Supporting European Aviation

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From Airport Collaborative Decision Making to Total Airport Management

Presentation to the ICAO Regional Conference

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EUROCONTROL
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FOUNDING MEMBER SESAR JOINT UNDERTAKING

NETWORK MANAGER

Personal Introduction

- Joined EUROCONTROL in 1995 working on simulations focussing on automated controller tools and strip-less ATC systems
- Early 2000s, led the development of the European 5-year Capacity Planning cycle in close collaboration with the Member States.
- Detachment to Air France (2004/2005) supporting the CCO and early A-CDM implementation project in Paris CDG.
- More recently led EUROCONTROL's contribution to the Airport Operations Management concept in SESAR as well as EUROCONTROL's contribution to the Total Airport Management project (PJ04) in SESAR2020.

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Proposed presentation content….

- Airport Collaborative Decision Making (A-CDM)
- Building blocks for Total Airport Management (TAM) and APOC
- Some examples of APOC tools and typical decision-making
- Questions

The need for airport / network integration

"… airports are key nodes of the European ATM network, an integral part of it and they must be integrated into the network operations to the extent possible. Airports should participate as equal partners in ATFM management at all levels. Airport Operation Plans should be developed together with Network Operations Plan as capacity on the ground needs to be connected to the capacity in the air. In order to achieve this integration into the network, digital solutions will surely play a very significant role.''

Henrik Hololei, Director-General for Mobility and Transport speaking at the ACI-Europe / EUROCONTROL Digitally Connected airports conference, 27 Feb.

"Airports are complex operational ecosystems and a crucial component of the European air traffic management network. Their full integration into the network is paramount. The exchange of advanced information and the full cooperation among all operational stakeholders will allow a true network approach and effective decision making, which is especially important in these times of crisis"

Iacopo Prissinotti – Director Network Manager

It seems a long time ago….

https://www.eurocontrol.int/articles/challenges-growth

- 3.8% traffic growth in European network in 2018
- There were 19 days in 2018 with more than 36 000 flights…..and none in 2017.
- 30 168 flights per day on average with peak day at 37 101 flights (07 Sept 2018).
- En-route ATFM delay for 2018 **close to 20million minutes** or 1.78 minutes per flight :
  - 3 times the network target
  - Double the value in 2017
  - If airport ATFM delays are included then total flight delay is **equivalent to 50 years !**
- The most likely scenario set out in the Challenges of Growth report (1.9% growth/year) shows **an increase of 53% in flights by 2040** – to 16.2 million a year
- **By 2040, 16 airports will be highly congested operating at close to capacity for much of the day** (up from 6 airports today)

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Airport Collaborative Decision Making (A-CDM)

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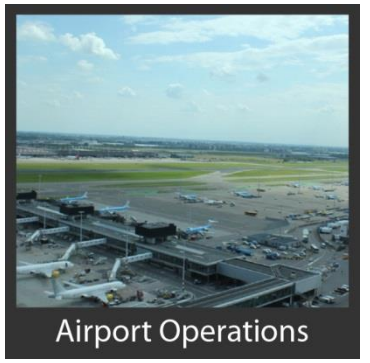
Today's "Airport Operations Challenge"….

- Multiple stakeholders and systems
- Decisions based on insufficient or poor quality information
- No individual partner has the complete picture
- Airports can be seen as "black holes" from the network perspective
- Low level of pro-active management
- Expansion is very difficult – so need to optimise the efficiency of the existing infrastructure

With negative effects on :
Punctuality, Predictability, Efficiency…and even Network Performance

Airport CDM – who is involved ?


Network Operations


Airport Operations

- Improve predictability
- Improve on-time performance
- Reduce ground movement costs
- Optimise use of infrastructure & reduce congestion
- Improve network flow and capacity management
- Flexible pre-departure planning
- Reduce apron & taxiway congestion


Air Traffic Control


Aircraft Operators

Ground Handling

Milestone Approach

Key Definitions

- **Target Off-Block Time (TOBT)**

  The time that an **Aircraft Operator or Ground Handler** estimates that an aircraft will be ready, all doors closed, boarding bridge removed, push back vehicle available and ready to start up / push back immediately upon reception of clearance from the Tower

- **Target Start up Approval Time (TSAT)**

  The time provided by ATC taking into account TOBT, CTOT and / or the traffic situation that an aircraft can expect start up / push back approval

The notion of ‘target’ is vital.
All stakeholders are working to achieve the target
Need to update the target if compromised

A-CDM Guidance Material

Principal European Guidance Material is “Airport CDM Implementation – The Manual”
It comprises :

- Descriptions of each concept element
- Guidance for setting up a CDM project
- Implementation Guidelines
- Risks and mitigation
- Success criteria
- Post implementation activities

Download the manual at :

www.euro-cdm.org

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Total Airport Management

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Our airspace is busy & complex with high traffic volumes

What are the problems for airports?

Total Airport Management – TAM

Operational Context - “Total Airport Management”

A-CDM is the first building block

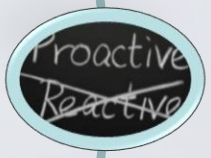
TAM means a more holistic view:

- Move away from purely aircraft view :
  - Consider various processes contributing to efficiency and punctuality including the passenger process.
  - (Arrival -> Turnaround -> Departure) link to (check-in -> Security -> Boarding)
- **Reinforce information sharing (single ‘Airport Operations Plan’)**
- **Enhance the collaborative processes (APOC / AOCC) based on traditional management cycle of plan, execute, monitor, act;**
- Performance based predictive management rather than reactive management;

Airport Operation Centres - APOC

Airport stakeholders and their data: integrated processes

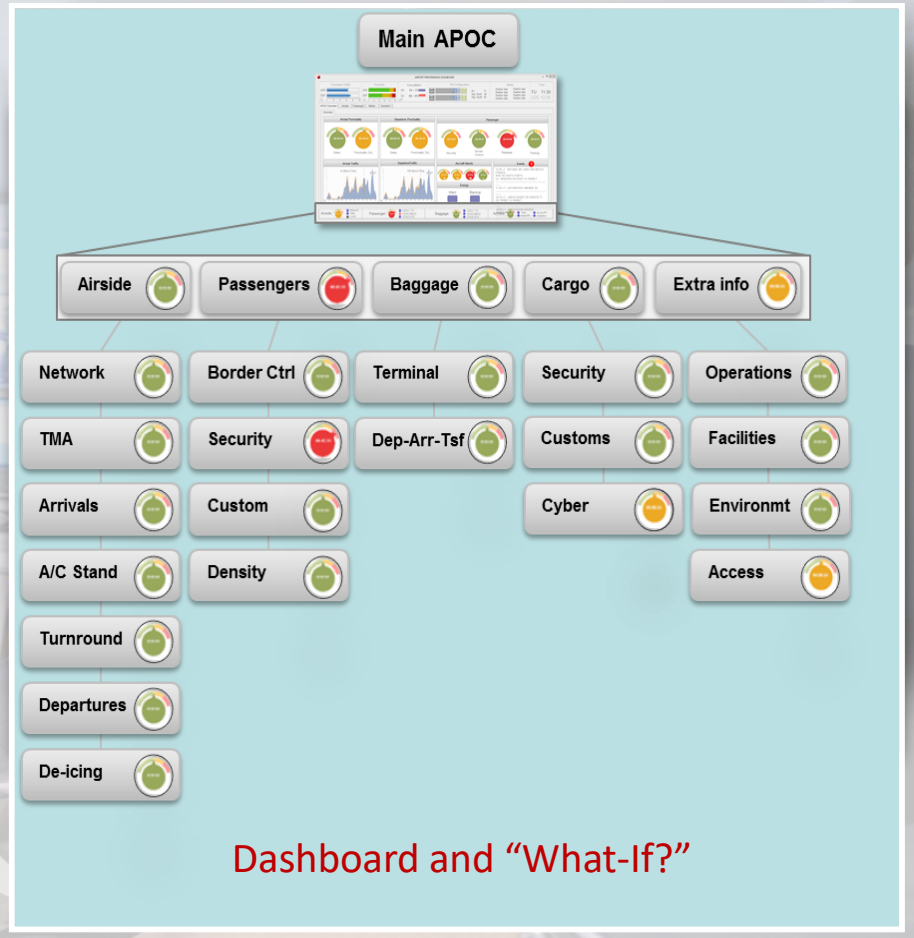
Holistic view – Airside / Landside / Network



Predictive, analytics, machine learning, optimisation

Performance - Less delay & disruption, better punctuality

Drives passenger satisfaction and quality of service



Heathrow has a very limited “capacity reserve”

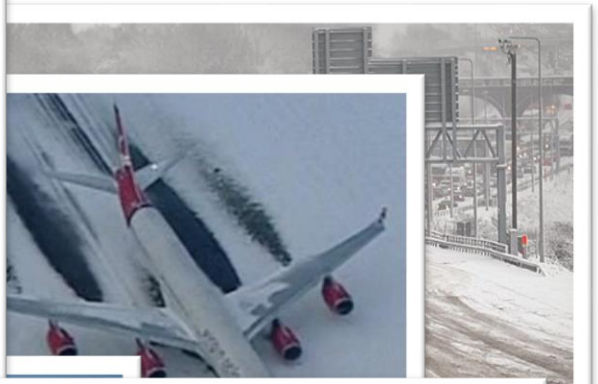
- LHR functions almost at full capacity, all of the day and every day of the year
- The UK Government forbids night flying at the airport
- As a consequence, there is very limited capacity if there is a need to recover from a degraded situation

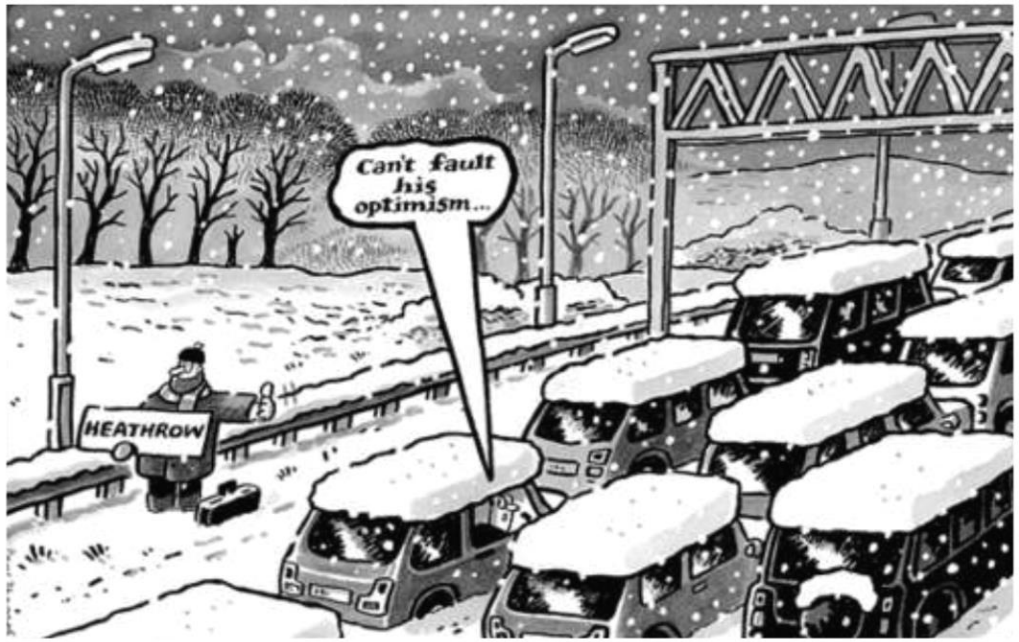
There's no business like snow business

-27C in Munich, but still every plane flies…meanwhile, despite £32m on new snowploughs, Heathrow cancels flights BEFORE a flake of snow falls

IT'S SNOW-GO HEATHROW!

AIRPORT bosses came under fire last night after cancelling … By Christopher Leake



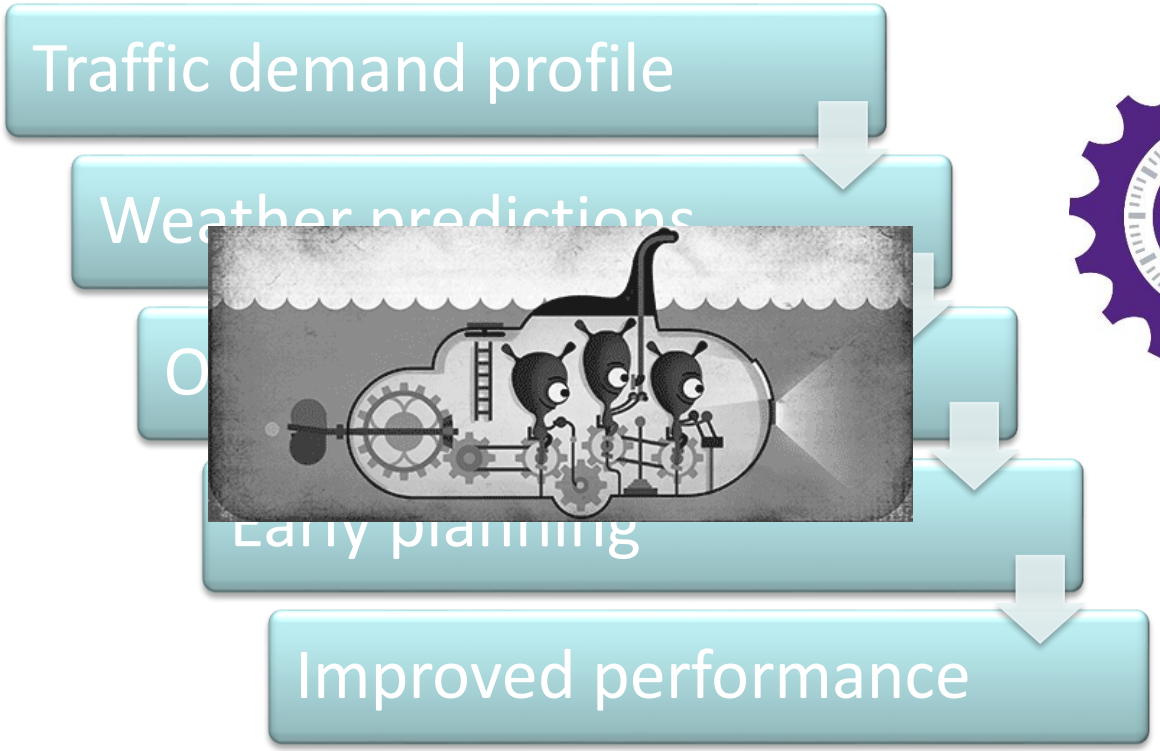


Winter 2010


BBC NEWS
Heathrow Winter Resilience Enquiry
"…there was no command and communication centre allowing each actor to have a real-time visualisation of the state of the airport"

To efficiently manage operations, there is a need to establish a detailed daily plan.

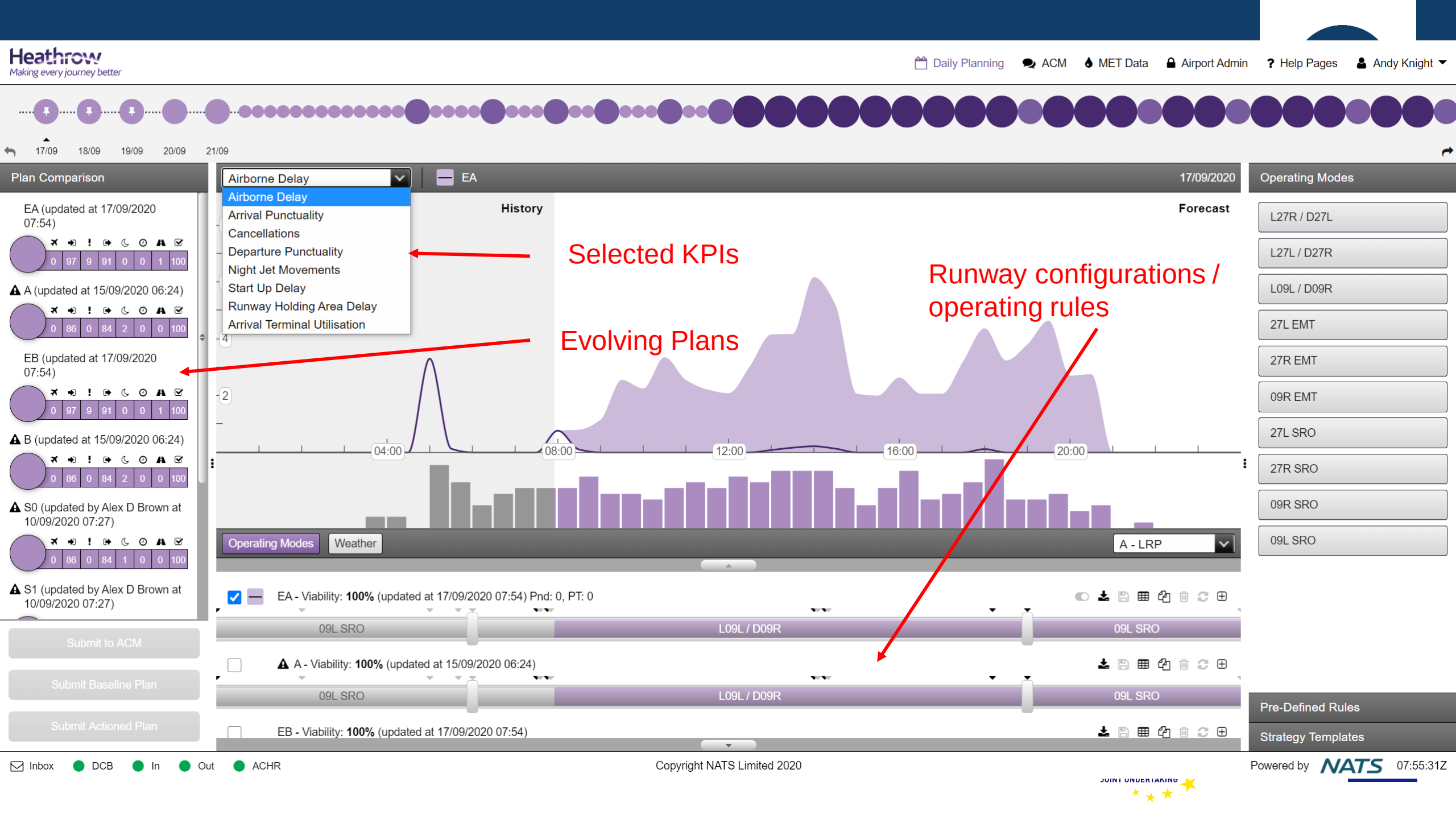
Daily operational mode =



Accurate information is essential

Developing the daily Plan

- Initial Plan (baseline) can be generated as soon as the traffic schedule is known (D-6months).
  - At this stage, there is no assessment of how the airport will be operated (resource availability, runway configurations etc)
- As the day of operations approaches (D-2) a more accurate plan is developed taking into account the likely runway configurations and all automatic updates to the demand profile.
- Many different ‘parallel plans’ can exist.
- At D-1, update the AOP with the selected plan for D day, agreed by the airport and ANSP and share with all APOC stakeholders.


Heathrow
Making every journey better
Daily Planning
ACM
MET Data
Airport Admin
Help Pages
Andy Knight
17/09
18/09
19/09
20/09
21/09
Plan Comparison
EA (updated at 17/09/2020 07:54)
0 97 9 91 0 0 1 100
A (updated at 15/09/2020 06:24)
0 86 0 84 2 0 0 100
EB (updated at 17/09/2020 07:54)
0 97 9 91 0 0 1 100
B (updated at 15/09/2020 06:24)
0 86 0 84 2 0 0 100
S0 (updated by Alex D Brown at 10/09/2020 07:27)
0 86 0 84 1 0 0 100
S1 (updated by Alex D Brown at 10/09/2020 07:27)
Submit to ACM
Submit Baseline Plan
Submit Actioned Plan
Airborne Delay
EA
17/09/2020
Airborne Delay
Arrival Punctuality
Cancellations
Departure Punctuality
Night Jet Movements
Start Up Delay
Runway Holding Area Delay
Arrival Terminal Utilisation
History
Forecast
Selected KPIs
Runway configurations / operating rules
Evolving Plans
4
2
04:00
08:00
12:00
16:00
20:00
Operating Modes
Weather
A - LRP
EA - Viability: 100% (updated at 17/09/2020 07:54) Pnd: 0, PT: 0
09L SRO
L09L / D09R
09L SRO
A - Viability: 100% (updated at 15/09/2020 06:24)
09L SRO
L09L / D09R
09L SRO
EB - Viability: 100% (updated at 17/09/2020 07:54)
Operating Modes
L27R / D27L
L27L / D27R
L09L / D09R
27L EMT
27R EMT
09R EMT
27L SRO
27R SRO
09R SRO
09L SRO
Pre-Defined Rules
Strategy Templates
Inbox
DCB
In
Out
ACHR
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An intense focus on passenger service quality

Immigration Flow

Rather than base predicted load at the immigration desks, it is possible to use the predicted arrival time from the DCB tool and parameters such as walking time to predict accurately the real load at the immigration desks. Allows for more efficient resource allocation

Tight and Missed Connections

Again, using the predicted arrival times for flights and the minimum connecting times, it is possible to identify flights where passengers will have tight or missed connections. This leads to the possibility to assist the passengers in their connections (tight) or assist in re-booking etc in the event of missed connections.

In summary:

- The future **APOC is essential** to increasing the resilience and operational performance of airports
- This means **less delay** and **better punctuality** for passengers, resulting in **improved customer service**
- It requires the **collaboration** of all airport stakeholders, **integration** of data & **common situational awareness**
- More accurate information & data means **better planning, reduced disruption** and **greater service** for customers
- **Better operational decisions** at an earlier stage to make **best use of capacity**

"…the single piece of technology within our operation that has had the biggest impact on the passenger"

Heathrow Objective

Happy passengers, travelling with their bags, on time.

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Thank you

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