INTEGRATING AIRPORTS INTO THE ATM SYSTEM

David Bowen
Head of ATM Operations & Systems
SESAR Joint Undertaking
Main Airport Objective

- “To achieve full integration of Airports into the ATM Network”
- To allow knock-on effect transmissions down the Network:
  - Introducing the butterfly Effect in ATM

---a small change at one place in a complex system can have large effects elsewhere

From Reactive Performance Management

- Airports will obtain Accurate Predictive information of Traffic Evolution
  - Monitored and Transmitted by a fully airborne-airport integrated Network

To Proactive Performance Management

Based on Post Analysis

Based on a Predictive Network Model
- The SESAR airport is fully-integrated into the ATM environment.

- The planned and integrated management of aircraft at the airport forms part of the trajectory management concept, encapsulated in the ATV.

- Operations are managed using the Airport Operations Plan (AOP). Stakeholders interact with the AOP using an airport Collaborative Decision-Making (CDM) environment.

- Data from the AOP, and AOPs from other airports, are shared with the Network Operating Plan (NOP) via System-Wide Information Management (SWIM).
Airborne Spacing on Arrival

- Avionics are used to achieve and maintain spacing between two aircraft on arrival
- Spacing is more precise, which maximizes runway throughput
- Separation responsibility is not delegated to flight crew
Integration of Departure and Arrival Managers

- Arrival and Departure Rates and Patterns are dynamically determined based on demand (ADA, ADDA, etc.)
- Output is used by AMAN to determine time at arrival metering fixes and by DMAN to determine take-off times
- Airport capacity and efficiency is maximized
Enhanced Runway Throughput

- Time-based separation on final approach improves the landing rate resilience to headwind conditions on final approach when compared to distance based separations (DBS).

- Enhanced Runway Management Through Optimised Braking Systems maximises runway throughput and capitalises on more predictable operational consistency.

- Weather Dependent Surveillance will be applied when weather is such that wake will either dissipate faster or be transported out of the follower path. WDS will help recover from delays by increasing the throughput above the normal capacity over the duration of the favourable weather conditions.
Integrated surface management

- The system calculates the best taxi route by minimizing delay according to planning, ground rules, and potential conflicts with other mobiles.

- The system displays dynamic traffic context information, including runways, taxiways, obstacles etc. Routes provided by ATC are displayed and Ground signs (stop bars, centreline lights etc) are triggered automatically.

- Exchange between Vehicle Drivers and Controller using data link.

- Exchange between Flight Crew and Controller using data link for start-up/pushback, runway exit and for taxi (D-TAXI services).
Low-visibility operations

Low-visibility conditions reduce runway throughput, and therefore airport capacity.

- GBAS-based CAT II/III operations will increase efficiency, capacity, landing rate and safety.

In reduced visibility conditions, level of delay increases, reducing airport capacity. ATCOs, flight crews and vehicle drivers operate under block control without system assistance, limiting situational awareness. Capacity is significantly reduced.

- Advanced airfield Ground Lighting (‘Follow-the-greens’) improves safety and efficiency.
Actions have been taken to reduce runway incursions, and some safety nets have been introduced for ATCOs, but some safety issues remain on the airport surface.

Enhancement of existing, and development of new Airport Safety support tools for pilots, vehicle drivers and controllers will help to prevent collisions by predicting, detecting and providing alerts for safety critical issues on the airport surface. These include:

- Runway Status Lights;
- Conflicting ATC Clearance Alerts;
- Conformance Monitoring Alerts for Controllers;
- Alerts for Pilots; and
- Alerts for vehicle drivers.
Remote Towers

- Tower Air Traffic Services (ATS) and Aerodrome Flight Information Services (AFIS) are provided from control facilities based at a remote location.

- Remote tower centres provide remote services to multiple airports.

- Contingency control facilities are provided to enable services to continue to be provided in the case of loss of the main tower at busy airports.

- Advanced technologies provide supplementary information to controllers to improve controller situational awareness and support decision making.
Thanks for your attention