International Civil Aviation Organization

WORKING PAPER

AN-Conf/13-WP/47
24/8/18
(Information Paper)
English only

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

TOTAL AIRPORT MANAGEMENT

(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

This information paper describes the European perspectives regarding development and implementation of total airport management (TAM) in Europe, integrating airport collaborative decision making (A-CDM) and airport operations centres (APOC).

1. INTRODUCTION

1.1 Major European airports are increasingly focusing on a total airport management (TAM) approach by removing barriers to information sharing, developing common situational awareness supported by shared processes and products to drive airport performance improvements.

1.2 TAM brings together collaborative decision-making processes and integrates airside with landside operations to improve the efficient management of airport resources on an equitable basis.

1.3 Development work is supported by the Single European Sky ATM Research program (SESAR) and implementation by the SESAR deployment program.

2. TAM CONCEPT

2.1 Today, many airports remain constrained by the lack of integrated processes in and between airside, landside and network systems, unclear roles and responsibilities, limited data sharing

[1] Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and United Kingdom.

[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.

restricting collaboration and resulting in a poor understanding of overall airport resources and performance.

2.2 Traditionally, performance has been driven by independent stakeholder business processes, often in contradiction to other stakeholders needs, leading to inefficiencies and reactive decision making rather than shared and accurate predictive decision making, anticipating and solving issues in advance.

2.3 Furthermore, many airports are constrained by operations that rely on personal experience rather than shared, internalised and historic knowledge that can be used to drive performance through integrated business processes, data analytics and machine learning to support predictive decision making.

2.4 Within TAM, many of these issues and challenges are addressed as airport processes, roles and products are defined and increasingly integrated with the air traffic management (ATM) system and other stakeholder system components to ensure that the priorities of aircraft operators and the constraints of the airport and air transport network are known.

2.5 Airport processes from passenger check-in, security, baggage to aircraft turn-round are defined, integrated and work collaboratively with airside and network processes to improve the predictability of agreed departure times.

2.6 A key building block for TAM is airport CDM (A-CDM), where the efficiency of airport operations is improved through information sharing between the principal airport stakeholders. The focus of A-CDM is oriented to aircraft turnaround on the day of operations. The airport operations plan (AOP) will expand A-CDM in time and scope with in an airport operations centre (APOC), whilst TAM expands this concept further and is based on a holistic view of the entire airport, integrating passengers and baggage and in a performance-driven approach.

2.7 TAM is dependent on the AOP which, ideally, is connected to air traffic flow management (ATFM) functions (in Europe, the network operations plan of the network manager) and enriched by airport specific data. The AOP is a “local product” that requires continuous updating, agreed data definitions, actor roles and responsibilities and processes for managing the operations and related data.

2.8 The collaborative management of airport performance is embodied in an APOC that brings together different airport stakeholders who are in constant communication, helped by decision support systems, who co-ordinate, develop and maintain joint plans to drive airport performance and who then execute those plans in their respective area of responsibility.

2.9 **Airport collaborative decision making (A-CDM)**

2.9.1 A-CDM is well documented by ICAO in the third edition of the *Manual on Collaborative Air Traffic Flow Management* (Doc 9971) with regional variants currently being implemented. A European handbook developed by EUROCONTROL and aligned with ICAO provides the guidance for implementation.

2.9.2 A-CDM resolves some of the identified inefficiencies through information sharing that supports stakeholders develop a common situational awareness and process synchronisation leading to improved decision making.

2.9.3 A-CDM implementation is well underway in Europe with twenty eight A-CDM deployments at major airports representing around forty per cent of European traffic. Another seventeen airports have deployed a lighter version, "Advanced Tower" and further deployment is underway. This is driving airport and network performance benefits covering predictability, capacity, performance, resilience and efficiency.

2.9.4 A 2016 EUROCONTROL study underlined the benefits, showing that A-CDM supports strong taxi-out time savings of between 0.25 and three minutes per departure, average schedule adherence improvements between 0.5 and two minutes per flight and ATFM delay reductions with a strong tendency for generating more favourable slots for its customers, resulting in significant ground delay savings.

2.9.5 The increased predictability and reduced taxi out time brought by A-CDM are reflected in fuel savings and a related positive impact on emissions.

2.9.6 The study suggests that A-CDM provides a return on investment over eighteen months and a cost benefit ratio of seven over ten years. Several CDM airports showed tactical delay cost savings amounting to €1 million in 2015 (study reference year). The standard deviation of take-off accuracy was shown to have reduced from an average of fourteen minutes to around five at the A-CDM off-block milestone.

2.10 **Total airport management**

2.10.1 TAM builds on A-CDM and the AOP/APOC through an "integrated" airport management framework, adding land side processes where all major aircraft operators, airport, aerodrome air traffic control (ATC) and ground handling, passenger, baggage and freight processes are conducted using common data sets linked through the AOP and agreed procedures within a collaborative environment.

2.10.2 In TAM, an APOC provides key stakeholders with decision support systems and performance dashboards fed by multiple data sources and real-time monitoring of land and airside airport processes as well as network operations. APOC managers use these systems to steer monitor and manage airport performance with post operations analysis improving their decision making.

2.10.3 The processes incorporated into the APOC address airport demand/capacity imbalances, pre-departure sequence preparation, de-icing, stand management, coordination of airline flight priorities, passenger, baggage and freight handling services, passenger flow management through security and border control checkpoints, weather and adverse conditions, ground transport, infrastructure and power.

2.10.4 Airports and their stakeholders optimise the use of their resources supported by TAM, which provides airports, air navigation services and the network manager with improved predictive analytics, rather than reactive situational awareness, driving resilience to disruptions, cost efficiency, capacity, environmental sustainability and security.

2.10.5 European airports developing or implementing TAM and APOC include: Amsterdam, Barcelona, Brussels, Dusseldorf, Frankfurt, Geneva, London Heathrow, Madrid Barajas, Munich, Paris CDG and Zurich.

2.11 **Future Perspective**

2.11.1 Big data, machine learning techniques and artificial intelligence are now being harnessed in TAM to internalise operational knowledge and further improve airport performance. These techniques and capabilities support analytics, predictive performance dash boards and what-if decision making supporting the ability to anticipate / manage abnormal situations, drawing on knowledge held in large historic data sets through machine and deep learning algorithms.

2.11.2 SESAR research and deployment are addressing the opportunities offered by tailoring and downsizing TAM to support regional airport operations and increased connectivity, encouraged by the European network manager.

3. CONCLUSION

3.1 The Conference is invited to note the progress of Europe in the implementation of TAM.

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