NAT 2030 Vision WKS – IP/XX
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International Civil Aviation Organization

INFORMATION PAPER

Update of NAT Operations from the Dispatch Perspective

(Presented by the International Federation of Airline Flight Dispatchers- IFALDA)

EXECUTIVE SUMMARY

The principles of Flight Planning in the North Atlantic (NAT) region are contained in ICAO Doc 007, The North Atlantic Operations and Airspace Manual. The fundamental guidelines have changed little over the years. The operational landscape over the NAT has however changed significantly over the last 20 years. With about 1,500 daily flights and the introduction of a diverse array of city-pairs, times of operation, aircraft models and performance capabilities, the NAT is currently the busiest oceanic airspace in the world today.

This changing dynamic is both a challenge and an opportunity for NAT operations. IFALDA in its role of representing the professional and licensing requirements of a large body of Flight Dispatchers for safe and efficient Flight Planning, Dispatch and the exercise of Operational Control offers itself as a willing partner in the planning and implementation program towards building a successful Vision 2030.

1. INTRODUCTION

1.1 The International Federation of Airline Dispatchers Associations (IFALDA), formed in 1961, is a global professional Standards, non-labour association. We represent the professional and technical roles and responsibilities of dispatchers and flight operations officers worldwide. IFALDA is recognized by ICAO as an International Organization representing Flight Operations Officers and Flight Dispatchers worldwide; and, as an industry stakeholder, carries wide expertise and interest in contributing to the development and promulgation of ICAO Provisions for Standards, Procedures and Guidance. Where reference is made to Flight Dispatchers (Dispatchers) and Flight Operations Officers (FOOs) in ICAO documents, the terms are functionally identical and used interchangeably. The term “those engaged in the control and supervision of flights” refers to individuals designated by the operator to serve in a similar functional capacity to Dispatchers and FOOs, whether licensed or not, in the exercise of operational control in those States not requiring dispatch systems. Appendix A refers.

1.2 The principles of Flight Planning in the North Atlantic (NAT) region are contained in *ICAO Doc 007 The North Atlantic Operations and Airspace Manual*. The fundamental guidelines have changed little over the years. The operational landscape over the NAT however has changed significantly over the last 20 years. With about 1,500 daily flights, the NAT is currently the busiest oceanic airspace in the world today. The near-term annual traffic growth (2016-2021) is projected for a 5,3%[1] traffic growth

[1] ICAO NAT EFG- April2017

characterized by a rapid increase in LCCs operations, large wide-body orders by Middle East carriers and long-range & performance capabilities of newer aircraft (B737-MAX, A321-LR, B787 etc.). Appendix B refers. Scheduled airlines also expect significant increases in aircraft orders for aircraft (A350, A339, B787, B777) [2]. Technological airborne navigational, communications and surveillance capabilities have also improved; given significant investments by airlines in aircraft based avionics which in turn provides major opportunities for more efficient and optimized strategic planned route trajectories. Likewise, ANSPs have invested significantly in upgrading ground ATM systems and space-based Surveillance (ADS-B) and Communication (Satcom) capabilities. Commercially, the region is particularly important for its yield and revenue potential, with the NAT representing up to 25% [3] of an airline's profit base. It is also noteworthy that ICAO has also declared that *"unmanaged air traffic growth can also lead to increased safety risks in those circumstances when it outpaces the regulatory and infrastructure developments needed to support it."* [4]

1.3 States and ANSPs around the world are faced with a challenge from Airspace users, mainly airlines their primary customers. They expect improved service by way of higher tracking intervals, direct routings, optimum cruising levels & speeds and fewer flight delays. With volatility in fuel prices and carbon emission costs, they also expect fuel savings through the most optimal choice of advanced ANSP technology and solution investments. At the same time they also expect reduced ATC charges.

1.4 The ICAO Global Air Navigation Plan - Doc. 9750 offers several ASBU planning modules that would support the 2030 NAT Vision- i.e. B0-FRTO (free route operations), B0-NOPS (Network Operations), B0-TBO (Trajectory-based operations). The region offers many operational, technical and capacity building opportunities that must be seized and can be best achieved by means of a long term planning strategy as envisioned under terms of this Workshop.

2. **DISCUSSION**

2.1 It is IFALDA's view that many opportunities can be characterized in the main by optimum airspace utilization by means of rational structure of airspace to build the daily organized track system (OTS) leaving the remainder of this premium airspace for trajectories modelled on user-preferred routes (UPRs). Elsewhere, within the transition area that connects the North American seaboard with the oceanic portions over the NAT, a fixed arc transition structure known as the North American Route Program (NAR) for eastbound routes could make way for 'directs' owing to the augmented surveillance capability now available in this complex area. There are also several opportunities in context of tactical flow management planning that could leverage capabilities using Collaborative Decision Making (CDM) principles under ICAO Doc. 9971.The Collaborative Decision-Making Process described in Doc.007 refers to the Preferred Route Message (PRM) process which has been used for decades. The fact that Minimum Time Tracks are referred to suggests that a different approach is needed. Although well-intentioned, resources and value in the CDM process have been developed in the past, [5] they have never been used effectively. Considered in context of benefits from system efficiencies, a recent airline-sponsored empirical study indicated that a 1-minute flight time savings per day can be equated to USD$ 39,7 million per year in fuel costs and 170,535 tonnes/CO_2 in emissions reduction savings. Appendix C refers.

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2 Air Canada fleet size operations across the NAT has increased from 434 weekly flights, forecast for 732 weekly flights in 2021.
3 OAG source
4 Pg.6 Executive Summary ICAO Doc. 9750 GANP Ed.5, 2016-2030
5 CDM Portal hosted by the NAV CANADA- Traffic Density Analyzer- TDA

2.2 When designing the OTS 50 years ago the core traffic was between major city pairs in Western Europe and NE North America with LHR-JFK-LHR being the busiest city pair. Today LHR-JFK-LHR remains the busiest city pair, however, everything else has changed except the way the OTS is designed and managed. A recent one-week traffic sample shows over 340 operators operating 56 different aircraft types. Airlines have invested billions in flight planning technology and new generation aircraft and avionics that has in turn opened a myriad of new market opportunities. Legacy processes to determine the OTS do not meet today's airline business requirements.

2.3 Due to the limitations of ANSP tools, the legacy PRM process and an ineffective CDM process, today's NAT OTS is rarely an optimal solution. This combined with the inherent limitations in the way the NAT traffic is managed on the ocean and its interfaces (e.g. fixed Mach technique, few step climbs, split track scenarios that restrict thousands of miles of airspace and the requirement to use fixed NARs) contribute to the increased costs of flying the NAT. ANSPs don't have all the tools or resources to perform post operational data analysis to assess whether the OTS was in the "right" place in all 4 dimensions. The information that resides in ANSP data warehouses lies dormant with no process to learn from the previous day's operation.

2.4 When planning an OTS today it is critical to understand the city-pair flows, core route trajectory demands and their timings. This will generate 'bottom-up' 4D flow-based traffic forecasts for high-density traffic periods. Furthermore, there is a need to have accurate aeronautical data and aircraft performance models.to create the single '4D Trajectory of truth' that can be shared among all NAT ANSPs during the OTS design exercise. CORSIA will contribute to increasing airline costs and differing commercial priorities. In effect, the lack of a collaborative data driven approach will, to a significant degree also contribute to airlines having difficulty to meet CORSIA mandated performance.

2.5 Modern analytical tools make it relatively easy to support planning decisions based on rule-based scenarios. ANSPs need to be able to translate direct demand/capacity balancing and traffic forecast scenarios to evaluate 'choke-points' at domestic interfaces to/from system airports. Controller availability/licensing/sector specialty could often be a limiting factor in "offloading" OTS traffic – hence skewing the optimum placement of the core tracks. This planning exercise could be used to forewarn against tactical staffing constraints.

2.6 Although the development of new process and tools will take time it can be seen daily that some lower flight levels are rarely used, the removal of these flight levels from the OTS would provide a greater number of random flights. The introduction of 5 degrees of longitude reporting instead of the current 10 degrees would provide additional flexibility. Why is there a need for OTS, or even procedural separation, in the NAV CANADA/Greenland/Iceland ADS-B corridor, where surveillance-based separation should be provided?

2.7 The Nav Canada TDA and any other available CDM tools should be augmented to support day of flight oceanic & domestic effective capacity and resource planning for airline use based on pre-agreed KPIs and therefore avoid bottlenecks before they occur. An improved user interface would allow for all stakeholders to take joint decisions and mitigate OTS overloads and avoid additional tracks where they are not required.

2.8 In the airline world today, no longer are there conclusions drawn from anecdotal opinions. Rather it's intelligence from data that drives business decisions. NAT airspace has always been the busiest oceanic airspace in the world and taken a leadership role when it comes to global ATM initiatives. Now is the time to take the next step with that leadership and embrace the new world of using "big data" and the efficiency and safety benefits that will come with it. Data is available, cloud computing provides access to tools anywhere in the world. What if one entity was responsible for designing the NAT OTS, the PACOTS and the AUSOTS? It may seem unlikely but in IFALDA's view it's entirely feasible

3. CONCLUSION

3.1 IFALDA fully agrees that direct (one-on-one) airline and State/ANSP collaboration in the NAT region in recent years has bought about increased awareness for the need of efficiencies and its benefits. However, efficiencies are being quickly eroded with outdated process and the lack of data driven solutions and predictive analytics available to all NAT stakeholders. Further efficiency can be achieved by including Dispatcher-related flight planning aspects into the core planning elements under the NAT 2030 vision goals. The NAT working under a one system approach involving SPG leadership and multi-disciplinary inputs from all stakeholders would be the key driver in this process.

3.2 Such activities would ideally be formalized through a collaborative process sponsored by the NAT SPG and supported by strategic guidance from the members of the NAT IMG with technical and regional contributions from the ANSPs under the auspices of the Procedures & Operations Group (POG).

3.3 To support the paradigm shift in collaboration a centralized data warehouse is required where business analytics for pre-flight and post flight study becomes the new planning norm. Fundamental in the development will be the modelling capabilities using dynamic flight parameters such as individual aircraft performance, NOTAMs, restricted airspace, significant weather and upper meteorological influences in producing a combined array of 4D flight trajectories 'of the day' in an end-to-end fashion. Subsequent activities prior OTS finalization would necessarily include mechanisms for Dispatchers to pro-actively participate in a CDM process. The CDM dialog would also provide insights into capacity balancing requirements and any ATM Flow and Capacity requirements. Should this collaborative working model be deemed successful in the NAT, IFALDA would seek ICAO's support to expand this work program to other major route areas such as the South Atlantic, PACOTS & CEP and the north Polar regions as well.

Appendix A- Extracts from ICAO Annex 1

4.6 Flight operations officer/flight dispatcher licence
4.6.1 Requirements for the issue of the licence
4.6.1.1 *Age*
The applicant shall be not less than 21 years of age.

4.6.1.2 *Knowledge*
The applicant shall have demonstrated a level of knowledge appropriate to the privileges granted to the holder of a flight operations officer licence, in at least the following subjects:

Air law
a) rules and regulations relevant to the holder of a flight operations officer licence; appropriate air traffic services practices and procedures;
Aircraft general knowledge
b) principles of operation of aeroplane engines, systems and instruments;
c) operating limitations of aeroplanes and engines;
d) minimum equipment list;

Flight performance calculation, planning procedures and loading
e) effects of loading and mass distribution on aircraft performance and flight characteristics; mass and balance calculations;
f) operational flight planning; fuel consumption and endurance calculations; alternate aerodrome selection procedures; en-route cruise control; extended range operation;
g) preparation and filing of air traffic services flight plans;
h) basic principles of computer-assisted planning systems;

Human performance
i) human performance relevant to dispatch duties, including principles of threat and error management;
Note.— Guidance material to design training programmes on human performance, including threat and error management, can be found in the Human Factors Training Manual *(Doc 9683).*

Meteorology
j) aeronautical meteorology; the movement of pressure systems; the structure of fronts, and the origin and characteristics of significant weather phenomena which affect take-off, en-route and landing conditions;
k) interpretation and application of aeronautical meteorological reports, charts and forecasts; codes and abbreviations; use of, and procedures for obtaining, meteorological information;

Navigation
l) principles of air navigation with particular reference to instrument flight;

Operational procedures
m) use of aeronautical documentation;
n) operational procedures for the carriage of freight and dangerous goods;
o) procedures relating to aircraft accidents and incidents; emergency flight procedures;
p) procedures relating to unlawful interference and sabotage of aircraft;

Principles of flight
q) principles of flight relating to the appropriate category of aircraft; and

Radio communication
r) procedures for communicating with aircraft and relevant ground stations.

4.6.1.3 *Experience*
4.6.1.3.1 The applicant shall have gained the following experience:
a) a total of two years of service in any one or in any combination of the capacities specified in 1) to 3) inclusive,

provided that in any combination of experience the period serviced in any capacity shall be at least one year:
1) a flight crew member in air transportation; or
2) a meteorologist in an organization dispatching aircraft in air transportation; or
3) an air traffic controller; or a technical supervisor of flight operations officers or air transportation flight operations systems;
or
b) at least one year as an assistant in the dispatching of air transport;
or
c) have satisfactorily completed a course of approved training.

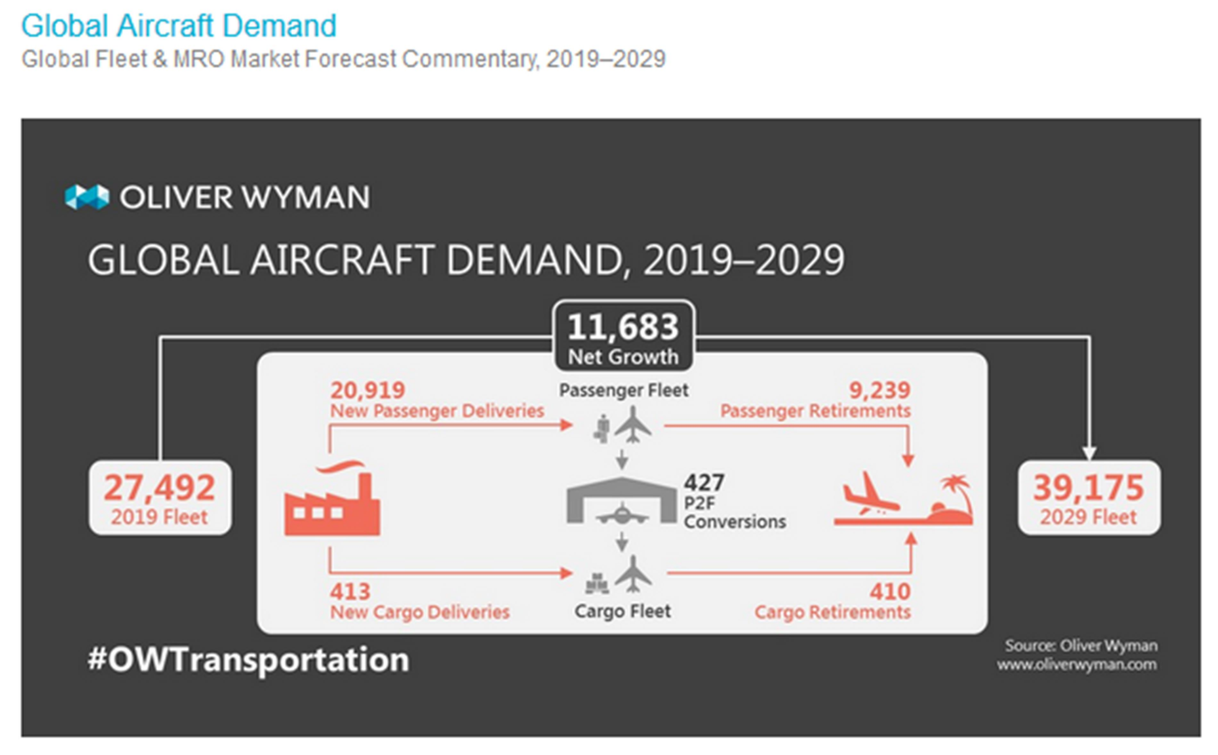
4.6.1.3.2 The applicant shall have served under the supervision of a flight operations officer for at least 90 working days within the six months immediately preceding the application.

4.6.1.4 *Skill*
The applicant shall have demonstrated the ability to:
a) make an accurate and operationally acceptable weather analysis from a series of daily weather maps and weather reports; provide an operationally valid briefing on weather conditions prevailing in the general neighbourhood of a specific air route; forecast weather trends pertinent to air transportation with particular reference to destination and alternates;
b) determine the optimum flight path for a given segment, and create accurate manual and/or computer generated flight plans;
c) provide operating supervision and all other assistance to a flight in actual or simulated adverse weather conditions, as appropriate to the duties of the holder of a flight operations officer licence; and
d) recognize and manage threats and errors.

Note.— Guidance material on the application of threat and error management is found in the Procedures for Air Navigation Services — Training *(Doc 9868, PANS-TRG), Chapter 3, Attachment C, and in Part II, Chapter 2, of the* Human Factors Training Manual *(Doc 9683).*

4.6.2 Privileges of the holder of the licence and the conditions to be observed in exercising such privileges
Subject to compliance with the requirements specified in 1.2.5, the privileges of the holder of a flight operations officer licence shall be to serve in that capacity with responsibility for each area for which the applicant meets the requirements specified in Annex 6.

Appendix B- Aircraft Fleet Demand 2019-2029



Appendix D- What is 1 minute worth?

Jet Fuel Price	2.164	USD$ per Galon	0.732910386	USD$ per KG

Total Fuel - Opportunity Cost North Atlantic flying - per minute							CO2 Savings			
	per day	per year	per day	per year	per day	per year	per day	per year	per day	per year
	Kilograms		Pounds		USD$		kgs/CO2		lbs/CO2	
Eastbound	75,574	27,584,650	166,613	60,813,755	55,389	20,217,124	238,059	86,891,649	524,831	191,563,327
Westbound	72,749	26,553,514	160,385	58,540,488	53,319	19,461,346	229,160	83,643,569	505,212	184,402,537
Total NAT	148,324	54,138,164	326,998	119,354,243	**108,708**	**39,678,471**	**467,220**	**170,535,218**	**1,030,043**	**375,965,864**

One minute of flight time saving per flight per day is worth USD$39.7M per annum and >170M Kgs/CO_2 emissions savings

Data sample (Eurocontrol) Jun 11-19 2018

Flight Counts		
	Weekly	Yearly
	sampling	projections
Eastbound	5,506	286,312
Westbound	5,331	277,212
Total NAT	10,837	**563,524**