ACI EUROPE

AIRPORTS COUNCIL INTERNATIONAL

AIRPORT OPERATIONS CENTRES: A GUIDEBOOK

Produced in collaboration with

airport intelligence

INTRODUCTION

Airports, due to the dynamic nature of air transport, encounter a variety of operational challenges that can impact their efficiency, safety, and passenger experience. In this context, the Airport Operations Centre (APOC) plays a critical role in the overall management and efficiency of airport operations. In fact, the APOC is relevant for all airports regardless of their size, as their goal to contribute to a more efficient aviation ecosystem by improving operations, enhancing safety, all while improving passenger experience, is a common goal of all airports.

An APOC achieves this by bringing together airport operational stakeholders, ideally in one location, to act as one team. This can improve situational awareness and teamwork by bringing together people, processes, and technology, and by strengthening the sense of team with the common goal of achieving better airport operations and passenger journeys. This is the value added by an APOC, as described in more detail in this guide. This guide aims to promote practical guidance material applicable at all airports, and to encourage a process of continuous capacity enhancement and optimisation while improving the passenger experience.

Accordingly, this ACI EUROPE APOC Guidance document provides:

- a concise insight on how to set up an APOC, with a specific focus on the definition of commonly used terms in the context of APOC, general principles, location, key functions involved in APOC, systems, implementation plan and timeline;
- a description of an APOC's added value to airport operations, including the opportunities and challenges linked to the APOC implementation and use;
- an overview of several very concrete examples of APOC implementations throughout Europe (Annex 1).

CLARIFICATION OF CONCEPTS

APOC, what's in a name?

Strictly speaking, an APOC can be defined as follows:

*An APOC (**A**ir**P**ort **O**perations **C**entre) is a coordination arrangement at an airport, whereby operational stakeholders (actors) collaborate for the effective/efficient establishment and execution of an agreed operational plan, in a structured manner with agreed processes, either through physical or virtual interaction or a combination thereof. The APOC is also the primary interface between the Airport and the Network Manager Operations Centre (NMOC).*

From the above, we can derive that the APOC is thus a structured form of coordination within an airport ecosystem that serves as the nerve centre for all operational activities. The APOC is responsible for coordinating and managing all aspects of airport operations, including but not limited to airside[1] operations, terminal operations (passenger and baggage services), ground handling, security and (often but not always) emergency response. The APOC is also the platform that ensures communication with not only the local airport stakeholders (through inclusion in the APOC or by means of structured lines of communication), but also the main communication channel between that airport and the network.

The APOC is staffed by a team of professionals who monitor and respond to any real-time or upcoming events that can have an impact on the safe and efficient flow of the airport processes. While the essence of this principle is to facilitate communication by structuring the interaction between stakeholders, the APOC often has (advanced) technology at its disposal to monitor airport operations and airport performance with precision and take necessary actions. Such technology may include radar systems, transponders and GPS information, surveillance cameras, the Airport Operations Plan tool (AOP including dashboards, forecasting models, Demand-Capacity Balancing Tools, etc.), communication networks, and much more.

Among the key functions of the APOC, it is possible to find:

- **Monitoring and managing terminal operations:**
  - Passenger Services: close follow-up of the different passenger processing points to ensure efficient flows and up-to-date provision of real-time information to passengers,
  - Baggage Services: close follow-up of the different baggage processing points to ensure efficient flows,
  - Monitoring and managing of terminal assets.

[1] "Airside" refers to the ramp/taxiways/runway of an airport. Cf. "Terminal" – inside the terminal building and "Landside" – parking/drop off/cargo areas.

- **Monitoring and managing security services:**
  - Monitoring security cameras, access control systems, and threat detection sensors to ensure the safety and security of passengers, staff, and aircraft.

- **Monitoring and managing airside operations:**
  - Monitoring and managing air traffic flow, including aircraft arrivals and departures, taxiing, and turnaround performance,
  - Gate and Stand allocation,
  - Safe management and adherence to procedures,
  - Monitoring and managing of airside assets and equipment,
  - Monitoring serviceability and condition of runways, taxiways and stands.

- **Coordinating with ground servicing companies:**
  - Coordinating the movement of ground vehicles, baggage handling, and aircraft servicing vehicles to ensure efficient passenger flows and aircraft turnaround times,
  - Oversight of supplementary services such as fuelling, catering and PRM.

- **Ensuring close interaction with emergency response services (when necessary):**
  - Coordinating operations with emergency response efforts in the event of aircraft accidents, medical emergencies, or security threats,
  - However, the coordination may not always take place at the APOC – as at some airports, the emergency response coordination and Crisis Team is located not at the airport but elsewhere (mainly due to different roles and responsibilities). In those cases, there is a strong communication link between the Crisis Centre and the APOC as to exchange status and actions.

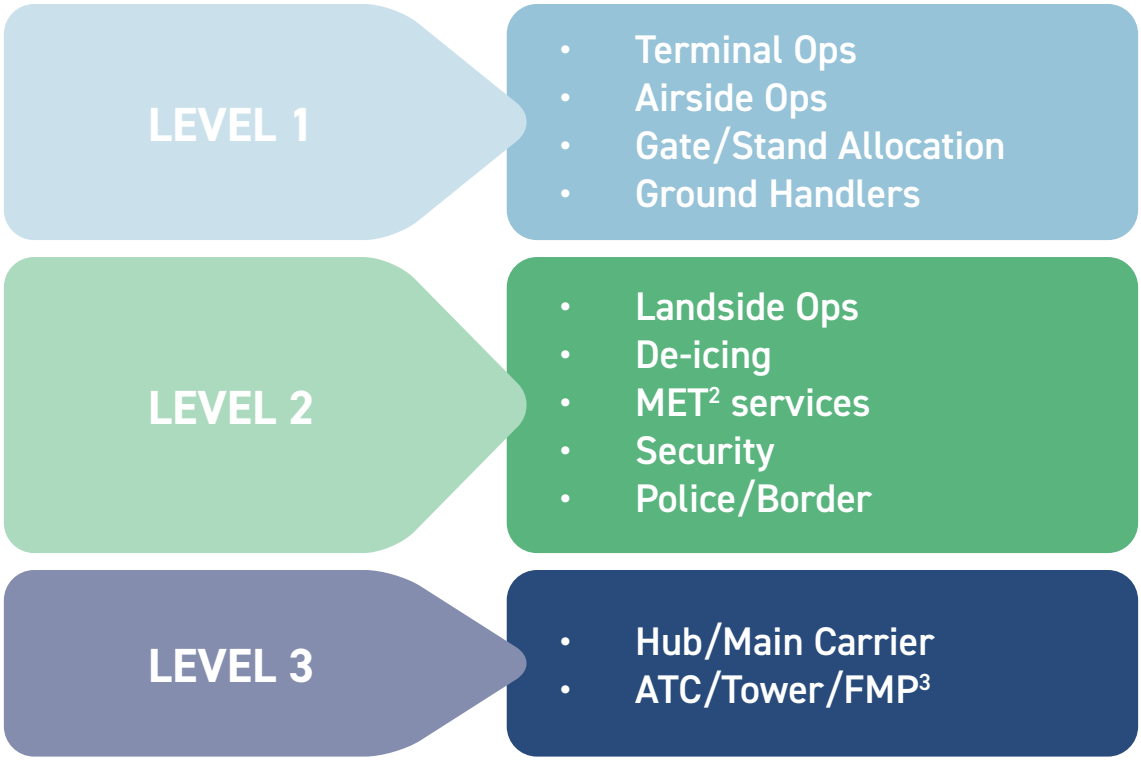
- **The APOC may act as a 'linking pin' with the Network Manager via the Airport Function Position within the EUROCONTROL Network Manager Operations Centre (NMOC):**
  - Through data exchange via AOP-NOP, Airport Corner or simply by phone.

The APOC can be physical, virtual or hybrid. Whatever solution is chosen depends on local needs and possibilities. What matters most is the actual APOC coordination arrangement, that should encompass:

- Scope
- Mandate
- Roles & responsibilities
- Processes
- Procedures
- Decision-making

ACI EUROPE observed that the composition of APOCs differ depending on local arrangements and often reflects a phased evolution of the concept. Three typical compositions are observed and are here defined as 3 APOC coordination levels, as illustrated below.

APOC Level 1-2-3 setup in terms of roles (example only)



Overall, the APOC plays a critical role in ensuring the safe, efficient, and seamless operation of an airport, enhancing the overall passenger experience, and maximising the airport's operational performance.

What about AOP?

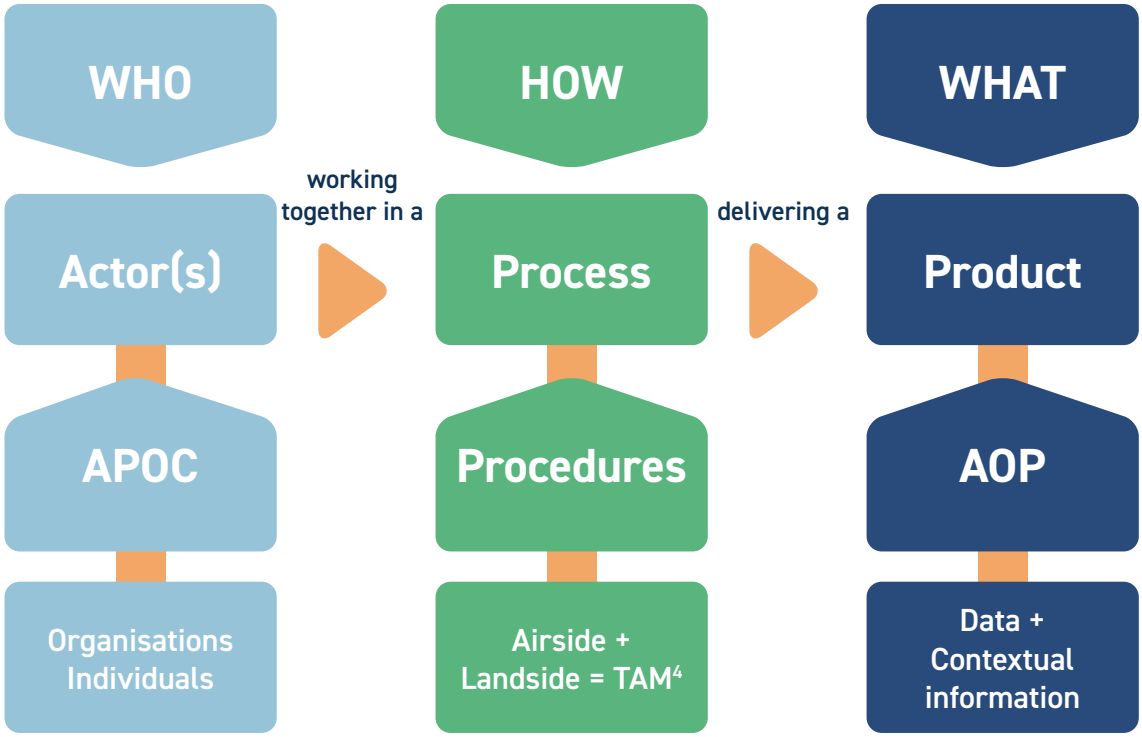
An Airport Operations Plan (AOP) is a consolidated rolling airport operational plan – containing all the necessary data, contextual information, scenarios and KPIs required to enable decision-making in a collaborative manner. An Airport Operations Plan is designed to proactively address the challenges and complexities of airport management, ensuring the safety, efficiency, and security of the airport for passengers, airlines, and other stakeholders. A mature AOP should also consider the environmental impact as to reduce noise, fuel burn, and emissions as much as possible.

Linking the airport with the Network is a key role of the APOC. Key data and other (contextual) information is exchanged between the airport and the Network Manager (AOP-NOP) as to identify bottlenecks on the local and network level as early as possible, take appropriate measures early and find the optimum solutions when traffic demand exceeds capacity.

As mentioned above, the APOC can be supported by technology, with advanced APOCs often implementing a platform that consolidates and visualises the Airport Operations Plan (AOP), allowing for effective planning, execution, and monitoring.

[2] MET: Meteorological information management — [3] FMP: Flow Management Position

The flow chart below illustrates how the different actors within the APOC work together on the process of balancing demand and capacity to deliver efficient and smooth airport processes to deliver a product called the AOP.



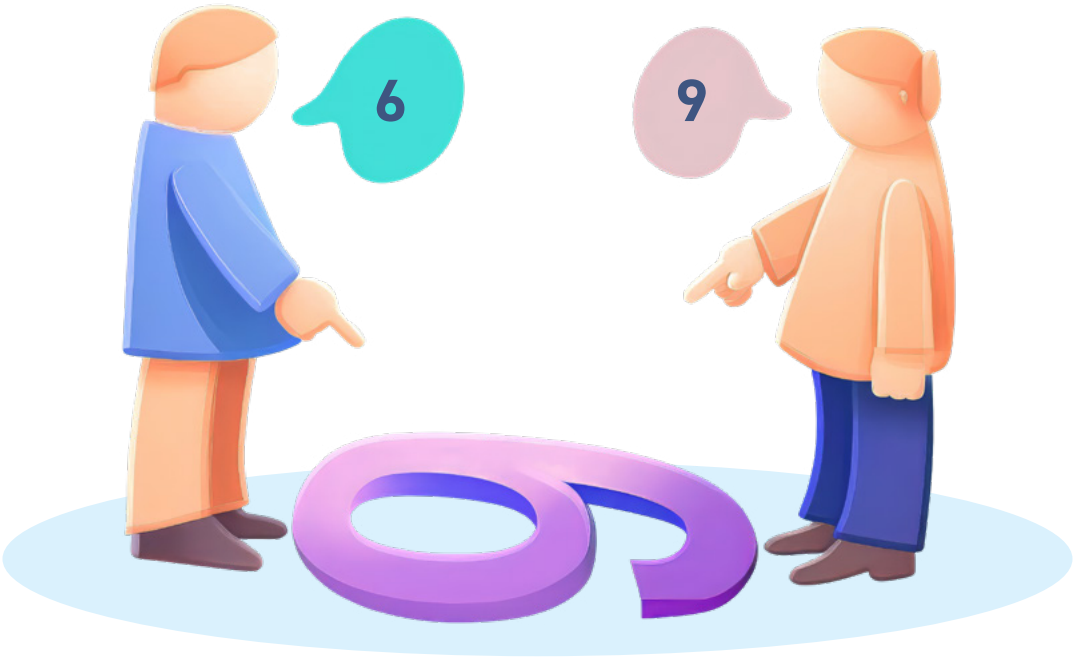
For more information on the AOP and the link with the Network Operations Plan (NOP), we refer to the AOP Practical Guide (published March 2024).[5]

The APOC concept: a need for harmonisation?

Performing research on the concept of APOC often leads to a dispersed picture, for several reasons:

- The term APOC and other concepts suffers from a lack of harmonisation across stakeholders. In short, there is no established and agreed-upon definition for key concepts, such as APOCs. The same term can, in practice, often refer to a wide range of different concepts, and the same in reverse: different terms can, in practice, refer to the same concept. For instance, there are many unique terms used to refer to the principle of a structured coordination arrangement in an airport – one airport may refer to this as an APOC, whilst other terms such as Airport Operations Control Centre, Ground Coordinator and many more are used in practice.
- Even when the terms are used with the same meaning, often the implementation widely varies to cope with local specificities, leading to a further lack of harmonisation.

[4] TAM: Total Airport Management
[5] Available exclusively for ACI EUROPE members via ACI Infoshare > ACI Europe ERP (aci-europe.org)



It is therefore important to have the same understanding of the terminology used and harmonise the use of it. ACI EUROPE recommends the following explanation and statements:

- **Airport Collaborative Decision-Making (A-CDM) is a process (not a system)** focusing on an individual flight, based on A-CDM milestones, designed to enhance airport turnaround and foster collaboration. **A-CDM concerns the process of an individual flight**, with a relatively short time horizon from 3 hours before arrival at an airport and ends when the aircraft has taken off.
- Different from A-CDM, an **Airport Operations Plan (AOP) is about airport capacity** (multiple flights), with a longer time horizon, considering traffic demand and airport capacity, that takes measures to keep airport performance within certain parameters. The plan is based on the demand-capacity balancing process, and it is the outcome **(product)** of a process, not a system in itself (while the platform that offers the tooling for the AOP is often simply referred to as 'the AOP').
- An **Airport Operations Centre (APOC)** is a structured coordination mechanism. The term is used for both the location ('coordination room') and the collaboration arrangement. While the location in itself is less important and can be physical, virtual or hybrid, the key is the collaboration mechanism set-up: what stakeholders (actors) participate, what are the roles and responsibilities, how do they plan and operate in a collaborative manner, how do they ensure to have a common understanding based on the same shared information and what agreed procedures do they follow?

Annex 1 of this document gives an overview of several concrete examples of APOC implementations throughout Europe.

VALUE ADDED OF THE APOC

What value does the APOC bring?

While the concept of the APOC has in time gained better ground and is more and more accepted by external stakeholders, airports in practice must still work on building their business case to defend the investments related to the actual implementation of an APOC. This paragraph therefore lists the typical benefits that are related to the implementation of the concept, to support such business cases.

Understanding	**APOCs increase mutual understanding and reduce complexity:** • More intense exchanges simplify the complexity of the overall system, making it easier to see roles and responsibilities • (Competing) partners are more inclined to help each other • Demonstrates that optimal for the system is not always optimal for each individual
Stable operations	**APOCs trigger proactive, holistic collaborative decision-making, leading to more stable operations:** • Increased speed of decision-making • More predictable operations • Better anticipation of potential issues, reducing number/duration of contingencies • Reduced escalations to higher management
Collaboration	**APOCs facilitate collaboration:** • Increased levels of trust and understanding internally and within the airport community • Increased sharing of data, leading to a common view • A heightened sense of collegiality and solidarity • Facilitating coordination on airport group level
Passenger experience	**APOCs increase passenger experience thanks to:** • Smooth passenger and bag flows • Increased passenger resilience and less contingencies • In case of disturbances: improved communication, less escalation and quicker recovery
Employee satisfaction	**APOCs increase employee satisfaction, thanks to better prepared operations, resulting in:** • Reduced stress levels, less blame, less frustration • Less demand for flexibility in terms of last-minute changes, overtime, activation of people on-call • Less absenteeism/increased retention • Better employer branding

Attractiveness	**APOCs contribute to a better brand reputation, thanks to more efficient and stable operations, leading to:** • Increased airline satisfaction, reduced claims and decreased insurance liability, airport more attractive for new airlines • Less waste and more efficient usage of resources promoting sustainability goals
Capacity	**APOCs do not bring additional capacity, rather it ensures most optimal usage of available capacity:** • Capacity is not wasted due to misalignment or other issues and thanks to quicker recovery • More accurate insights in demand ensure reduced manpower needs and buffers to obtain the same level of performance
Costs	**APOCs ensure cost reductions for all airport partners, thanks to:** • Efficient resource usage • Increased operational predictability reducing irregularity costs and buffers implemented to cope with variability • Delayed need for investments in additional capacity associated with growth and inefficient usage of capacity
Revenues	**APOCs increase commercial revenues, thanks to:** • Increased passenger experience, resulting from reduced waiting times, efficient and smooth airport flows and better communication • Attracting additional traffic, based on a better brand reputation

Not all of these elements may be relevant for each individual airport: the above overview is intended to be seen as a long list of potential sources of business value, from which an airport can select to build their own case. To build a business case, the addition of data and performance insights are required – with the consideration that such data and insights are often only unlocked with the development and implementation of an AOP. It is clear that there is a symbiotic relationship between the APOC and the AOP, and the greatest potential of both is released by the presence of the other. The APOC is a great enabler for an AOP: by setting up an APOC the airport enables a collaborative and pro-active environment, where partners feel confident to openly share data which is crucial for the establishment of the AOP.

To give an impression of a potential business case for an APOC, a list of quantified benefits that were demonstrated at one specific mid-sized hub airport are available below. It is important to note however, that these benefits are only to be interpreted as the joint result of the implementation of the APOC and the AOP that triggered optimisations in specific processes:

- A reduction of 10-15% in Operational Expenditure (OpEx) on specific processes was observed,
- A reduction of 4% in airport delay codes was realised,
- A performance increase was observed on specific KPIs: for some KPIs the performance increase amounted up to 25%,
- An increase of up to 5% in Spend Per Passenger (SPP) was realised on a specific passenger profile following the optimisation of a specific airport process.

Above is one specific example that serves to inspire: however, providing general guidelines to quantify the benefits is difficult. Each airport will thus have to perform the exercise individually by picking the benefits from the above list that are relevant and quantifying the expected benefits, taking into account elements such as:

- Current OpEx structure,
- The structure of their own organisation, such as the split in responsibilities between airport operator, partners and subcontractors,
- Actual airport performance, key areas for improvement, and potential margin for improvement, which could lead to a reduction in airline claims to be paid or penalties linked to underperformance against predefined service levels.

Although not directly contributing to the business case for the airport, it is important to note that an APOC brings a lot of direct benefits for the partners involved, such as: reduced delay minutes and irregularity costs for airlines, more efficient usage of resources by ground handlers, to name a few. The APOC ensures an efficient ecosystem and only the airport operator can facilitate this kind of optimisation.

A physical APOC still today?

Even though technology today offers great opportunities for remote collaboration, it is still believed that the biggest value from an APOC can be realised by physically co-locating people within the same room. The abundant and rapid availability of data and insights on the performance of the processes of each individual stakeholder – as well as how this affects the performance of the others – is key for successful collaborative decision-making.

While technology and data science are already very advanced today, these tools can only perform their magic when there is sufficient trust between partners to actually integrate and share available data. Working in a common, future-oriented environment greatly promotes trust, removes silo mentality, and demonstrates to people that individual optimisation of their own processes may not always contribute to the best overall result for the airport ecosystem and thus the passenger. Even where tools may

not be fully integrated yet, the fact that people are sitting back-to-back automatically ensures intangible data and contextual information sharing. Moreover, developing a tool that can handle every imaginable scenario is barely realistic. With a physical APOC in place, the setting is right for partners to cope with any possible disturbance, simply by coordinating with each other.

Reaching the stage where algorithms can perform all of the logic to fully support remote decision-making will still take time, and requires a profound understanding of the functioning of the ecosystem. It is possible to start realising the benefits of this principle before that ultimate stage, improving passenger experience sooner.

The APOC is a great environment to create a common identity and goals for the key stakeholders within the airport ecosystem, triggering collaboration between competitors when things are at stake, greatly contributing to performance, resiliency, better communication, and swift recovery from adverse conditions. ACI EUROPE concludes that the ultimate performance of an airport is thus optimally supported by a physical APOC.

Is an APOC only relevant for large airports?

Investing in an APOC is often perceived as only relevant or even economically viable for major hub airports. Why would a small or regional airport, where operations are focused on point-to-point traffic and communication lines are generally shorter, invest in an APOC?

Despite coping with less traffic, demand-capacity balancing is often more challenging and critical for smaller airports. This is due to a limited number of daily departures and high level of seasonality, disproportionally increased operational costs, with investments in additional infrastructure more difficult to amortise. Moreover, a smaller infrastructure creates relatively larger constraints on resources. Capacity shortage is thus not only a problem for larger airports – the need to properly align on efficient usage of resources is potentially more intense for smaller airports. The alleviation an APOC can offer on this issue is one of the key benefits.

Another argument against an APOC in a smaller airport could be that given the smaller ecosystem, communication lines with partners are shorter thus replacing the need for an APOC. In practice however, one often perceives in smaller airports that strong stakeholder engagement is not always extensively developed or that strong (informal) one-on-one connections between people are not always facilitating holistic coordination and common collaborative decision-making: elements further confirming the need for an APOC in a smaller airport.

For smaller airports, simply adopting the infrastructure of APOCs from larger airports and hubs will not serve their specific needs. Targeted alterations on elements such as the scope of responsibilities of key APOC roles or the consolidation of APOC functions with other services will result in a uniquely tailored APOC model, where the investment costs are defendable and the business case still positive.


H10
H6
H4
H2

GUIDELINES FOR APOCs

General principles

APOCs are designed to be the beating heart of airport operations, integrating various functions and departments into a unified system. This section outlines the essential components of an APOC and how they contribute to optimising airport efficiency:

- Location, main room design, and segregated rooms
- Key functions within an APOC and the role of an APOC Manager
- APOC tools and systems
- Creation of common situational awareness

To support the exercise of developing the concept of the APOC, the so-called 3 layers of functionality can be used as a guideline:

- **The Physical Layer:**
  - The physical layer of the APOC focuses on the spatial arrangement of people and resources. This layer is about ensuring that those who need to collaborate are positioned to do so naturally and efficiently.
  - Design the physical layout to facilitate natural collaboration among related functions.
- **The Process Layer:**
  - The process layer connects the necessary processes to produce optimal results. It ensures that all operations are aligned and working towards common goals.
  - Process mapping: identify and streamline processes that cut across different functions, ensuring they are well integrated.
- **The Data Layer:**
  - The data layer determines which systems need to be available at each workstation and how they interconnect. This layer is crucial for providing the necessary information and tools for effective decision-making.
  - System availability: Ensure that all required data and systems are accessible at the appropriate workstations, with robust interconnectivity.

What does a good APOC location look like?

The APOC is the place where the different APOC stakeholders literally "live together". Paying proper attention to the location and design of the APOC is hence an essential part of the APOC implementation project. The first question that arises is: where should the APOC be located?

Locating the APOC landside or airside is an important consideration and there is no good or bad choice here. The final decision will depend on several local elements and is often driven by the availability of the required space. What is essential is to ensure that the location is easily accessible for all of the stakeholders and guarantees them the proximity and interaction with teams that do not incorporate the APOC, but work closely with APOC-located colleagues.

While a direct view of the airside is not mandatory, it can potentially enhance situational awareness through direct sight of physical operations, or even be a useful element to convince doubtful partners. Having at least some sort of a view on aircraft, however, is often more related to keeping the APOC directly in sight of what it is all about.

Once a location is chosen, the layout of the APOC main room needs to be drawn. Effective room design is fundamental to the success of an APOC. A well-designed APOC should ensure that the space is utilised efficiently, with sufficient room for each function to operate without interference:

- **Open layout:** the layout should be open, allowing for easy communication and collaboration among different functions. This design minimises barriers and fosters a collaborative environment.
- **Flexible space:** flexibility in space allocation is crucial. As airport operations evolve, the APOC should be able to adapt to new functions and technologies without requiring significant structural changes.

Another essential element in the layout of the APOC is proximity of stakeholders. Functions that interact frequently should be positioned close to each other, even if they belong to different departments or even organisations. This strategic adjacency reduces response times, improves coordination, and can ensure data exchange even when fully integrated systems are not yet implemented:

- **Proximity of related functions:** functions that share workflows, such as airside operations and ATC coordination, should be located near to each other to streamline operations.
- **Visibility and communication:** the layout should ensure that all team members have clear lines of sight to each other and an eventual video wall, facilitating quick communication.
- **Function identification:** clear signage and naming conventions help in quick identification and access to different operational areas.

Apart from the APOC main room, additional facilities will be required to ensure a pleasant and efficient working environment for the APOC members:

- **Support facilities:** the inclusion of breakout rooms, staff welfare facilities, and visitor desks enhances staff comfort and productivity. These areas provide spaces for meetings, rest, and receiving external visitors without disrupting ongoing operations.
- **General briefing room:** a briefing room equipped with video conferencing facilities can be used for operational meetings, allowing teams to discuss strategies and updates without interrupting the main operations.

While the concept of an APOC naturally triggers collaboration in an open and transparent environment, certain functions within an APOC may require privacy due to the sensitive nature of the work. In these cases, separate rooms or adjoining anterooms may be necessary. Crucial for these segregated rooms, however, is that they still support efficient interaction and a common working attitude – and do not become silos. Examples could include:

- **Security control:** due to the sensitive nature of security operations, particularly the monitoring of CCTV feeds, a segregated room ensures privacy and prevents unauthorised access.
- **Police control:** police operations often involve sensitive communications that require privacy. A separate room ensures these discussions remain confidential.
- **Emergency coordination centre:** this room is used for managing extraordinary events and situations. It should be equipped with all necessary communication tools and have restricted access.

What are the key functions within an APOC?

To promote efficient collaboration, it is key the right partners are present within the APOC. To define who should be present, it is essential to list the key functions or activities that should be part of your APOC. A function, however, is not necessarily equivalent to a position in the APOC and one can decide to consolidate functions within the same position or to integrate some of these functions in a more hybrid way for the sake of efficiency.

As a general rule of thumb, the following functions should be considered in an APOC:

- **Terminal operations:**
  - Responsible for managing terminal operations, ensuring smooth passenger flow, and handling any issues that arise within the terminal.
- **Airside operations:**
  - Focuses on coordinating airside supervision, runway inspections, wildlife control, and runway and taxiway maintenance.
- **Stand/gate allocation:**
  - Responsible for assigning aircraft to gates and stands, ensuring optimal use of available resources and minimising delays.
- **Ground handling agents (including self-handling airlines):**
  - General ground handling functions; check-in, dispatch, baggage handling and loading, aircraft push-back and towing. These can either be airline contracted independent Ground Handling Agents or services that are taken by the airline in-house (self-handling).
- **Landside operations:**
  - Manages the operations outside the terminal, including transportation and parking, ensuring that the flow of vehicles and passengers is smooth and efficient.
- **De-icing operations:**
  - Manages de-icing operations in close cooperation with ground handlers, airside control, and stand/gate allocation.
- **Meteorological services:**
  - Provides weather information and forecasts – crucial for planning and decision-making in airport operations.
- **Security services:**
  - Ensures that all security measures are in place and functioning effectively, including managing access points and responding to security alerts.
- **Police/border control:**
  - Manages law enforcement and immigration processes, ensuring compliance with regulations and maintaining security.

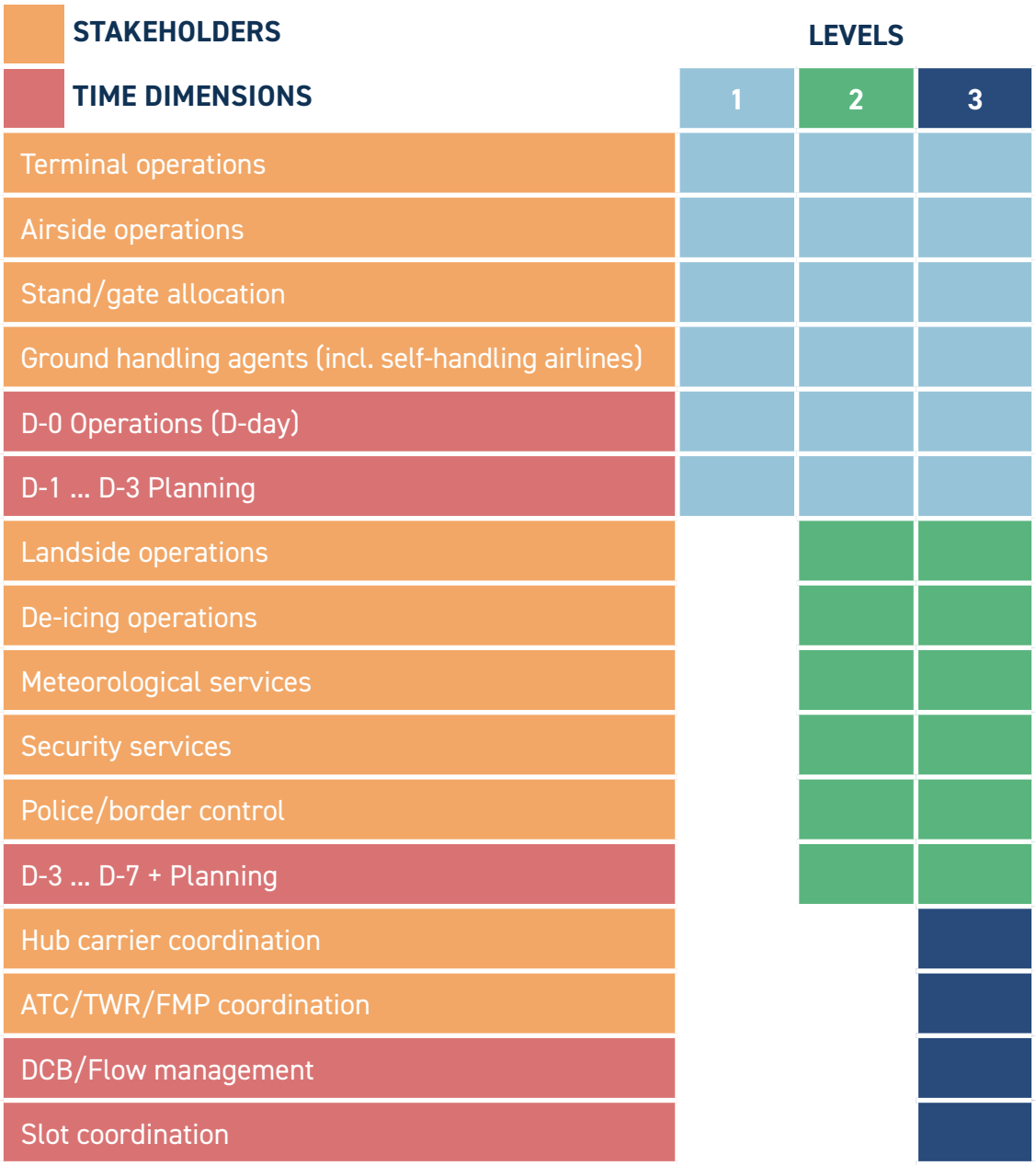
- **Hub carrier coordination:**
  - Coordinates the activities of a home-based carrier where single terminal operations and airline self-handling is prevalent.
- **ATC/TWR/FMP coordination:**
  - Coordinates air traffic in and out of the airport, ensuring the APOC is fully aware of flight flow and any tactical issues from ground services.
- **Slot coordination:**
  - Manages take-off and landing slots, particularly in airports with capacity constraints, to optimise scheduling and minimise delays.

Each function does not necessarily map to one specific person or organisation – it is entirely possible that each function is taken up by multiple people or stakeholders, as is necessary for operations. As an example: within terminal operations one may find a passenger flow position from the airport, representatives from the ground handler ensuring check-in, airport subcontractors that man screening platforms, and more.

The above-mentioned functions manage their respective processes and flows in different time dimensions through:

- **D-0 Tactical/Real-Time Operations:** involves monitoring of operations on the day of operations and managing/mitigating any deviations from expected performance now or in the upcoming hours.
- **D-1 Pre-Tactical Planning:** involves planning operations one day in advance, ensuring that all resources and schedules are optimised for the next day's operations.
- **D-7 Strategic Planning:** involves planning operations up to seven days in advance, ensuring long-term resource optimisation and preparedness for upcoming events.
- **DCB/Flow Control:** management of Demand Capacity Balancing (DCB) and flow control to ensure that the airport operates within its capacity limits and minimises congestion.

APOC functionalities can be categorised into different levels based on the specific needs and complexity of the airport's operations. These levels, identified as coordination Level 1, Level 2, and Level 3, represent the stages of functional deployment and integration within the APOC. The table below outlines these different levels and the level of integration of proposed roles and stakeholders.



As part of the reflection airports must have when establishing APOC roles and functions, the need for an APOC Manager (sometimes referred to as APOC Supervisor or Airport Duty Manager) often arises, i.e. the responsible manager for the APOC on shift. An APOC Manager is to be seen as the central role within the APOC, responsible for overseeing all operations, keeping a transversal holistic view over the different functions within an APOC and ensuring tactical decision-making. Their role is critical in ensuring that the APOC operates as a unified entity, as the APOC action plan should represent the collective, consistent judgment of all operational areas.

An APOC Manager is also responsible for setting expectations and ensuring clear communication across all functions. He/she acts as the single point of clear, consistent communication and contact for external stakeholders, such as remote airline Operations Control Centres (OCCs) and the Network Manager Operations Centre (NMOC).

Deciding on the role of an APOC Manager will be a delicate balancing act, revolving around different questions:

- What is the "authority" of the APOC Manager?
- Will partners accept the APOC Manager?
- What is the work/skill profile of the APOC Manager?
- What is the functional/hierarchical line between the APOC Manager and the APOC members?

The answers to these questions will depend on the sensitivities that prevail among the future APOC members and will be an essential part of the change management. However, external communicators with the APOC, such as the Network Manager, will expect any decisions or instructions to come from the APOC to be as agreed by all parties operating within – often through the unifying voice of the APOC Manager.

What systems does an APOC need?

For an APOC to function effectively, open and transparent data sharing is a must. Building that trustworthy environment is an essential element of the change management track and may take time. The launch of an APOC should not however be blocked by a lack of full data integration/sharing. Once partners are well settled in, the need for and importance of sharing data will become more obvious, paving the way to more elaborate data sharing naturally.

Despite this, it is important to define as part of the APOC development programme a vision on what data must be integrated within the APOC and how this will be done. This will ensure IT teams understand the evolution you are envisioning and allow them to evolve systems and tools with the objective to integrate data from various systems into a cohesive whole.

To deliver data to the APOC, different options exist:

- **Unified data sources:** integrate relevant systems and key operational data. The Airport Operational Database (AODB) is in most cases a very important baseline, including flight data, passenger information, and input from resource management systems. The AODB should be the single source of truth for all tactical decisions within the APOC. This ensures that all teams are working from the same data set, reducing errors and inconsistencies.
- **Consolidated Airport Operations Plan (AOP):** a more advanced APOC may need one system to ensure a common understanding of the demand and capacity of the airport over an extended period. This is where the AOP comes in.
- **Systems integration:** integrate the Network Operations Plan (NOP), Resource Management System (RMS), Airport Operations Plan (AOP), KPI/Performance Monitoring tools, and CCTV systems into a unified data layer.
- **Seamless data flow:** Ensure that data flows seamlessly between systems, enabling real-time updates and decision-making.

Creation of common situational awareness – or what about a video wall?

Good situational awareness by all stakeholders is key for an APOC to ensure efficient decision-making. This can be achieved through briefings, common dashboards, the AOP or other methods. An additional tool that is often observed in a coordination centre is a video wall (or a simplified a cluster of screens displayed for all on one or more locations).

Having a large central video wall is not crucial, but can be a good means for maintaining situational awareness within the APOC. It can serve as a focal point for displaying real-time information that is essential for decision-making. To this end, the video wall can display key performance indicators (KPIs), airspace views, and other critical data that allow staff to remain informed about ongoing operations.

Common displays should be configured to present the most relevant information to each function within the APOC. Examples of elements to be visualised on these displays:

- **Operational KPIs:** display key metrics that indicate the current performance of airport operations, such as flight punctuality, passenger flow, and operational and security status.
- **Network performance:** shows the status of the wider air traffic network and its impact on the airport, helping staff anticipate and manage disruptions.

IMPLEMENTATION PLAN

What are the key building blocks for implementing an APOC?

Once the decision has been taken to implement an APOC, the question quickly arises: how do we tackle this project? What are the key building blocks when implementing an APOC? The below list consolidates the key elements/streams for the APOC programme:

- Management onboarding, approval and support
- Stakeholder involvement, as of day 1, including a communication and change management programme
- Definition of the APOC organisation and governance model (collaboration arrangement):
  - Clear scope of what is in and out of the APOC
  - Clear roles and responsibilities
  - Integration of APOC roles within the corporate organisation structure
  - APOC governance structure
  - APOC procedures
  - APOC scenarios
- Data sharing agreements and implementation
- Continuous improvement of the APOC after go-live
- Celebration of your successes to help build a strong airport community

The exact duration and timeline of the implementation track of an APOC will greatly depend on local elements such as the:

- Level of onboarding of top management
- Availability of the APOC location
- Eventual tender procedures to be launched for works and purchases
- Amplitude of construction works for the APOC location
- Impact of the organisational change on existing roles and functions
- Willingness/resistance of future APOC members to join the APOC

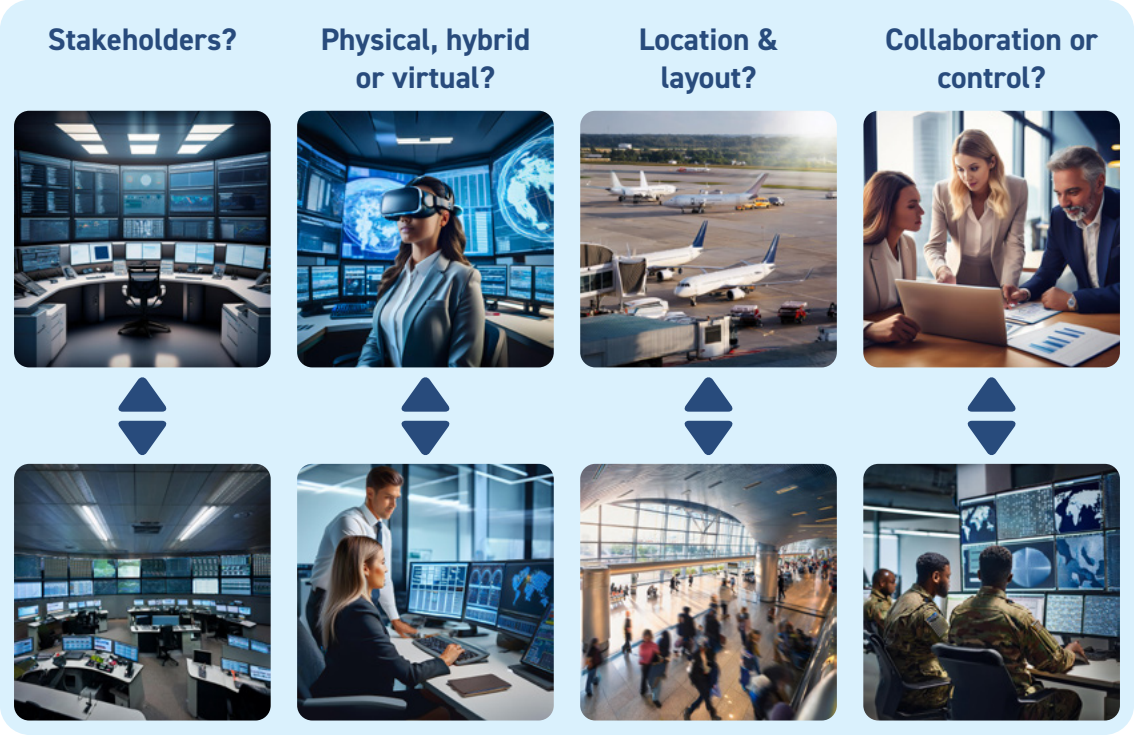
The above elements are key building blocks for implementing an APOC. As indicated above, the key element of setting up an APOC is the launch of a new way of working and collaborating within the airport community. Change management and communication is therefore the key focus of any APOC implementation track. Depending on the available time, the maturity of the envisioned APOC stakeholders and other issues, it may be decided to add a 'technology track' into an APOC implementation plan. However, this is not considered to be crucial and it is perfectly possible to launch an APOC with existing technology and tooling. Elements that could be considered in a potential technology stream are:

- Definition of a common operational picture based on:
  - Agreed data and contextual information
  - Visualisation of the common picture, ideally by means of an APOC dashboard or translated in an APOC briefing tool
- A-CDM (milestone approach)
- AOP:
  - Local operations (what is happening now and in the next few hours)
  - Network view (what is happening around the APOC)
  - Overview of capacity vs demand – bottlenecks (what, when, impact, mitigating measures)
- Performance goals, KPIs and dashboarding

OPPORTUNITIES AND CHALLENGES

Where to start?

Launching an APOC may appear to be an overwhelming project, but it should not be in practice. One key recommendation is that there is no wrong place to start: the key is to start somewhere and evolve gradually. The illustration below summarises some critical questions to be answered when developing the concept of your future APOC.



Based on this, envision the ideal APOC for your airport ecosystem to know where you are heading but break the project down in realistic phases answering above questions. Not everything may be possible as of day 1, but by starting with what is feasible, building credibility for the project and evolving from there, it is possible to create an ideal APOC environment from the ground up.

What will be the key in establishing an APOC?

Setting up an APOC is more than simply an IT project or defining KPIs – it is about bringing people together. It is about breaking down the silos between internal departments and with external partners, and creating an environment where people transparently share information to ensure efficient collaborative decision-making. The overall aim is always to ensure great performance in the airport ecosystem, for the ultimate benefit of the passenger. This kind of endeavour requires change: with cultural change arguably the biggest challenge that APOCs face.

Cultural change management will be key to overcome resistance to this new concept and reap its full benefits. Elements such as clarifying roles and responsibilities, teambuilding exercises between future APOC members, training & sandbox exercises, and the development of an APOC charter should be part of a well-thought-out change management and communication programme. While change management is often a key element of the project phase, it is sometimes overlooked after go-live. An "aftercare programme" should thus be in place to ensure follow-up of the functioning of APOC after opening and support the teams to overcome the first bumps on the road and ensure the continued efficiency of the APOC.

Within this context, management of expectations is key: stakeholders should understand that the true value of an APOC will not be entirely visible the day after its launch. Continuous improvement of the concept is essential and should be embedded as a role within the organisation (as a function or a task).

Where to start?

- There is no wrong place to start
- Ensure you have a clear vision but evolve gradually
- Get the buy-in from top management
- Listen to your stakeholders

Where to stop?

- This is a change trajectory, not an IT project
- Never stop evolving your APOC: implement a continuous improvement cycle
- Evolve your APOC in line with evolving stakeholder onboarding

As with all projects that involve change, it is inevitable that there will be resistance. One potential pitfall is to believe that the biggest resistance will come from external stakeholders. Based on this, airports sometimes start by only integrating internal teams, postponing stakeholder involvement to a later stage. Missing out on the opportunity to involve airlines or handlers that are in favour of integrating and who can even support the onboarding of the internal teams.

There is also the misconception that APOCs are one degree of separation from actual airport operations, under the mistaken idea that "people should be in the field (terminal or tarmac)" or "should have a view on the airside". It is important to establish that APOCs are about coordinating – not controlling – and overseeing process flows, potentially resulting in different roles to be incorporated in the APOC (or evolution from existing roles).

To cope with resistance, it is necessary to make the concept of an APOC attractive, and ensure that it is perceived as:

- A pleasant working environment
- The single source of truth on all operational matters
- The place where all operational decisions are made

Where would you like to work?

As outlined in this document, APOCs generate great business value: the best way to convince people of the need for an APOC is by demonstrating that value. When trying to build the case for an APOC, focus on the value it can bring to each stakeholder, rather than on compliance or the need to integrate with the Network.

What else can an APOC bring?

With great challenges also come great opportunities: this is not any different for the establishment of an APOC. While this document has already outlined the most obvious and direct value created by APOCs, and verifiably demonstrates that APOCs can act as a means to ensure collaborative and pro-active decision-making for the sake of operational excellence, there are also more indirect benefits present.

- An APOC should be seen as an enabler of the future state of airport excellence through the expansion of other operational initiatives:
  - Although A-CDM is often seen as a step preceding the APOC, this is not a requirement. An APOC can create the right collaborative mindset to ease the implementation of A-CDM at a later stage.
  - APOCs can pave the way for AOP implementation and adoption:
    - > An APOC can act as the trigger for more transparency and data sharing, which will pave the way for more data-driven decision-making. The more data is shared, the more people will feel the need for a tool such as AOP that will translate this data into actionable insights to support their way of working.
    - > To ensure a positive atmosphere, APOCs should promote more pro-active ways of working, such as focusing on preventing issues rather than on solving problems. This will ultimately demonstrate the need for more predictive tools which can be offered through an AOP, building a business case for one.
- A more pro-active way of working, supported with data and tools, will entail a gradual evolution of the roles present in APOCs: overseeing overall airport flows will trigger more end-to-end responsibilities and ownership. This will evolve the profile and capabilities required for these functions, offering development opportunities for operational people and a potential for prolonged career tracks for operational experts.

- In many airports, COVID has spurred the introduction of corporate HR programmes focusing on the "new way of working" – often resulting in new or renovated office spaces. While these programmes are often administratively focused, an APOC offers an opportunity to introduce a "new way of working" for operational teams, creating an attractive environment for operational teams to work in (and their partners).
- An APOC will ensure more coordinated operations, ensuring more stable and robust processes, ultimately reducing stress, triggering better working conditions, and improving employee/job satisfaction. This can positively contribute to corporate HR programmes on retention, recruitment, and employer branding.

As such, the benefits of an APOC are not only operational – APOCs can be seen as holistically positive contributors to the realisation of a good corporate strategy.

CONCLUSIONS

With this document, ACI EUROPE aims to provide airports with a strong insight into the concept of an APOC, with concrete examples, assurances and practices that can put your airport on the road to implementing or evolving your own APOC. An APOC is a powerful concept that enables airport ecosystems to become masters of their own capacity, ensuring continued balance with the expected growth in demand – increasing the number of smooth airport journeys and triggering the optimal passenger experience.

It is clear that an APOC is a living concept, focused on changing working culture and the way operations are managed. The successful delivery of an APOC will be based on this belief: it is essential to continuously evaluate and develop your APOC set-up, in line with evolving needs and mindsets of your airport ecosystem partners.

The same applies to the overall concept of an APOC: with inevitable further evolutions of ecosystems, the network and technology, the concept of an APOC will continue to evolve. ACI EUROPE therefore has established the Airport Integration Taskforce, reuniting European airports in a joint platform where airports can exchange on experiences and best practices. This platform is accessible for all ACI EUROPE members: feel free to contact Barbora Smolikova, ACI EUROPE Liaison Officer to the SESAR Deployment Manager (**barbora.smolikova@aci-europe.org**) for more information on how to join this community.

Furthermore, ACI EUROPE also offers the "APOC Peer Review" service, providing airports with access to expert advice and opinion on their current APOC set-up and opportunities for evolution. Feel free to contact Eugene Leeman, ACI EUROPE Senior Advisor Airport Operations (**eugene.leeman@aci-europe.org**) for more information and explore how the "APOC Peer Review" can give you powerful insights on how to evolve and to explore your APOC.

Contact information

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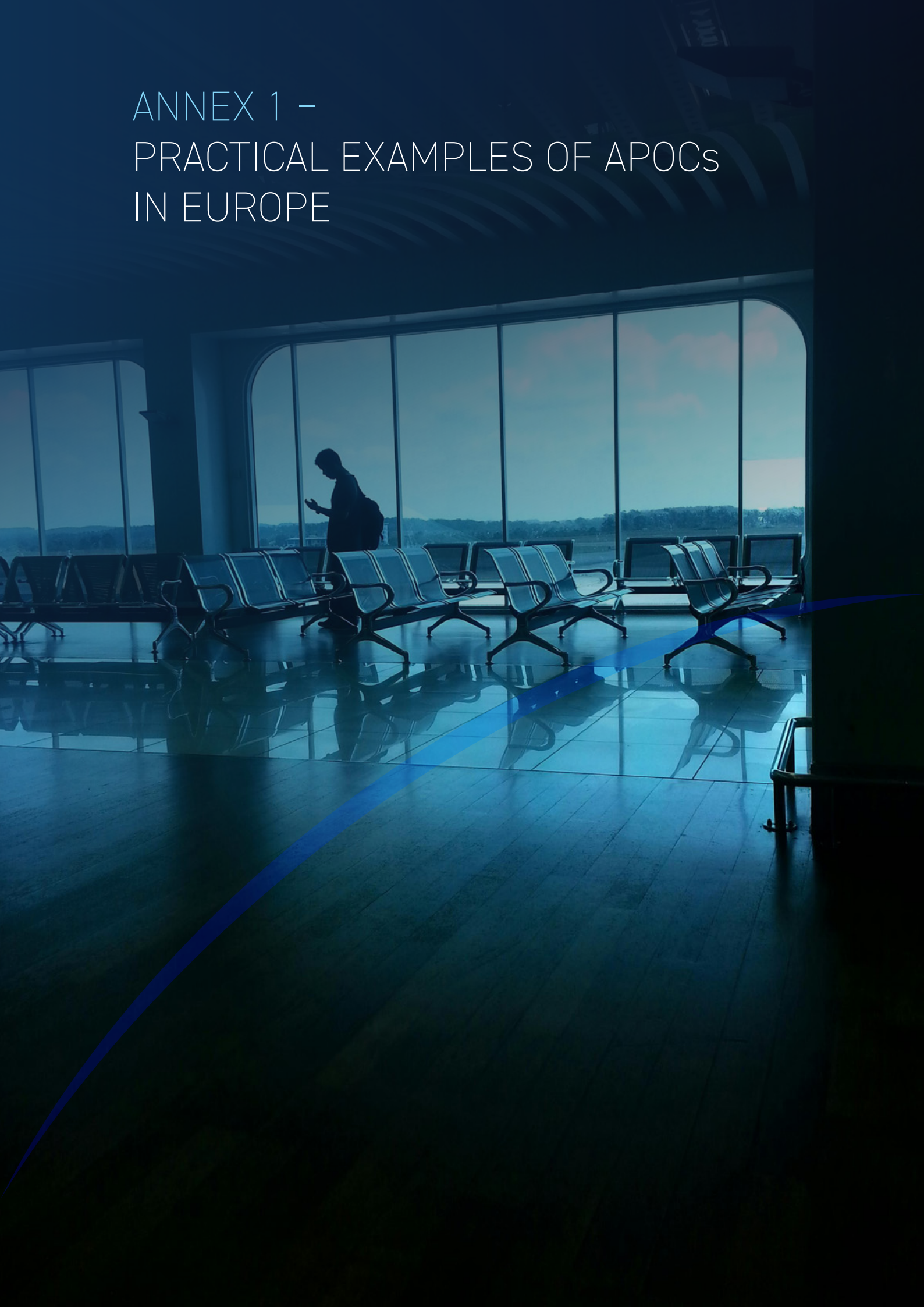
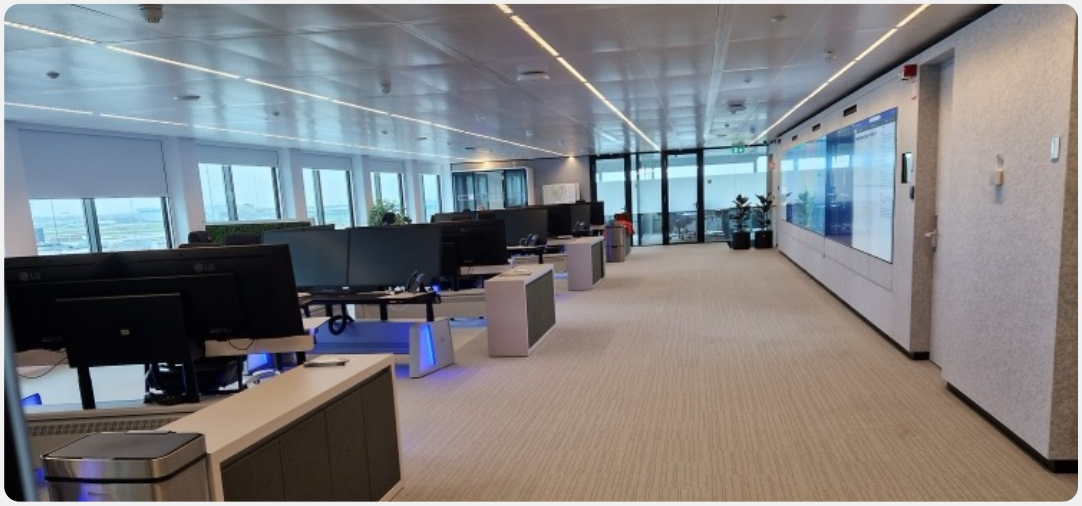
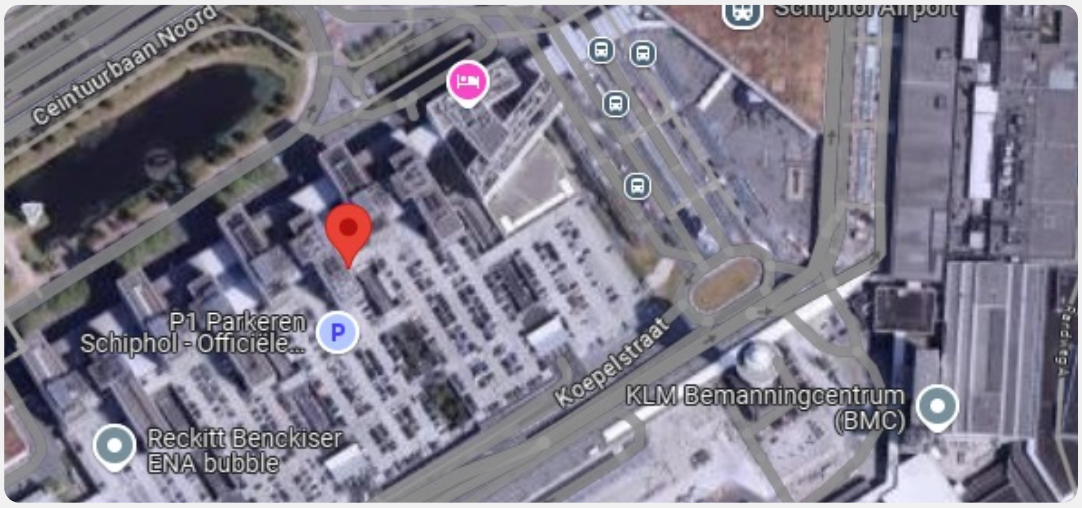
ANNEX 1 – PRACTICAL EXAMPLES OF APOCs IN EUROPE



Schiphol Airport





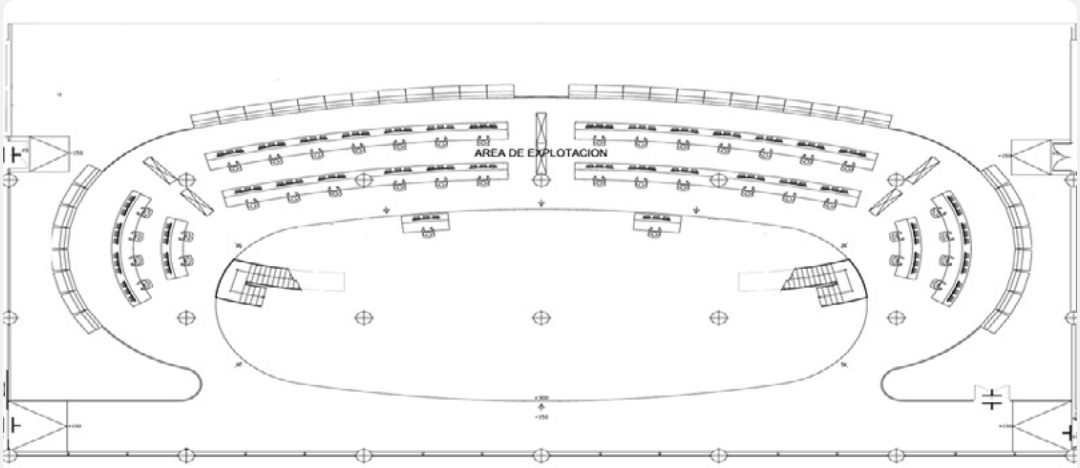
Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
18 work + 16 regie	860 m^2	Yes	D-7/D-1	D0/D+7

- Established in: 2017
- APOC location opened in 2019
- Operational functions since November 2022

Josep Tarradellas Barcelona-El Prat Airport



Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS		
52	4.000m² distributed on 2 floors	No	D-3	D-1	D0 & Post-OPS

- Established in: June 2009
- Other APOC members: Emergency Plan, Fire Stations, Winter Operation, Medical Service, PA Information, Pax transfer, PRM, Maintenance, Boarding Bridges monitoring, Facilities monitoring, Cleaning, Baggage Handling System operator, parking

Belgrade Airport

Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
14	270m²	No	D-X	D0/Post-OPS

- Established in: June 2021
- Moved to a new location in March 2024
- Other APOC members: Maintenance

Brussels Airport

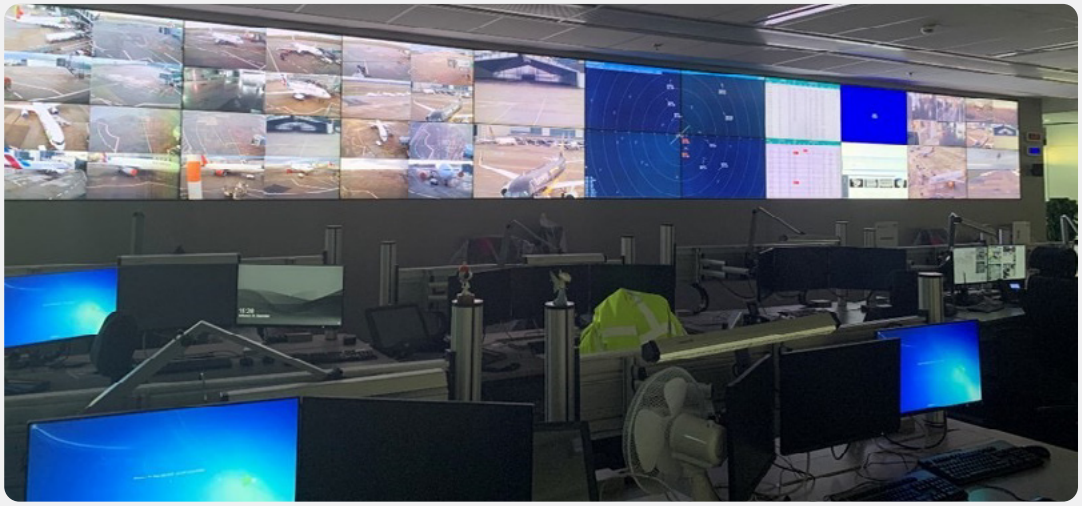
Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

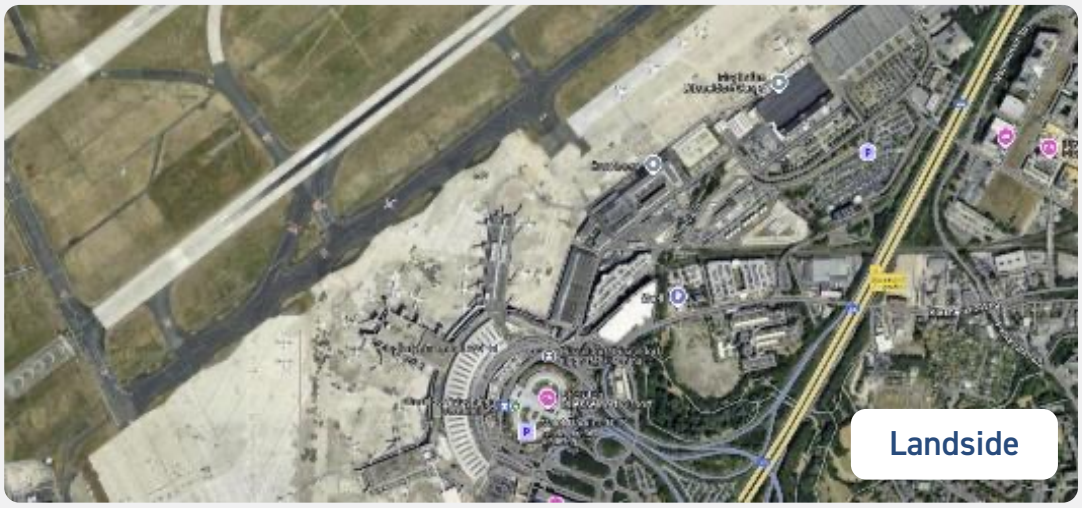
Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
52	1.100m²	Yes	D-3	D0 & Post-OPS

- Established in: May 2015
- Moved to a new location in 2017
- Project ongoing to further expand and improve current location
- Other APOC members: cleaning, social media, technical helpdesk, winter operations, de-icing

Düsseldorf Airport





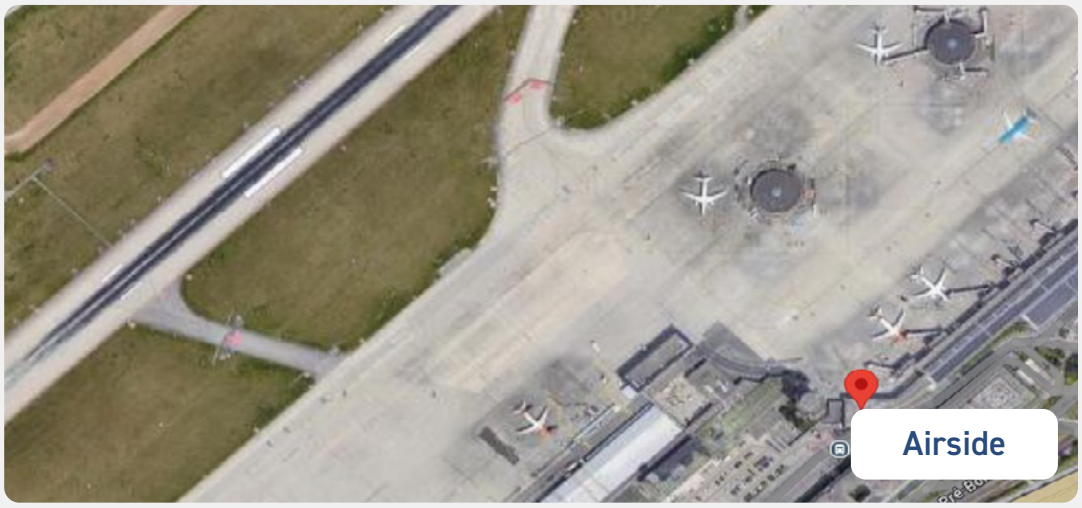
Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
16	500m²	Yes	D-1	D0/Post-OPS

- Established in: October 2012
- Located in the heart of the Terminal building (landside)
- Project started to further expand and improve current location and IT-infrastructure
- Landside and Terminal positions will move in in November 2024
- Other: Pax bus disposition and in winter times De-icing; 6 additional ACC Backoffice workdesks (Quality Management, Preliminary Resource Planning, A-CDM Management)

Geneva Airport



Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
#	260m^2	No	D-7	D0/Post-OPS

- Established in: 2017
- Easyjet representative joined the APOC in 2022
- Ongoing project to welcome other APOC members such as technical helpdesk & bus coordinator

Keflavík Airport

Landside	Terminal	Airside	ATC	MET*
Handlers	Airlines	Security	Border	Other*

Present | Hotdesk/present in briefings *In adverse weather conditions and during crisis | Not present

Positions	Surface	DCB	FOCUS	
13	100m²	No	D-1	D0/Post-OPS

- Established in: February 2021, only with internal stakeholders
- Project ongoing to move to a new and bigger location, this will allow for adding external stakeholders to the APOC and other improvements

Aeroporto Humberto Delgado – Lisbon Airport

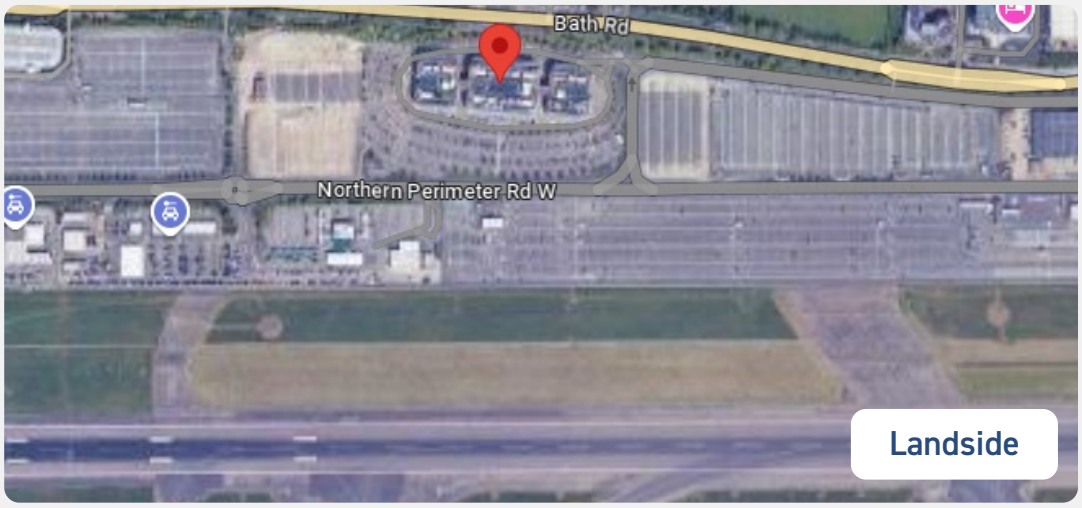
Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
14	163m^2	Ongoing	D0	D+1

- Trials: May 2014
- Shadow mode started: September 2014
- Established in: October 2014

Heathrow Airport (LHR/EGLL)



Landside	Terminal	Airside*	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
45	525m²	Yes	D-1	D0 & Post-OPS

- **Established in: November 2014**
- **Reviewing the 'Target Operating Model' for APOC**
- **Airfield Ops & Safety – Airside Ops Facility*
- **Aircraft Ops and Stand Allocation – APOC*
- **Other – Baggage, Engineering + Help Centre, Comms, IT, Centralised Emergency Services Dispatch (Airport Control), Police, Ops Planning**
- **Interfaces with other control rooms: Rail, Airfield, Fire, Police, Border, Baggage**

Adolfo Suárez Madrid-Barajas Airport

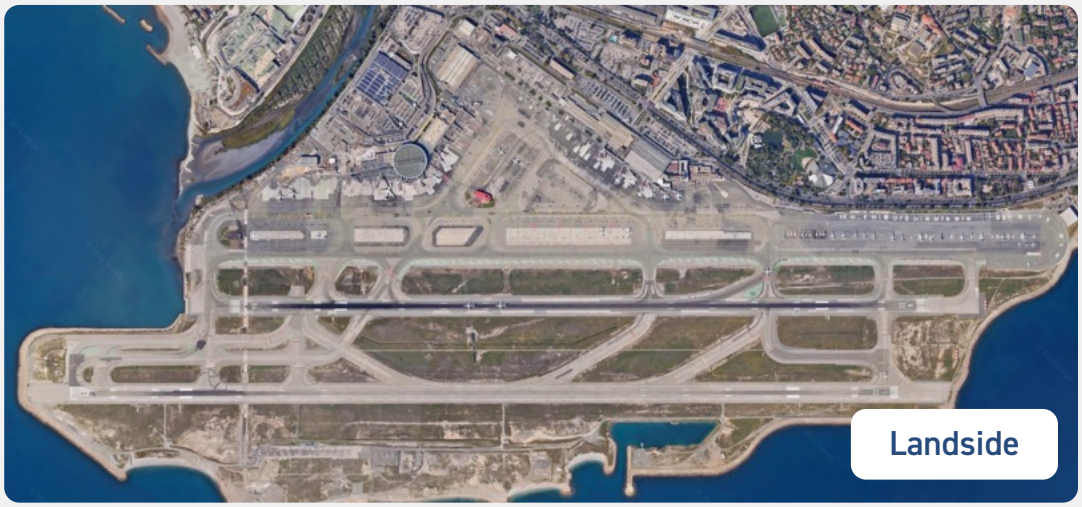
Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS		
90	1.400m²	Yes	D-3	D-1	D0 & Post-OPS

- Established in: February 2006
- Other APOC members: Emergency Plan, Fire Stations, Winter Operation, Medical Service, PA Information, Pax transfer, PRM, Maintenance, Boarding Bridges monitoring, Facilities monitoring, Cleaning, Baggage Handling System operator, parking

Nice Côte d'Azur Airport



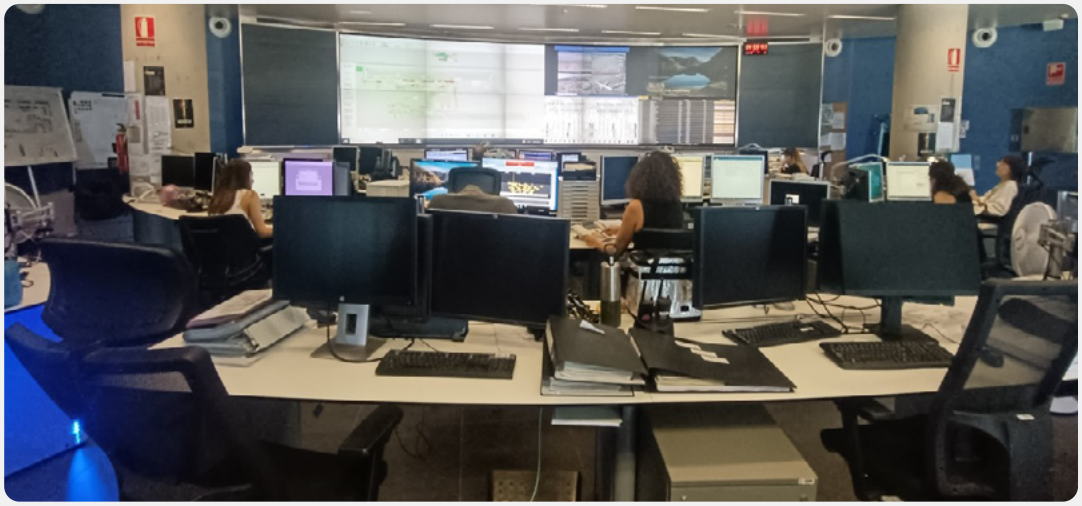
Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
22	200m²	No	D-2	D0

- Established in: December 2020
- Other APOC members: technical process, safety process
- In adverse conditions, temporary APOC members may join: handlers, airlines, police, weather, ATC...
- Continuous improvement of the APOC

Palma de Mallorca Airport



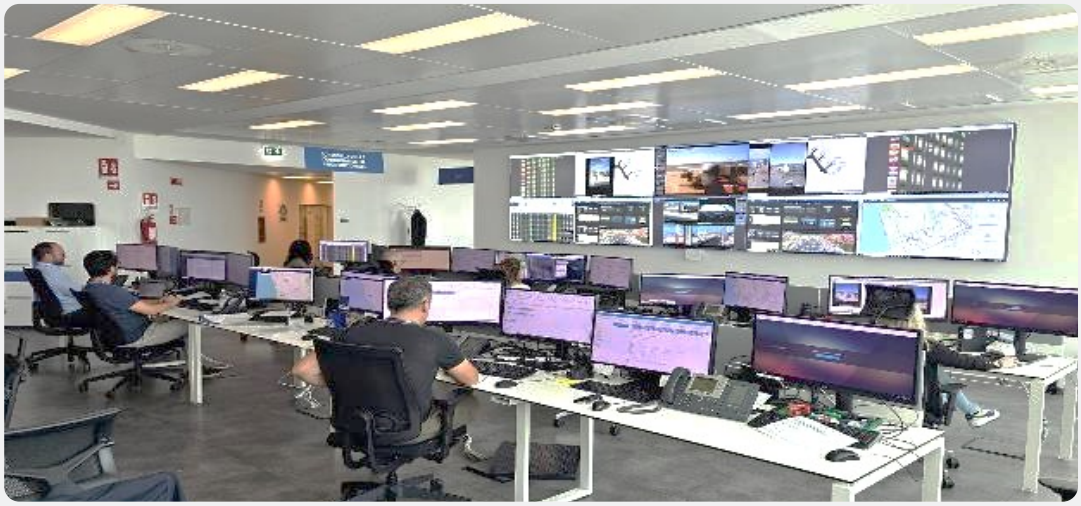
Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
24	200m^2	No	D-2	D0/Post-OPS

- Established in: 2011
- Other APOC members: Incidents Attention Center, Planification team, Crisis Room

Rome FCO “Leonardo da Vinci” Airport



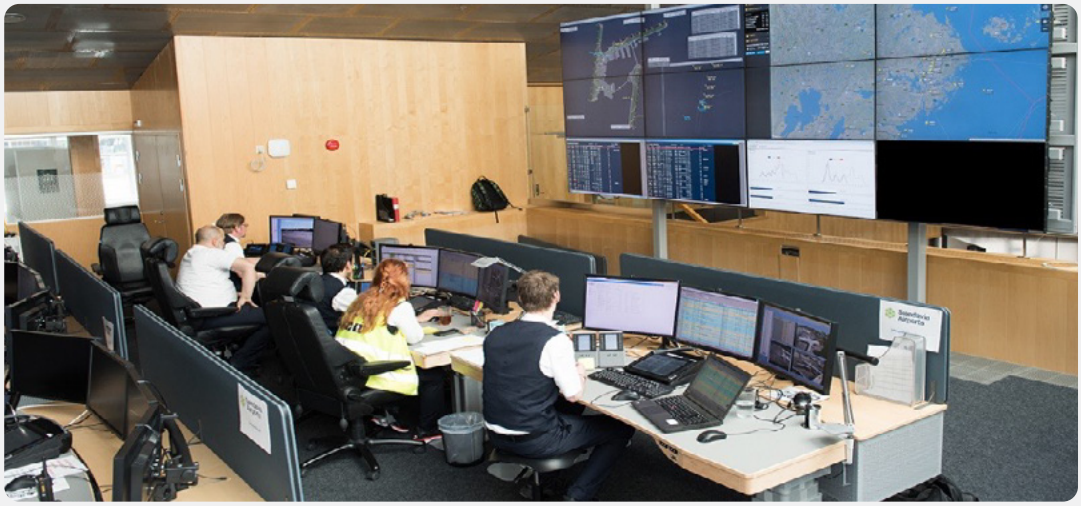
Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
112	1.900m²	Yes	D-60	D0/Post-OPS

- Established in: November 2021
- APOC is a single work area, with 16 control rooms. The APOC Center is undertaking further expansion and continuous improvement
- Airlines: ITA Airways (Hub carrier)
- Other APOC members: IT, maintenance, BHS, Airport duty manager, Terminal fire prevention

Stockholm Arlanda Airport



Landside	Terminal	Airside	ATC	MET
Handlers	Airlines	Security	Border	Other

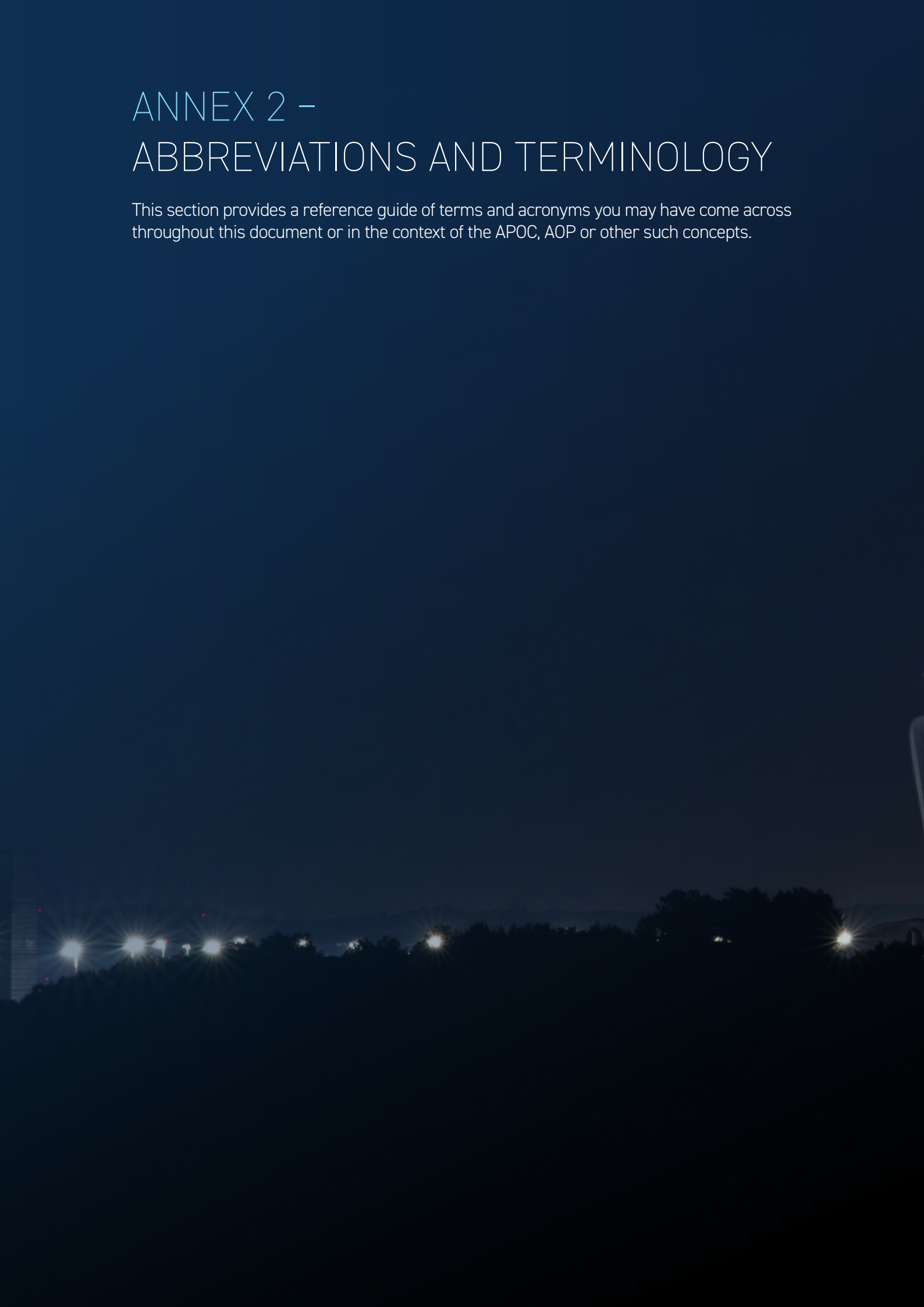
Present | Hotdesk/present in briefings | Not present

Positions	Surface	DCB	FOCUS	
14	300m^2	No	D-3	D-1

- Established in: 2016
- The APOC is situated in the TWR building
- Other functions in the APOC: Technical helpdesk, Pre-tactical planning and Security Control Coordinator.

ANNEX 2 – ABBREVIATIONS AND TERMINOLOGY

This section provides a reference guide of terms and acronyms you may have come across throughout this document or in the context of the APOC, AOP or other such concepts.



AAT

Advanced ATC Tower

An Advanced ATC TWR Airport provides Target Take-Off-Time (TTOT) estimations as well as Variable Taxi-Times (VTTs) and SIDs to the Network Manager. Typically there is little or no coordination with the airport operator.

A-CDM

Airport Collaborative Decision-Making

Airport Collaborative Decision-Making (A-CDM) is focused on the turnaround process of individual flights, between landing and departure. A-CDM is based on key milestones and starts 3 hours before arrival (activation of the flight plan).

ACC, AOC

Airport Control Centre/Airport Operations Centre

A more classic concept where the airport operator manages and controls their activities.

AF

Airport Function

The airport representative in the Network Manager Operations Centre. They are the main tactical point of contact between the Airport Operator and the Network Manager.

AOP

Airport Operations Plan

This is a rolling plan that is constantly updated. The key objective is to have an airport operating plan ready the day before operations (D-1), after evaluating traffic demand vs airport capacity. Based on the impact assessment with all stakeholders, a pre-determined scenario can be chosen including mitigation measures (if necessary).
On D-0 (day of operations) the airport should execute the plan, identify changes early (triggers), adjust the plan as necessary and monitor the pre-agreed airport performance. Data and contextual information relevant for the Network performance will be shared with Network Manager and vice versa.

AOP-NOP

AOP-NOP Integration and Exchange

The exchange of key operational information between airports and the Network Manager.

DCB

Demand-Capacity Balancing

The process of comparing traffic demand vs airport capacity in a certain timeframe, identifying over-demand and taking related mitigating measures. The main objective is to reduce the risk of delays and minimise the financial/environmental impact.
D-1/D-0/D+1 Codes used in relation to the Airport Operations Plan
D-1 = day before operations
D-0 = day of operations (D-day)
D+1 = day after day of operations ('post-ops')
D+7 = 7 days after operations

DPI

Departure Planning Information

Detailed departure planning information for a flight, sent to the Network Manager in a specific format. There are multiple forms of DPIs, depending on the phase in which the departure process and information is available.

ECRA

European Connected Regional Airports

A tool developed and used by the Network Manager to monitor the planning and execution of a particular aircraft during the entire day of operations. Presentation in a Gantt chart form makes it easy to monitor and see where and when any bottlenecks can be expected.

FMP

Flow Management Position

An operational position established in en-route Air Traffic Control units to monitor traffic load for defined sectors (at en-route or at airport level) to ensure that defined traffic volumes can be safely managed by Air Traffic Controllers.
The FMP is the prime interface between Air Traffic Control (ATC) and the Network Manager Operations Centre (NMOC).

NM

Network Manager (EUROCONTROL)

The Network Manager is a function set up by the European Union to execute the network functions as they are laid down in the relevant Implementing Regulation on Network Functions, managing the flow of air traffic throughout Europe, ensuring cooperative decision-making between all operational stakeholders, and providing for the overall view of the European ATM Network. The Network Manager is part of EUROCONTROL.

NMOC

Network Manager Operations Centre

An operations centre based in Brussels (EUROCONTROL) where all enroute European flight operations are monitored 24/7.

NOP

Network Operations Plan

A rolling operational plan set up, maintained and shared by the Network Manager, containing expected traffic, available sector capacities provided by the different Air Traffic Control organisation(s), and expected or actual delay information.

SESAR

Single European Sky ATM Research

Single European Sky ATM Research (SESAR) is a collaborative project to completely overhaul European airspace and its air traffic management (ATM) in order to make it safer, more efficient, to reduce environmental impact, and improve passenger experience.

ACI EUROPE is the European region of Airports Council International (ACI), the only worldwide professional association of airport operators. ACI EUROPE represents over 500 airports in 55 countries. Our members facilitate over 90% of commercial air traffic in Europe. Airports and air connectivity support 14 million jobs, generating €851 billion in European economic activity (5% of GDP). In response to the Climate Emergency, in June 2019 our members committed to achieving Net Zero carbon emissions for operations under their control by 2050, without offsetting.

airport intelligence

Airport Intelligence's goal is simple: using the wealth of knowledge and operational excellence of our expert team, we support airports in achieving their full operational potential. We offer consulting services with a proven set of methodologies, triggering efficient, pro-active and data-driven operations through process optimisation and implementation of TAM, APOC, AOP & A-CDM. Our in-house built AOP solution suite is available for our clients to enable TAM in the most efficient and user-friendly way. We complement our offering with targeted expertise in the development and implementation of Safety Management Systems, Business Continuity Planning & Emergency Management. To ensure the embedding of new ways of working, our experts also offer tailor-made trainings.

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