



ASSEMBLY — 40TH SESSION

TECHNICAL COMMISSION

Agenda Item 30: Other Issues to be considered by the Technical Commission

BUILDING CAPACITY IN ATM

(Presented by the Civil Air Navigation Services Organisation (CANSO),
the International Coordinating Council of Aerospace Industries Associations (ICCAIA) and Singapore)

EXECUTIVE SUMMARY

Current demand and near term traffic forecasts accelerate the need to modernise air traffic management (ATM) globally and regionally. This paper updates the Assembly on the key challenges that air navigation service providers (ANSPs) need to address to deliver the necessary capacity safely and efficiently and proposes a number of actions. In order to meet the objectives of the *Global Air Navigation Plan* (GANP, Doc 9750) and *Global Aviation Safety Plan* (GASP, Doc 10004) and to ensure these goals can be met, ANSPs require:

- a) A performance framework which fully takes into account the interdependencies between investments needed to ensure capacity, the effect of growth on the environment and potential impact this could have on costs - while fulfilling the overarching principle of safety.
- b) A fully cooperative culture between all stakeholders and regions, in which all stakeholders work together in a collaborative manner in the interest of the network and with shared goals.
- c) Appropriate funding of ATM systems and communications, navigation, and surveillance (CNS) infrastructure to enable major technological advances that are needed in the light of forecast traffic growth and ensure the continued efficiency of the system.

Action: The Assembly is invited to:

- a) take note of the information in the paper;
- b) instruct ICAO to further elaborate guidelines and best practices for the design of performance frameworks that include consideration of interdependencies between key performance areas;
- c) instruct ICAO to strengthen the inter-regional cooperation between ICAO planning and implementation regional groups (PIRGs) to provide the required support to develop ANS performance enhancements;
- d) request States to commit to enhancing collaboration and partnership as aviation recognises and addresses its multidisciplinary challenges ahead; and
- e) urge States to facilitate appropriate funding of ATM systems and CNS infrastructure to ensure the continued efficiency and capacity to meet the expected growth in air traffic.

<i>Strategic Objectives:</i>	This working paper relates to the Strategic Objective on Air Navigation Capacity and Efficiency.
<i>Financial implications:</i>	

¹ English, Arabic, Chinese, French, Russian and Spanish versions provided by CANSO.

<i>References:</i>	Doc 9883, <i>Manual on Global Performance of the Air Navigation System</i> Doc 9854, <i>Global Air Traffic Management Operational Concept</i> Doc 9750, <i>Global Air Navigation Plan</i> EUR Doc 030, <i>EUR Region Performance Framework Document</i>
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1. INTRODUCTION

1.1 The extraordinary, rapid rate of air traffic growth in many parts of the world is creating capacity, efficiency and other challenges for ANSPs.

1.2 Forecasts for world air traffic in the coming years indicate that continued growth is most likely. According to ICAO forecasts, significant growth of above 5 per cent per annum can be expected over the next 25 years in the regions of Asia, Australia and Africa and an increase of around 2 to 3 per cent per annum in Europe and the United States.

1.3 To ensure the capacity of the ATM system meets the expected demand, that ANSPs meet the objectives of the GANP and GASP, and that efficiency goals can be met, ANSPs require:

- a) A performance framework which fully takes into account the interdependencies between investments needed to ensure capacity, the effect of growth on the environment and the potential impact this could have on costs - while fulfilling the overarching principle of safety.
- b) A fully cooperative culture between all stakeholders and regions, in which all stakeholders work together in the interest of the network and with shared goals, including between ICAO PIRGs.
- c) Appropriate funding of ATM systems and CNS infrastructure to enable major technological advances and ensure the continued efficiency and capacity of the ATM system to meet the expected growth in air traffic.

2. DISCUSSION

Performance Framework

2.1 Air navigation services (ANS) is a complex 24/7 operation that provides a wide range of essential network services. ANSPs are required to offer services to consistently high standards irrespective of level or nature of the demand. This limits the scope of ANSPs to respond in the short term to events that affect planning assumptions.

2.2 In this perspective, ANS provision requires a stable and balanced performance framework to ensure continued service delivery as well as investments in service improvements and increased efficiency. The system should be flexible enough to cater for unforeseen events leading to major changes in traffic and economic parameters.

2.3 The ICAO *Global Air Traffic Management Operational Concept* (Doc 9854) provides a description of the expectations for eleven key performance areas (KPA) by the ATM community. The *Manual on Global Performance of the Air Navigation System* (Doc 9883) was developed to support a

performance-based approach based on identifying adequate performance measurement and data collection capabilities. In addition to this, the GASP lays the foundation for measuring safety performance.

2.4 On this base, ICAO regions have developed regional performance frameworks (e.g. *EUR Region Performance Framework Document*, EUR Doc 030) by using the relevant ICAO guidance material and, as far as appropriate, the already existing material and arrangements within the region (e.g. the Single European Sky Performance Regulations (EU) No. 390/2013 and (EU) No. 2019/317)

2.5 Interdependencies across the different KPAs play a critical role in determining appropriate performance indicators as well as setting performance targets that drive effective management decisions. An understanding of these interdependencies is essential for an ANSP to communicate both its ability and its limitations in improving overall ATM system performance. Where the simultaneous meeting of different targets is not possible, the balance between targets must be adjusted so that they reflect an acceptable and feasible compromise. The aim should be to ensure that the total set of agreed targets addresses customer needs while ensuring a safe and efficient service delivery.

2.6 Although the nature of interdependencies and a broad approach to them is described in Doc 9883, the lack of current application suggests that more needs to be done to develop and promote a practical understanding of how to reflect them in realistic objectives and targets. It means that performance improvements in one area can be achieved through a trade-off in performance with another interdependent area. This link and the need for trade-offs shall be duly considered when analysing performance and when setting priorities, objectives and performance targets.

2.7 Interdependencies play a critical role both the development of suitable key performance indicators (KPIs) and the setting of appropriate performance targets. A balanced set of KPIs and targets can contribute to effective management decisions. An understanding of these interdependencies is essential for an ANSP to communicate both its ability and its limitations in improving the overall ATM system performance and to prioritise appropriately.

2.8 The Civil Air Navigation Services Organisation (CANSO) believes that where regulatory performance targets are being set, they need to give appropriate recognition to these interdependencies and the specific factors and local conditions. This includes the local legal frameworks, specific operational requirements and constraints which have an impact on cost bases in different ways (e.g. scope of ANS provision obligations, salary structures and social obligations, pension arrangements, specific local environmental constraints, civil/military arrangements and other regulatory requirements).

2.9 Furthermore, performance targets should be set and agreed upon between stakeholders and modulated when the need arises as a result of major changes in variables such as traffic demand, economic parameters or technology available. This is particularly important in the context of multi-year investment plans which should remain flexible to adjust as key requirements evolve.

2.10 In addition to the requirement of fulfilling the overarching principle of safety, there are numerous examples of specific interdependencies between KPAs:

- a) Cost efficiency versus capacity, flexibility and predictability – The interdependency between the need to reduce the cost of ATM capacity balanced against the need to provide sufficient resources to provide capacity in a wide range of circumstances and against an uncertain traffic demand pattern and volume, i.e. traffic volatility.
- b) Providing user-preferred routes versus providing capacity – The interdependency, particularly in high density and high complexity airspace, between providing more direct (or vertically efficient) profiles and the loss of capacity due to higher controller workload required to handle the traffic with less structured airspace.

- c) Flexibility versus predictability and capacity – Allowing flight plans to be modified close to or even after departure reduces the accuracy of traffic predictions on which downstream capacity provision is reliant.
- d) Predictability of flight versus environment – The strict adherence to specific arrival times may adversely affect environmental and flight efficiency performance as a result of having to fly fuel sub-optimal trajectories.

2.11 The magnitude of the impact of these interdependencies differs between different geographical areas and operational circumstances. For example, the cost of increasing capacity and the cost of delay will differ between a region where capacity can be increased with existing resources and a region where increases in capacity will require considerable investment.

Cooperative culture

2.12 Planning and delivering optimised airspace capacity is not something that can be done by ANSPs in isolation; it requires a common effort of all stakeholders and a collaborative and transparent approach. The legal and regulatory framework should therefore recognise and facilitate appropriate modes of cooperation between all stakeholders.

2.13 For example, when setting flight schedules, airspace users and airport operators should engage with ANSPs from an early stage, such that the impact on the performance of the overall network can be assessed and to ensure that potential outcomes are understood.

2.14 In this process, the accuracy of all relevant forecast data (meteorological, flight readiness, airport status, etc.), which form the basis on which ANSPs plan and operate, is of increasing importance with the evolution to trajectory-based operations.

2.15 Meteorological (MET) provider weather models could be improved with better data granularity in many regions of the world. Aircraft MET data gathering programs such as aircraft meteorological data relay (AMDAR) and TURBULENCE reporting with Eddy Dissipation Rate algorithms would greatly enhance forecast accuracy if use of these programs was mandatory.

2.16 Cooperation between all the operational stakeholders represents one of the most powerful and efficient means to enable performance improvements. However, where performance targets are established, it requires a well-balanced regulatory and performance framework in order to ensure that beneficial cooperative initiatives are not hindered.

2.17 The above cooperative culture at regional level is seen as essential in the development of regional plans for air navigation systems – undertaken by ICAO's PIRGs based on the GANP. CANSO also sees benefits from expanding this to inter-regional cooperation as cooperation between regions will play an increasingly important role in delivering optimised air navigation services. A strengthening of the inter-regional cooperation between these ICAO PIRGs should therefore be explored to provide the required support to develop ANS performance enhancements globally.

Funding in ATM systems and CNS infrastructure

2.18 Modern, state-of-the-art infrastructure is critical to improving the efficiency and performance of ATM. The digitisation of aviation infrastructure is key to respond to the increasing demand for air travel.

2.19 Efforts to increase capacity should consider a comprehensive range of factors which affect capacity and efficiency including higher levels of automation technology in ATM systems.

2.20 It is essential to further promote the harmonised implementation of technological solutions both in the air and on the ground. This will help to ensure timely, coordinated and synchronised deployment of new and innovative technologies and operational procedures to implement a new and more performant ATM system, which in turn enables economic growth.

2.21 CANSO believes that any State and regional funding schemes should adopt appropriate approaches to incentivise transformation, e.g. by rewarding the accelerated deployment of new technologies capabilities that demonstrate a tangible benefit to network performance.

2.22 CANSO members are actively supporting important ATM development and modernisation programmes (e.g. SESAR, CARATS, NextGen). These are challenging initiatives that funding schemes should underpin to assure timely deployment.

3. CONCLUSION

3.1 The Assembly is invited to accept the actions in the Executive Summary.

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