International Civil Aviation Organization
ICAO South American Regional Office
Twelfth Meeting of the Civil Aviation Authorities of the SAM Region (RAAC/12)
(Lima, Peru, 3 – 6 October 2011)

Agenda Item 2: Air navigation regional activities

Airspace Efficiency

Presented by IATA

SUMMARY

Airlines, Civil Aviation Authorities and Air Navigation Service Providers have being continuously challenged to improve the existing level of safety and airspace efficiency while facing with traffic level growth. In many areas, current static flight route structure has been slow to keep pace with the rapid changes of users operational demands, especially for long-haul city-pairs.
This paper provides information on the benefits of flexible routing implementation and results achieved from a recent implementation.

Action by the meeting is in Paragraph 5.

1. Introduction

1.1 Airlines and air traffic authorities are being continuously challenged by the current airspace structure. In many areas, flight routings offered by air traffic control (ATC) services being static have been slow to keep pace with the rapid changes of users operational demands, especially for long-haul city-pairs. Traffic levels continue to increase at an average rate of 4% yearly, implying a doubling of traffic every 10-15 years. In certain parts of the world, legacy regional route structures have become outdated and are becoming constraining factors due to their inflexibility.

1.2 Specifically, flight times in excess of 10 hours coupled with the robust navigational capabilities of modern day aircraft make a compelling argument to migrate away from the fixed route structure towards a more flexible alternative. The major variable here is the energetic nature and daily variability of the upper wind patterns. Constantly changing upper winds have a direct influence on fuel burn and, proportionately, on the carbon footprint. Therein lies the benefit of daily flexible routings. Sophisticated flight planning systems in use at airlines, now have the capability to predict and validate optimum daily routings. Likewise, ground systems used by ATC have significantly improved their communication, surveillance and flight data management capabilities.

1.3 Using what is already available on the aircraft and within ATC ground systems, the move from Fixed to Flex can be accomplished in a progressive, orderly and efficient manner. This constitutes a challenge to the traditional way of thinking. Success requires the engagement of all stakeholders working together to implement user preferred trajectories and reduce the reliance on the fixed route system wherever safely possible.

2. Necessary Technology

2.1 Enhanced flight planning systems (FPS) today are predicated on the determination of the most efficient flight profile. The calculations of these profiles can be driven by cost, fuel, time, or even a combination of the factors. All airlines deploy FPS at different levels of sophistication and automation in order to assist flight dispatchers/planners to verify, calculate and file flight plans.

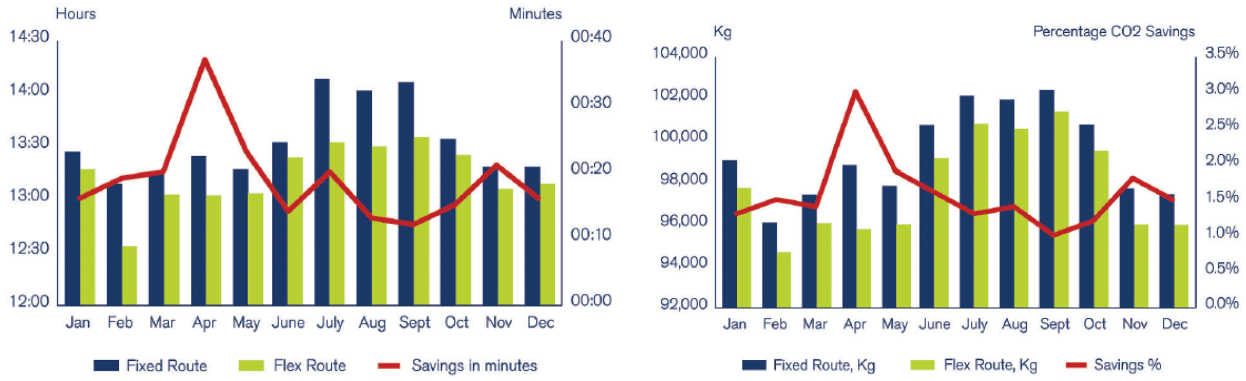
2.2 Regardless of the route calculated, due diligence is always exercised by the airline in ensuring that NOTAMs and any restrictive flight conditions will always be checked and validated before a flight plan is filed. Further, most airlines are required to ensure a flight following or monitoring program to update the crews with any changes in the flight planning assumptions that might have changed since the first calculation was made.

3. Expected Benefits

3.1 Early modeling of flexible routing suggests that airlines operating a 10-hour intercontinental flight can cut flight time by six minutes, reduce fuel burn by as much as 2% and save 3,000 kilograms of CO2 emissions. These improvements in efficiency will go a long way in helping the industry in meeting its environmental targets.

Some of the benefits that have accrued from Flex Route programs in sub-region flows include:

a) Reduced flight operating costs (1% to 2% of operating costs on long-haul flights)
b) Reduced fuel consumption (1% to 2% on long-haul flights)
c) More efficient use of airspace (access to airspace outside of fixed airway structure)
d) More dynamic flight planning (airlines able to leverage capability of sophisticated flight planning systems)
e) Reduced carbon footprint (reductions of over 3,000 kg of CO2 on long-haul flights)
f) Reduced controller workload (aircraft spaced over a wider area)
g) Increased passenger and cargo capacity for participating flights (approximately 10 extra passengers on long-haul flights)



Comparison of Flight Time and Fuel Burn using Fixed and Flex Routes using Sao Paulo-Dubai flights throughout the year 2010 (Source: IATA iFLEX Preliminary Benefit Analysis)

4. Recent Achievements

4.1 New flexible routings have been introduced between Atlanta and Johannesburg. This is the culmination of 8 months' work between IATA, ICAO, CANSO and six air navigation service providers. Operational data from the iFLEX trial (provided by Delta Air Lines) shows an average time savings of 8 minutes. Annualized this equates to some 690 tonnes fuel or 2.150 tonnes CO2.

4.2 A more flexible routing structure also provides a safety benefit in that airlines have more options on how to avoid adverse weather. Routing decisions can be taken at the planning stage therefore potentially avoiding tactical en-route deviations that can significantly increase controller and pilot workload.

5. Action by the meeting.

5.1 The meeting is invited to take note of the information contained in this working paper and to consider the possibility to implement flexible routing initiatives.

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