others. For example, the single aisle aircraft, such as the A321 neo, generally have relatively shorter range than the twin aisle aircraft. Therefore, the single aisle aircraft are expected to be deployed on routes that connect points relatively near the coastline on opposite sides of the Atlantic, while the longer-range capable aircraft do not have this restriction. A related assumption is that if a new aircraft type is added to a carrier's fleet, this type will have a similar mission profile as comparable existing aircraft, unless the carrier specifies a strategic purpose for the new aircraft type. For example, Delta's new A350-900s are assumed to have approximately the same mission profile as the 777s which Delta has had in its fleet for many previous years.

A third assumption is that the forecast beyond five years is not dependent on a detailed fleet forecast. The fleet assumptions apply primarily to the first five years of the forecast. Because carrier fleet plans become far less firm beyond the first five years, a higher-level macroeconomic approach is used for year six and beyond.

3. METHODOLOGY FOR NEAR-TERM NAT FORECAST

Once the carriers' fleet plans are determined for the select set of carriers, the mission profiles for each aircraft type are used to calculate the number of weekly transatlantic flights that are planned for the each aircraft in that fleet. In this analysis, we call the weekly transatlantic flight count the carrier's utilization rate for that fleet type. The utilization rate tells how many times a single aircraft of this fleet type for a particular carrier will fly a transatlantic mission. The purpose of the utilization rate is to recognize that carriers can assign aircraft to multiple missions, and count only the operations that traverse the North Atlantic. The utilization rates are based on each carrier's historic operational trends as determined by matching fleet data with the published flight schedules.

The utilization rates are applied to the carrier future fleet plans to project the total number of North Atlantic operations for each carrier. If additional carrier specific information is available, the utilization rates can be manually adjusted to better reflect those strategic plans (e.g., if a carrier announces a new strategy for its current or future fleet). This provides a standardized way to project North Atlantic activity for each carrier by fleet. The product of the fleet counts and utilization rates gives the total number of flights.

Once the total number of NAT flights for each carrier is determined, the next step is to distribute them among the carrier's NAT network. This is done manually by first selecting the top 25 city-pairs operated by each NAT carrier. The remaining city-pairs are grouped into the "Other" category. This approach focuses on the routes responsible for most of the traffic in the NAT. New routes, not yet in operation, are also added for select carriers such as Norwegian Air whose trans-Atlantic operations are anticipated to grow. Through the use of historical trend analysis and information from public announcements by the carriers, flights are added (or removed) to (from) the baseline year as a total number of flights or a percentage of the base year. A process flow of the methodology is shown in Figure 2.

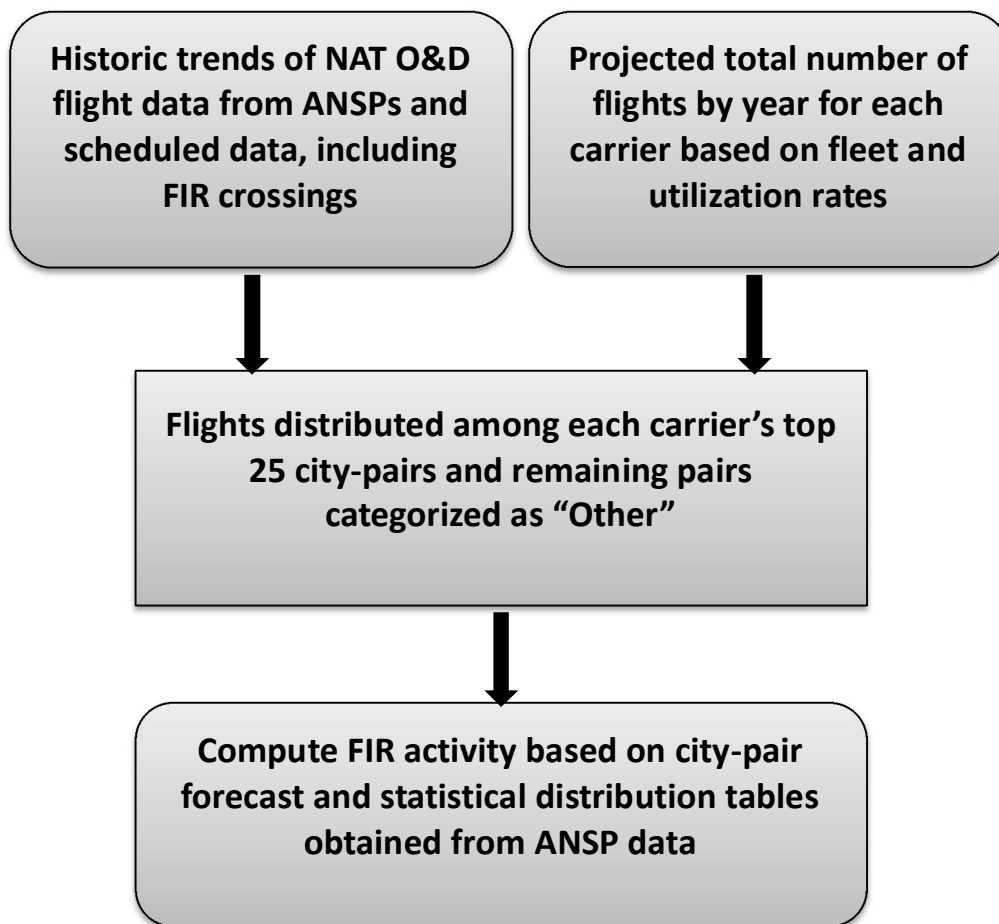


Figure 2: NAT Near-Term Forecast Process Diagram

To complete the near-term forecast, the baseline level of activity for all other carriers is added to the projection for the select set of carriers developed using the fleet and market analysis described above. These flights make up the remaining 20 percent of the total number of scheduled NAT flights. If a particular carrier in this group becomes of interest, it can be removed from the general group and incorporated into the group of carriers with individual forecast without disrupting the continuity of successive forecasts. Unscheduled flights are not included because their irregularity would introduce an increased level of uncertainty to the forecast. Such irregular flights include helicopters, charter flights, cargo, and military flights. We recognize cargo is an important part of NAT activity but primarily in terms of tonnage because total cargo flights do not contribute significantly to overall NAT traffic.

4. NEAR-TERM FORECAST RESULTS

1. The final forecast results show 20.9 percent growth in the number of NAT flights between 2017 and 2022. Table 4 below shows the baseline data for 2017 according to published schedules with the projected number of flights for 2022. The far right column is the carrier's rank based on the number of flights added to the system.

Table 4: Preliminary NAT Five-Year Forecast by Carrier

Row #	Carrier Name	Carrier	HISTORICAL					FORECAST					Rank Order by Growth
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
1	Delta Airlines	DAL	1,081	1,079	1,160	1,192	1,222	1,231	1,272	1,333	1,368	1,393	4
2	United Airlines	UAL	1,060	1,073	1,126	1,124	1,092	1,093	1,095	1,122	1,160	1,225	6
3	American Airlines	AAL	882	940	924	910	910	921	930	940	957	1,017	8
4	British Airways	BAW	842	880	870	878	880	918	919	917	917	930	18
5	Icelandair	ICE	452	522	582	734	780	852	888	936	960	972	2
6	Air Canada	ACA	436	479	554	648	696	753	741	742	730	732	23
7	Lufthansa	DLH	597	604	608	630	635	626	657	647	656	656	30
8	Air France	AFR	534	540	540	544	554	575	611	625	660	660	9
9	WOW Air	WOW	0	108	146	234	368	416	509	533	556	556	3
10	Virgin Atlantic	VIR	304	306	366	368	364	396	418	445	454	454	10
11	KLM	KLM	308	320	326	336	344	361	395	427	433	433	11
12	Aer Lingus	FIN	198	234	268	295	334	398	372	379	379	379	21
13	Air Transat	TSC	272	271	270	276	290	312	312	312	312	312	29
14	Iberia Airlines	IBE	216	232	252	271	282	283	317	317	366	365	13
15	Ryan Air	RJR	170	214	214	226	274	231	237	272	355	355	14
16	Norwegian Air	NAX	18	92	100	134	268	381	511	662	792	962	1
17	United Emirates	UAE	120	155	208	254	228	240	263	309	352	352	7
18	Air Berlin	BER	132	134	140	178	208	0	0	0	0	0	44
19	Turkish Air	THY	106	130	146	198	188	191	191	191	191	191	37
20	Scandinavian Airlines	SAS	118	126	142	176	188	190	195	179	184	181	43
21	Thomas Cook Airlines	TCX	76	80	95	153	167	167	167	167	167	167	39
22	Swiss Air	SWR	148	150	162	176	162	178	177	176	176	176	32
23	Condor	CFG	108	116	132	138	160	160	160	160	160	160	39
24	Alitalia	AZA	132	122	126	132	144	144	144	144	144	144	39
25	Air Europa	AEA	94	94	104	118	142	150	166	166	228	228	12
26	Jet2	EXS	50	80	78	104	114	121	146	155	164	174	16
27	Etihad Air	ETD	48	76	96	102	106	83	102	121	154	154	19
28	Air Caraibes	FWI	64	62	64	76	90	90	90	120	120	120	24
29	WestJet	WJA	0	14	28	84	84	82	118	138	167	226	5
30	Avianca	AVA	50	54	70	70	84	101	109	118	134	134	17
31	TAP Portugal	TAP	42	58	50	72	82	81	96	101	111	111	26
32	Aeroflot	AFL	74	72	62	66	82	84	94	100	110	110	27
33	Polish Airlines	LOT	60	60	60	64	78	90	94	122	150	150	15
34	SATA International	RZO	44	52	48	50	67	67	77	82	97	97	24
35	EasyJet	EZY	36	46	66	64	62	62	80	96	109	109	20
37	Air India	AIC	42	42	42	42	51	57	69	69	71	71	31
36	Royal Air Maroc	RAM	26	38	32	40	48	48	56	64	68	76	27
38	Finnair	FIN	28	20	26	30	40	48	49	52	52	52	34
39	Air Greenland	GRL	34	32	28	32	36	39	39	39	39	39	38
40	Qatar Airways	QTR	74	110	118	30	34	34	34	67	75	79	22
41	Atlantic Airways	FUJ	12	18	16	24	24	24	24	24	24	24	39
42	TAM Airlines	TAM	20	18	14	14	18	21	26	27	28	28	35
43	Southwest Airlines	SWA	0	0	0	0	0	0	0	0	13	13	33
44	jetBlue	JBU	0	0	0	0	0	0	0	0	6	6	36
45	Scheduled Others	Oth	1,278	1,159	1,104	1,395	1,540	1,567	1,567	1,567	1,567	1,567	
Total			10,386	11,012	11,563	12,682	13,520	13,866	14,515	15,162	15,916	16,341	
Yr-Yr %Change				6.0%	5.0%	9.7%	6.6%	2.6%	4.7%	4.5%	5.0%	2.7%	
5-Year %Change			20.9% Total 5-Yr Growth										
5-year Yr-Yr %Change			3.9% Avg Yr-Yr Growth										

Figure 3 shows FIR peak-week traffic trends by FIR. Traffic volumes at Gander and Shanwick are at similarly high levels compared to the traffic volumes at the other FIRs. This is intuitively consistent, since some of the highest frequency NAT markets pass through these two FIRs, including most of the traffic between North America and Western Europe, including the highest frequency market John F. Kennedy Airport (JFK)-London Heathrow (LHR).

Note that the total forecast for the NAT does not equal to the sum of the forecasts of each the individual FIRs. Because of the way the North Atlantic is partitioned into FIRs, most NAT flights traverse more than a single FIR. Summing the flights from all FIRs would result in counting single flights more than once. The total NAT forecast is determined by summing the market-level forecasts for each year.

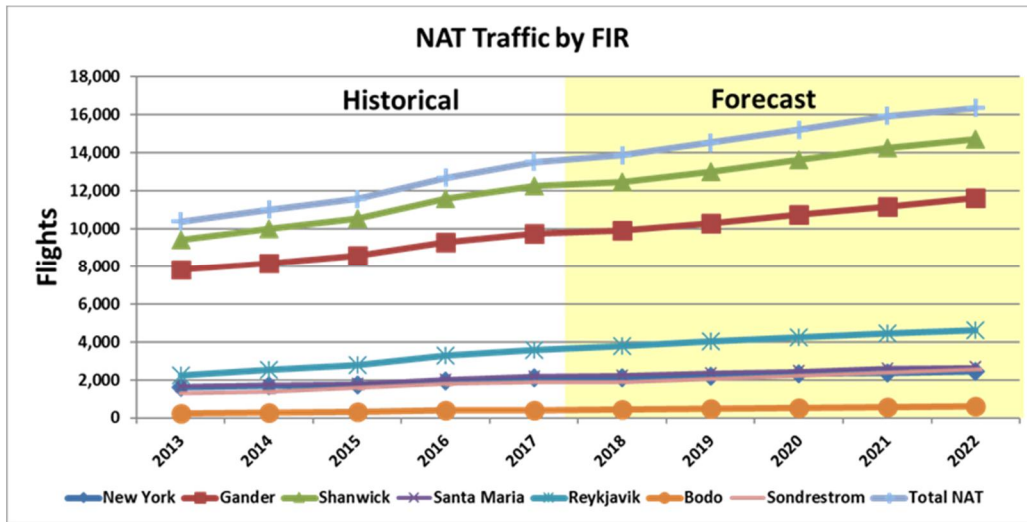


Figure 3: NAT Peak Week Traffic Trends by FIR

Table 5: Preliminary NAT Five-Year Forecast by Carrier and FIR

Average Yearly Growth Rates by FIR		
FIR	2013 – 2017 (actual growth rate)	5-Yr Projected
New York	7.1%	2.9%
Gander	5.6%	3.6%
Shanwick	6.8%	3.7%
Santa Maria	7.6%	3.9%
Reykjavik	12.4%	5.1%
Bodo	13.4%	7.4%
Sondrestrom	9.9%	6.2%
Total NAT	6.8%	3.9%

Table 5 lists the annual historic growth rate from 2013 to 2017 along with the five-year (2017-2022) average annual forecast growth rates. The growth rates in the forecast are supported by the publicly accessible fleet information for 44 identified carriers. Note that while the percentage growth rates for Shanwick and Gander are lower than for some other NAT FIRs, Shanwick and Gander total traffic is by far larger than the other FIRs. The percentage growth rates for Reykjavik, Bodo, and Sondrestrom are higher, although over a lower base.

More detailed and complete forecast results are posted at ICAO’s secure portal (<https://portal.icao.int/NATEFFG>).

5. METHODOLOGY FOR LONG-TERM NAT FORECAST

Once the near-term forecast is established, the long-term forecast (beyond the first 5 years) is based on the long-term forecast beyond 2022 is expected to be in the range of 1.94 percent to 3.3 percent, consistent with the combined passenger traffic growth rate forecast from an updated IATA forecast, a 2017 ICAO working paper, Airbus forecast, and Boeing forecast.

Since there is less certainty in the long-term forecast, the long-term forecast is not expanded to the detailed market and carrier levels as in the near-term forecast. Instead, the long-term forecast growth rates are applied to the end points of the aggregate traffic numbers at the FIR level to determine the FIR long-term growth projections beyond the short-term forecast.

Table 6: Long-term North Atlantic Passenger Growth Forecasts (*Assembly 39th session-economic commission working paper)

Sources	CAGR from 2017 to 2036	CAGR from 2012 to 2032	CAGR from 2012 to 2042	CAGR from 2022 to 2036
IATA				1.94%
Boeing	2.9%			
Airbus	2.9%			
ICAO High*		3.3%	3.3%	
ICAO Central*		3.1%	2.9%	
ICAO Low*		2.8%	2.7%	

Table 7: Summary of North Atlantic Passenger Growth Forecasts

Summary of Long-Range (2022-2037) North Atlantic Passenger Growth Forecast	
High	3.30%
Central	2.90%
Low	1.94%

Tables 6 and 7 provide long-term passenger growth forecasts. Table 6 shows specific forecasts by source and their respective forecast periods. Table 7 summarizes the results from Table 6 to provide High, Central and Low growth rate forecasts, which correspond to the maximum, median, and minimum growth rates presented in Table 6, respectively.

The forecasts in Table 6 do not all reference the same base year, nor do they all reference the same end-point to define their growth forecasts; however, since these forecasts project far into the future (referencing 2010 to 2020 as a starting point and 2030 to 2035 as the end-point), we consider these growth rates to be comparable.

The long-term forecast branches into high, central and low forecasts from the end of the near-term forecast, based on the high, central and low forecasts shown in the long-range growth summary table. The long-range forecast is presented as a range to reflect the increased uncertainty of the forecast as it looks farther into the future. In addition, because the fleet plans beyond five years are less developed, it is reasonable to treat passenger and flight count growth rates interchangeably.

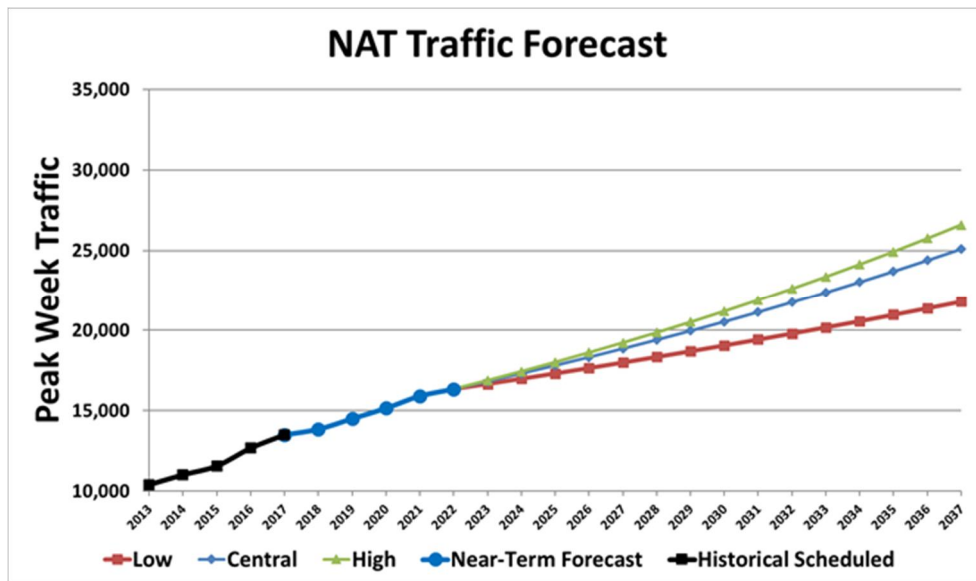


Figure 4: NAT Peak Week Traffic Forecast

When the near-term forecast is combined with the long-term forecast as shown in Figure 4, the average annual growth rate for the entire period ranges from 2.4 percent at the low end, 3.4 percent at the high end and forecast 3.1 percent as the central forecast.

7. CONCLUSIONS

7.1 Near-Term Forecast

Total NAT operations are expected to grow at an average annual rate of 3.9 percent between 2017 and 2022.

Gander and Shanwick, the busiest FIRs, are expected to continue to grow at a rate of 3.6 percent and 3.7 percent annually. These FIRs manage the heavily travelled North Atlantic Organised Track System (NAT-OTS) between North America and Europe. Shanwick has slightly higher activity than Gander due to more intra-FIR traffic with flights between the UK, Iceland, and the rest of Europe.

Traffic through the New York FIR is expected to grow 2.9 percent due to aggressive growth plans from the Middle East carriers, as well as Norwegian Air, Air Europa, and jetBlue. Note that while the percentage growth rate in this region appears to be high, it is being applied to a relatively small base.

Santa Maria will also see a significant growth of 3.9% primarily due to Air Europa which has a large order book for Boeing 788s and 789s. The higher percentage growth rate is being applied to a relatively small base.

Reykjavik is expected to grow significantly at a rate of 5.1% due to Icelandair, Norwegian Air, and WOW. Bodo is expected to grow by 7.4% which is primarily driven by these same three carriers.

Finally, Sondrestrom is expected to grow by 6.2% which is primarily driven by Russian carrier Aeroflot, Westjet, WOW, and Icelandair.

LCCs such as Westjet, WOW, Norwegian Air, and Air Canada's Rouge will add significant growth in the North Atlantic.

Large order books by Middle East carriers Etihad, Qatar, Emirates, and Turkish Air will contribute to FIR traffic growth.

NAT traffic volumes by legacy carriers such as American, Delta, Air France, and British Airways are expected to remain relatively stable.

7.2 Long-Term Forecast

The long-term forecast, which provides a range of expected growth rates for the NAT beyond 2022, is appended to the near-term forecast. The long-term average annual growth rate forecast ranges from 1.94 percent to 3.3 percent, with 2.9 percent as the central forecast. Combining the near-term forecast with the long-term forecast, the average annual growth rate for the entire period ranges from 2.4 percent at the low end, 3.4 percent at the high end. The central forecast projects a 3.1 percent average annual air traffic growth rate in the NAT for 2017 to 2037.

8. CURRENT ISSUES AND RISKS TO FORECAST

Delivery and Retirements Assumptions

While the current forecast may seem aggressive relative to the historical trends, it is a reflection of the aircraft delivery and retirement assumptions. These assumptions may be too optimistic or not aggressive enough, respectively, particularly for year five (2022). This forecast effort will continue reviewing aircraft delivery orders and expected retirements.

Structural Changes

Structural changes can cause significant changes in trends over time. Middle East carriers and LCCs are anticipated to grow aggressively. In addition, fuel price volatility can significantly affect carriers' plans and strategies. Carriers may also go out of business such as Air Berlin, which has already ended operations past 2018, and Alitalia may possibly be next.

Middle East Carriers

Middle East carriers have a very large order book but the identity of new markets is not certain. A conservative estimate of future operations is projected although the Middle East carrier order books indicate potential for greater growth.

Legacy Carriers

Current market level forecast method allows only aircraft that already serve a market to continue to serve it in the future. Legacy carrier aircraft are not assigned new markets because we don't have information on where specific aircraft will be deployed in the future.

Forecast Differences among Carriers

The legacy carrier forecast is a top-down forecast such that we use the total fleet forecast to determine how much traffic will fall into each of the FIRs and O/D routes. For the legacy carriers, growth of current markets is based on their future fleet inventory and their current ratios of utilization. However, an in-depth analysis was performed to identify new markets for the Middle East carriers and the LCCs.

9. FUTURE WORK

Future work on this project includes:

- Continually reviewing and refining the fleet forecast. Deliveries of new aircraft are continuing to refine the market-level forecasts
- Updating the forecast semi-annually

This forecast will continue to be updated and refined. Forecast updates are planned to be released semi-annually.

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