THIRTEENTH AIR NAVIGATION CONFERENCE

COMMITTEE A

Agenda Item 2: Enabling the global air navigation system
2.1: Aerodrome operations and capacity

TOTAL AIRPORT MANAGEMENT AND THROUGHPUT

(Presented by Austria on behalf of the European Union and its Member States[1], the other Member States of the European Civil Aviation Conference[2]; and by EUROCONTROL)

EXECUTIVE SUMMARY

Airports are key nodes of the global air navigation system and are critical to the future safe growth of the air transport industry worldwide. The Global Air Navigation Plan (GANP) and aviation system block upgrades (ASBU's) support strategic objectives that will enhance civil aviation safety, increase capacity and improve efficiency of global civil aviation as well as minimising adverse environmental effects. Airport collaborative decision making (A-CDM), WAKE and NOPS ASBU thread updates will bring performance benefits to airport and global ATM system operations.

This paper presents updates on industry based regional ATM improvements related to total airport management (TAM) incorporating airside and interfacing with land side, airport integration into the network, reduced wake vortex separation minima on arrival and departure, and the use of time instead of distance separation on approach, to increase runway throughput and mitigate the effect of headwind which provide an opportunity to enhance the relevant ASBU threads.

Action: The Conference is invited to agree to the recommendations in paragraph 3.

1. INTRODUCTION

1.1 Airports are key nodes of the global air navigation system and are critical to the future safe growth of the air transport industry worldwide.

1.2 Continued growth in global demand of around 4.6 per cent per year, increases in operational constraints, greater environmental awareness and runway throughput congestion during peak

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[2] Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Georgia, Iceland, Republic of Moldova, Monaco, Montenegro, Norway, San Marino, Serbia, Switzerland, The former Yugoslav Republic of Macedonia, Turkey and Ukraine.

hours is leading to airport and air traffic management (ATM) delays and inefficiencies to the detriment of airspace users and passengers.

1.3 The Global Air Navigation Plan (GANP) and aviation system block upgrades (ASBU's) support strategic objectives that will enhance civil aviation safety, increase capacity and improve efficiency of global civil aviation as well as minimising adverse environmental effects.

1.4 Airports are increasingly focusing on a total airport management (TAM) approach to enable airport performance improvements, using collaborative decision-making processes, integrating airside and interfacing with land side operations to improve the efficient management of airport resources on an equitable basis.

1.5 As the Global Air Traffic Management Operational Concept (GATMOC) (already accepts that "*There is a dependency on landside operations where improvements are needed to optimize aerodrome capacity. ….*" the ASBU ACDM thread should be updated to reflect land side activities whilst taking a TAM perspective.

1.6 Recognition of the airport as a key node in trajectory based operations (TBO) by integrating airports into network operations (NOPS) will improve predictability and efficiency and support a seamless TBO based air navigation system.

1.7 To address the issue of runway congestion and improve operational efficiency, major regional airports have improved arrival and departure separation minima by further expanding the existing three ICAO wake categories based on enhanced knowledge of wake-vortex resulting in significant throughput benefits of up to 17 per cent.

1.8 Further capacity benefits have been achieved at regional airports through the implementation of time-based Separations (TBS) together with optimised wake separation minima, to mitigate wind impact and increase runway throughput.

1.9 The ICAO Wake Turbulence Working Group (WTWG) recently proposed an alternative wake turbulence provision that expands the three existing ICAO wake categories into seven groups optimising wake separation minima. The ASBU WAKE thread should be updated to reflect the seven group wake separation minima together with provisions for TBS.

2. DISCUSSION

2.1 Total airport management

2.1.1 The Twelfth Air Navigation Conference (AN-Conf/12, 2012) acknowledged the importance of airport collaborative decision making (A-CDM), recognising that information sharing among stakeholders will improve predictability, capacity, performance, resilience and efficiency. Furthermore it recommended the standardisation of all elements to support CDM processes which is captured in the third edition of the Manual on Collaborative Air Traffic Flow Management (Doc 9971).

2.1.2 Major airports are implementing ACDM and Airport Operations Centres (APOC) with dedicated Airport Operations Plans (AOP) connected to NOPS providing a network performance vision with greater predictability, efficiency, capacity and environmental benefits. This expands ACDM processes towards air traffic flow management (ATFM) taking account of airport landside and network operational aspects.

2.1.3 TAM brings greater integration of airport and network stakeholder processes improving predictability and resilience, supporting future growth and consistent capacity at airports, in a seamless air navigation system. Integrated processes are a performance prerequisite together with full access to timely and accurate cyber and confidentially secure data from all air navigation system stakeholders.

2.1.4 Key processes are built around CDM including airport and network capacity demand management, pre-departure management, surface and runway optimization. Increasingly, airport operations centres monitor ground transport and infrastructure, passenger, baggage and freight handling services, passenger flow management through security and border control checkpoints, to build confidence on terminal processes to drive airport and ATM performance.

2.1.5 Predictive A-CDM tools provide a wider and earlier perspective on actual and anticipated operational issues through performance dashboards and support a proactive response to the consequences of disruption i.e. active crisis and recovery management, supporting stakeholder decision making in the APOC. This collaboration is extended to network connectivity to monitor, act and agree on key airport and airspace performance issues.

2.1.6 TAM imposes no specific requirements on communication, navigation and surveillance (CNS) systems whilst integrating airports into the network can be achieved through Business to Business (B2B) systems which will improve the precision of information supporting the ACDM milestone approach implementing system-wide information management (SWIM) will ensure the availability of high-quality, updated and reliable information. SWIM, and its information domains, mainly meteorology, aeronautical and future flight and flow information for a collaborative environment (FF-ICE) will become increasingly important.

2.1.7 TAM enhances human-operator performance, supporting tasks through access to shared up-to-date information, analytical and predictive decision support tools providing for common situation awareness and the ability to drive performance, anticipate and prepare for non-nominal situations.

2.2 **Runway Throughput improvements**

2.2.1 A joint proposal for the amendment of Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444) that incorporates new wake turbulence separation minima was made at the ICAO WTWG 10th meeting (Proposal for the amendment of PANS-ATM concerning wake turbulence separation minima WTWG/10-WP/Rev 20/12/2017 refers).

2.2.2 Expanding the existing three ICAO wake categories and regrouping aircraft, taking into account their wake vortex characteristics can optimise runway throughput and improve resilience for arrival and departure phases of flight. Regional versions of optimised wake turbulence separation groups have been implemented with significant throughput benefits of between 3 per cent and 17 per cent.

2.2.3 The WTWG wake separation proposal expands the current 3 ICAO wake categories to an optimum seven group wake separation minima covering various traffic mixes at major global airport hubs, supported by existing regional safety cases and operational experience. This wake separation minimum responds to ICAO strategic performance objectives, driving safety, capacity and efficiency improvements at relevant capacity constrained airports having significant demand for medium and heavy aircraft types.

2.2.4 The A380-800 State Letter (TEC/OPS/SEP – 08-0294.SLG) is in practice treated as a fourth-wake turbulence category. The WTWG proposed to recognise this by extending the PANS-ATM three-category wake separation minima to four categories, incorporating “super” to cover the A380-800 and future comparable types.

2.2.5 Strong headwind conditions on final approach cause a reduction of aircraft ground speed resulting in reduced landing rates and ATFM delay. The negative impact on predictability of operations leads to service disruption, time, fuel and environment inefficiencies with significant delay impact at major airports and in the air navigation system.

2.2.6 TBS addresses this issue by improving runway throughput and landing rate resilience for a range of headwind conditions by changing the separation on final approach from distance to time based. Regional experience shows significant throughput benefits (including in low wind), delay reductions, increased resilience and safety with the automation support enhancing the air traffic controller role.

2.2.7 The ICAO seven-group wake separation minima and TBS impose no specific requirements on CNS systems or aircraft avionics and flight management systems. Ground air traffic control (ATC) systems will require adaptation or development to support such operations.

2.2.8 TBS automation brings consistency, increases resilience and safety by enhancing the controller's role without changing working methods, ensuring the controller is able to retain control in the event of reduction in system performance and manage new concepts supported by TBS. Significant performance can be realised by operating TBS with the ICAO seven group wake separation minima.

3. **CONCLUSION**

3.1 Regional developments in TAM, airport integration into network operations, proposals to amend ICAO wake vortex separation provisions and regional experience with time-based separation on final approach, address continued growth in global demand and runway throughput congestion, mitigating related airport and ATFM delays and inefficiencies for airspace users and passengers.

3.2 These industry based regional ATM improvements provide ICAO the opportunity to enhance the ASBU threads ACDM, WAKE and NOPS that serve States and other stakeholders to progressively advance their air navigation system capabilities.

3.3 The Conference is invited to agree on the following recommendations:

That the Conference:

a) request ICAO to update provisions and guidance on airport collaborative decision making (ACDM) by extending ACDM towards TAM and interfacing with airport landside operations;

b) request ICAO to update provisions and guidance in ACDM and NOPS by integrating airports into network operations to drive predictable air navigation system performance;

c) request ICAO to update provisions and guidance in WAKE and complete guidance for an alternative wake turbulence provision that expands the three existing ICAO wake categories into seven groups and to formalise the recommendations of the 2008 State Letter on wake turbulence by adding a new category into the existing wake categories;

d) request ICAO to develop provisions and guidance on Time Based Separation in WAKE; and

e) urge States to continue to implement ACDM and when appropriate, to extend ACDM to incorporate TAM and integrate airports into network operations.

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