Aircraft spotlight
What to expect from the next generation of aircraft

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AIRPORT OPERATIONS - Organization

Assistant

Head of Airport Operations (EIJ)

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Safety, Airport Programs and Environmental Affairs in Airbus Americas, Inc.

Airside Operations Department (EIJA)

- Aircraft maneuvers
- Airport database
- Engine topics
- Airport capacity
- Operational concepts for R&T
- ILS interferences
- Airside compatibility

Ground Operations Department (EIJG)

- GSE staging
- Environment
- GSE compatibility
- New equipment
- Turnaround time
- Aircraft Maintenance Manual
- Airfield Pavement Department (EIJL)

- Pavement design
- ACN/PCN
- Full scale tests
- Tire pressure effect
- Pavement roughness
- Analyses and diagnostics

Transverse topics:
- Participation to regulatory working groups (ICAO, EASA) and standardization bodies
- Operational data analyses
- Coordination with external stakeholders (airport operators, civil aviation authorities, etc)
- Analysis of Airbus products vs regulation and standards
- Aircraft Characteristics for Airport Planning document
Airport Operations Expertise

- Airport assessments (including ground maneuvers, pavement loading, regulatory compliance)

- Turn-Round Time optimization studies

- Modelling of traffic increase linked to future SA production rate increase with AirTOp simulation tool to assess potential congestion issues & benefits of adding new taxiways.
Airport Operations Expertise

• Identification of taxi routings as a support to airport assessments

• Analyses e.g. taxi times vs temperature

• Pavement distress analysis

• Turnpads extension
Airport Operations Expertise

• Design/accommodation impact analysis
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Issue 1
Traffic doubles every 15 years

World annual traffic (trillion RPKs)  
ICAO total traffic  
Airbus GMF 2017 – 4.4% growth per annum

- Runway capacity
- Aircraft stands
- Terminals
- Environment

RPK = Revenue Passenger Kilometre

Source: ICAO, Airbus GMF
20-year demand (34,899 aircraft)

Passenger aircraft (≥ 100 seats)
- 24,807 single-aisle aircraft
- 8,686 twin-aisle aircraft
- 1,406 very large aircraft

Jet freight aircraft (>10 tons)

Source: Airbus GMF 2017
Fleet in service evolution

Number of aircraft:
- Beginning 2017: 20,500
- 2036:
  - Growth: 22,030
  - Replacement: 12,870
  - Stay: 7,630
- New Deliveries: 34,900

20-year new deliveries
An **Airbus** takes off or lands **every 1.4 seconds**

- **18,234** Orders
- **10,991** Deliveries
- **7,243** Backlog

**End December 2016**

**End February 2018**

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Airbus Aircraft: next developments

A319neo CFM/PW and ACJ320neo certification in 2018
Airspace cabin in 2020

A330neo EIS in 2018, including Airspace cabin
A330neo 251t MTOW in 2020

A350-1000 EIS in Q1 2018
A350-900 Ultra Long Range and
A350-900 Regional EIS in 2018
A350-900 Domestic EIS in 2019:

A380 increased cabin efficiency enablers in 2019
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There are currently 58 Aviation Mega-Cities

2016 Aviation Mega-Cities

45 out of 58 are schedule-constrained

- IATA WSG level 1: airport infrastructure is adequate
- IATA WSG level 2: airports with potential for congestion
- IATA WSG level 3: airports where conditions make it impossible to meet demand
There will be 95 Aviation Mega-Cities by 2036

2036 Aviation Mega-Cities

- >50,000 daily long-haul passengers
- >20,000 daily long-haul passengers
- >10,000 daily long-haul passengers

95 Aviation Mega-cities

2.7M Daily Passengers: Long-Haul traffic to/from/via Mega-Cities

98% of long-haul traffic on routes to/from/via Mega-Cities

+37

+2.5

+3%
Airport: capacity limitations

Major bottlenecks

- Runways (incl. airspace and ATM limits)
- Aircraft stands
- Taxiways
- Environment

~10% of flight delays are due to airport congestion

Air Traffic Growth is impacted by airport capacity.
Maximize Runway capacity

Bigger aircraft

Reduce RWY Occupancy Time
Reduce separations (radar, wake vortex)
Eliminate curfews
Maximize stand capacity

Maximize aircraft size in stand
- A321 instead of A319
- MARS concept
- Reduce clearance margins

Minimize the time the aircraft occupies the stand
- Industrialize the turnaround process
- Monitoring & Control
- Reduce or eliminate variations
- Reduce margins
- Integrate aircraft into A-CDM
- Robotics for servicing - less people on the apron
Moving Terminal concept
Monitoring & control

Some examples

Platform to improve operational performance

Autonomous passenger stairs
Conclusions

More and bigger aircraft

More passengers per aircraft

More technology to industrialize the process

More ….
Engine concepts for tomorrow

Counter rotating fan

Open Rotor

Counter rotating open rotor

Engine research

Working with engine manufacturers researching the next steps in engine technology to further reduce noise and emissions
Airbus future hybrid Single Aisle aircraft

Electrical-hybrid to improve fuel economy and reduce exhaust gas and noise emissions for future aircraft designs.

One advanced gas power unit to provide electrical power for six internally mounted fans that skim air off fuselage boundary layer.
Regulations will have to balance noise, CO₂ and NOx emissions requirements. All impose different requirements on aircraft design.
Preparing the future

Flying wing

Autonomous vehicle

Supersonic/Hypersonic aircraft

Electric technology
Thank you