



WORKING PAPER

THIRTEENTH AIR NAVIGATION CONFERENCE

Montréal, Canada, 9 to 19 October 2018

COMMITTEE A

Agenda Item 2: Enabling the Global Air Navigation System

2.1: Aerodrome operations and capacity

AERODROME CAPACITY AND EFFICIENCY ENHANCEMENT

(Presented by the Secretariat)

EXECUTIVE SUMMARY	
This paper discusses challenges and initiatives related to aerodrome capacity and efficiency, in light of the significant traffic growth forecast for the next fifteen years in both passenger volume and aircraft movements at aerodromes serving international operations. It highlights areas where both ICAO and States should put more efforts to further enhance aerodrome capacity and efficiency. Action: The Conference is invited to agree to Recommendation 2.1/x – Aerodrome capacity and efficiency enhancement, in paragraph 3.1.	
<i>Strategic Objectives:</i>	This working paper relates to the Safety and Air Navigation Capacity and Efficiency Strategic Objectives.
<i>Financial implications:</i>	<i>Impact for the aviation community:</i> Proper airport planning, optimized aerodrome design and well-coordinated aerodrome operations with established procedures should bring significant benefits to the aviation community, both financially and operationally. The financial implications would be mainly associated with the need for training and updating of regulations and varying levels of investment in infrastructure and staff recruitment. <i>Impact for ICAO (relative to the current Regular Programme Budget resource levels):</i> Since ICAO's current Standards and Recommended Practices (SARPs) development and implementation roll-out will continue over the next triennia, additional resources are required to support ICAO's work on aerodrome capacity and efficiency enhancement.
<i>References:</i>	Annex 14 — <i>Aerodromes</i>, Volume I — <i>Aerodrome Design and Operations</i> Doc 9184, <i>Airport Planning Manual</i>, Part 1 — <i>Master Planning</i> Doc 9750, <i>Global Air Navigation Plan</i> Doc 9774, <i>Manual on Certification of Aerodromes</i> Doc 9971, <i>Manual on Collaborative Air Traffic Flow Management</i> Doc 9981, <i>Procedures for Air Navigation Services (PANS) – Aerodromes</i> Doc 10004, <i>2017–2019 Global Aviation Safety Plan</i>

1. INTRODUCTION

1.1 Aerodromes are an integral part of the global civil aviation system. Aerodrome infrastructure serves as a key enabling function of international air navigation. As such, airport operations constitute one of the important performance improvement areas in the *Global Air Navigation Plan* (GANP, Doc 9750).

1.2 ICAO long-term traffic forecasts indicate that global passenger traffic will almost double by 2032, reaching more than 6 billion passengers annually (compared to 3.5 billion in 2016), with over 60 million flights.

1.3 With increasing air traffic, airport congestion remains one of the biggest constraints in the civil aviation system in terms of capacity enhancement. As the number of aerodromes serving international operations is not expected to increase significantly, and certainly not in proportion with the forecast growth in passenger volume and aircraft movements, how to ensure the sustainable accommodation of traffic growth with existing and new aerodromes, while maintaining safety and regularity, is a real challenge.

1.4 While the focus of this paper is on aerodrome capacity and efficiency from aerodrome design and operations perspectives, aerodrome safety is always of paramount importance. The ICAO aerodrome programme covers safety initiatives in line with the *Global Aviation Safety Plan* (GASP, Doc 10004).

1.5 Aerodrome certification is an essential means of ensuring that aerodrome facilities, equipment and operational procedures comply with relevant Standards and Recommended Practices (SARPs), thereby supporting optimization of aerodrome capacity and efficiency while maintaining safety and regularity.

1.6 Traffic growth at aerodromes may be constrained by a lack of airspace capacity at the interface with runways and, where this is the case, such constraints should be studied with regard to available options such as those set out in the GANP, including the threads concerning airport accessibility (APTA), wake turbulence separation (WAKE) and runway sequencing (RSEQ).

2. DISCUSSION

Work in progress

2.1 ICAO has been developing provisions to enhance aerodrome capacity and efficiency from both aerodrome design and operations perspectives. In the field of aerodrome design, studies have revealed significant over-provision in certain aerodrome design specifications including, for example, buffers that are excessive for the safe operation of aircraft given improved aeroplane capabilities and operational safety. Accordingly, amendments to certain design specifications in Annex 14 — Aerodromes, Volume I — *Aerodrome Design and Operations* have been made which include, among others, a reduction in the taxiway minimum separation distances, runway and taxiway widths, shoulders and strip widths, etc. These changes are expected to enable optimum use of aerodrome capacity. Driven by new technological developments, further work is ongoing to optimize aerodrome design specifications.

2.2 In the field of aerodrome operations, ICAO has recently published the *Procedures for Air Navigation Services - Aerodromes* (PANS – Aerodromes, Doc 9981), in which procedures are provided to help States and aerodrome operators deal with operational issues at existing aerodromes, including

certification, compatibility studies and safety assessments. A new edition containing day-to-day operational procedures is currently under review by ICAO.

2.3 Furthermore, ICAO has developed guidance material on airport collaborative decision making (A-CDM), as Part III of the *Manual on Collaborative Air Traffic Flow Management* (Doc 9971). A-CDM plays an important role in enhancing the utilization of existing infrastructure, through a coordinated effort among key players involved in airside operations at aerodromes, to proactively plan and manage the punctuality, efficiency and predictability of operations.

2.4 Work is ongoing at ICAO to further enhance aerodrome capacity and efficiency, including, for example, the following areas:

- a) development of SARPs for airport planning and updating and modernization of the *Airport Planning Manual*, Part 1 — *Master Planning* (Doc 9184, with the objective of supporting the development of additional aerodrome capacity, where needed, and reducing delays through the implementation of more precise and up-to-date airport planning techniques;
- b) development of a standalone manual on ground handling at aerodromes aimed at ensuring standardization, thereby improving the safety and efficiency of ground handling operations;
- c) development of new criteria on runway and taxiway pavement overloading using new and emerging technology in pavement design, to allow for increased frequency of the use of pavements by heavy aircraft; and
- d) development of provisions for surface management, including the use of such systems as the advanced surface movement guidance and control systems (A-SMGCS) through the use of visual aids, contributing to a seamless and optimized surface management procedures and improved capacity, particularly during periods of reduced visibility.

New initiatives

2.5 An emerging area which complements A-CDM is total airport management (TAM). While A-CDM is mainly focused on airside operations, TAM is an overarching concept for planning, coordinating and connecting airside and landside processes (such as security and border control etc.), as well as for integration of these processes with the wider ATM network, all of which influence airport capacity, and efficiency and predictability of operations. The concept of TAM is included in the GANP.

2.6 There is also a growing trend of joint civil/military aerodromes serving international operations. A contributing factor to this trend is the increasing budgetary constraints being faced by military authorities which can lead to cooperation with civil authorities and the sharing of infrastructure. At the same time, civil aircraft operators are looking to avoid congested aerodromes. This trend of joint civil/military aerodromes has the potential to increase the capacity of aerodrome systems in many States.

2.7 As the demand for greater operating efficiency has driven aircraft manufacturers to combine technological advances with increased wingspans, successive new aeroplane models have increased wingspan to the span limit in each aerodrome reference code (ARC) category. New generations of aeroplanes equipped with new and emerging technologies such as folding wing tips (FWT) will enter into service in early 2020. The aeroplanes are expected to benefit from the improved aerodynamic flight

performance of the larger wingspan while being compatible with a lower ARC in terms of taxiway and apron systems. ICAO provisions are being developed in response to such new technologies.

Aerodrome certification

2.8 Aerodrome certification is an effective way of ensuring safe and efficient aerodrome operations through their compliance with international Standards and Recommended Practices. Many States have not yet fully implemented the requirements of Annex 14, Volume I for aerodrome certification. An analysis of the Universal Safety Oversight Audit Programme (USOAP) audit findings, feedback from seminars and workshops conducted by ICAO, as well as discussion with Member States indicate that many States (in some regions more than half) still face significant challenges in this area. These include a lack of relevant regulations, the staffing and expertise of entities responsible for aerodrome certification and an effective means to address any non-compliance that certification reveals.

2.9 Of particular importance is the conduct of compatibility studies and safety assessments as outlined in the PANS-Aerodromes, in order to develop operational procedures, including operating restrictions, before certifying the aerodrome with certain non-compliances. In this regard, States should be urged to develop a plan to certify aerodromes under their jurisdiction.

3. CONCLUSION

3.1 In light of the foregoing, the Conference is invited to agree to the following recommendation:

Recommendation 2.1/x – Aerodrome capacity and efficiency enhancement

That the Conference:

- a) urge States to establish a plan for the certification of aerodromes under their jurisdiction, incorporating the identification of gaps and implementation of solutions to overcome those gaps, including the assessment and development of mitigation measures in areas of non-compliance.
- b) urge States to review all options to increase aerodrome capacity as needed, including increasing the efficiency of existing aerodrome infrastructure, reviewing the need for investment in new infrastructure, and mitigating restrictions in surrounding airspace.
- c) request ICAO to progress the work on the development of provisions related to aerodrome design and operations in support of aerodrome capacity and efficiency enhancement;
- d) request ICAO to further explore new areas for enhancing aerodrome capacity and efficiency, including total airport management (TAM), joint civil/military aerodromes and other new initiatives, and technologies such as folding wing tip (FWT); and
- e) request ICAO to continue to provide assistance to States in the area of aerodrome certification.

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