



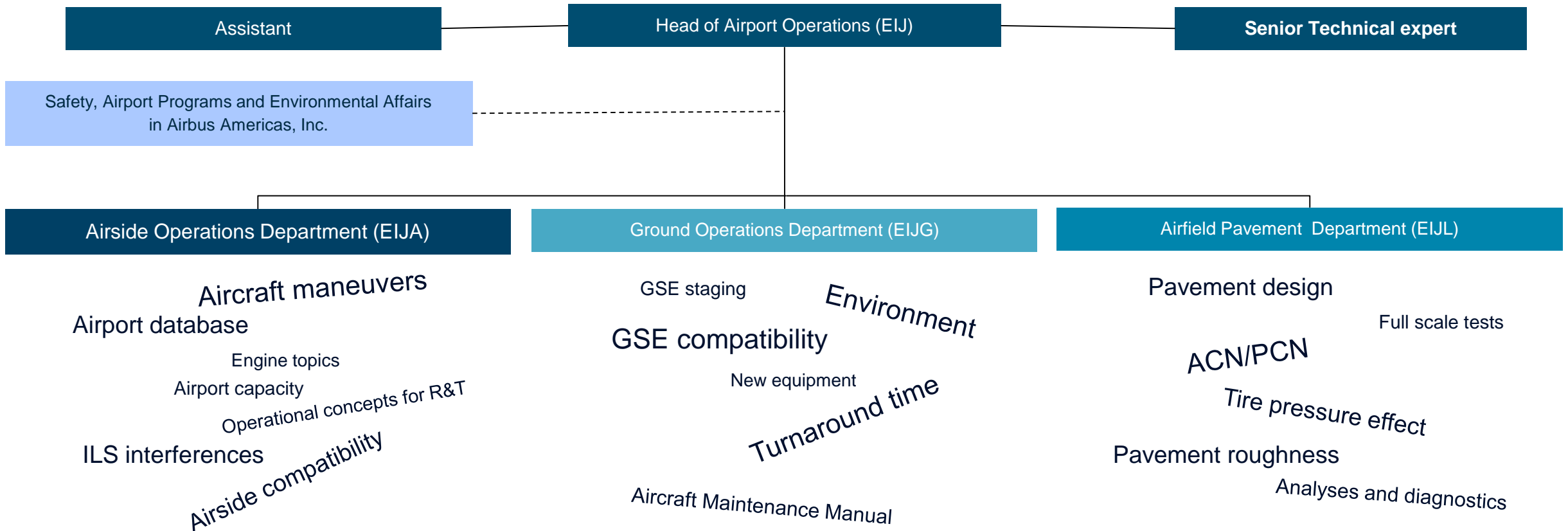
# Aircraft spotlight

What to expect from the next generation of aircraft

Sebastien Lavina  
Airbus Airport Operations  
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**AIRBUS**

# AIRPORT OPERATIONS - Organization



**Transverse topics:**

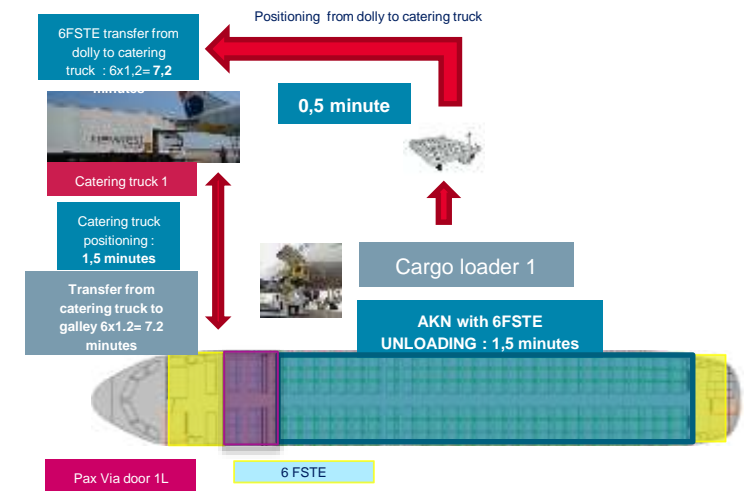
- Participation to regulatory working groups (ICAO, EASA) and standardization bodies
- Operational data analyses
- Coordination with external stakeholders (airport operators, civil aviation authorities, etc)
- Analysis of Airbus products vs regulation and standards
- Aircraft Characteristics for Airport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

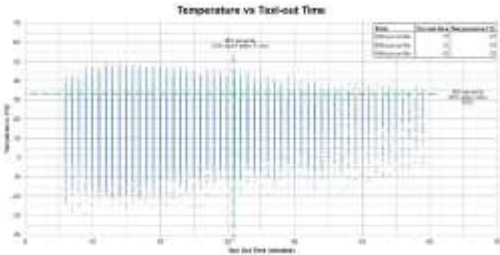


# Airport Operations Expertise

- Identification of taxi routings as a support to airport assessments



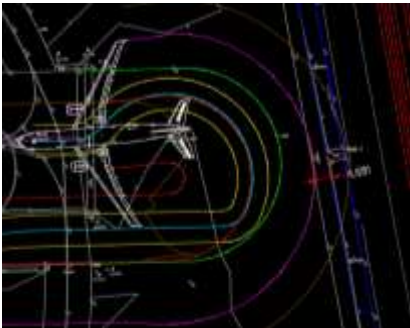
- Analyses e.g. taxi times vs temperature



- Pavement distress analysis

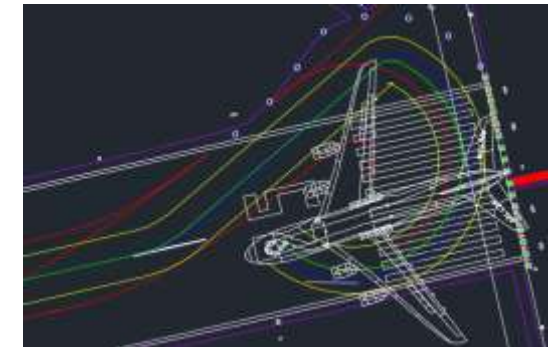
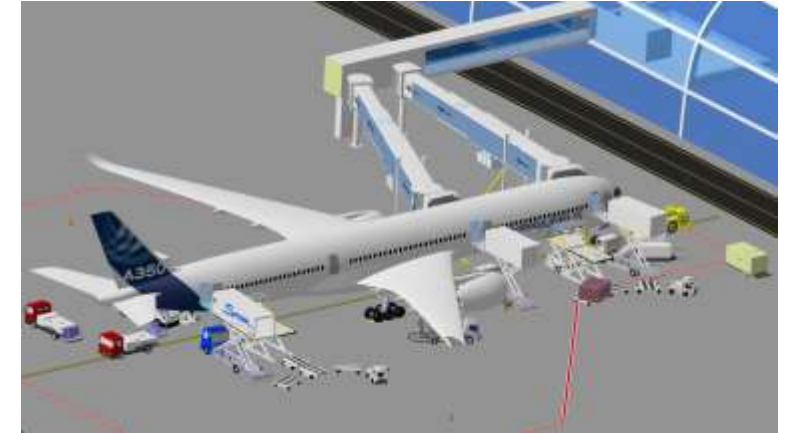
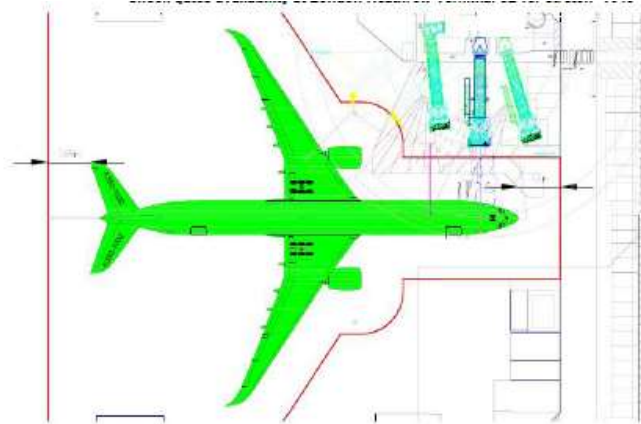
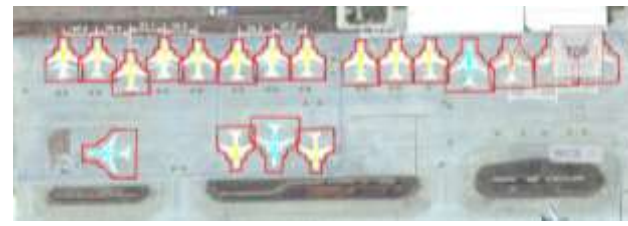


- Turnpads extension



# Airport Operations Expertise

- Design/accommodation impact analysis



# Contents

The trends – General Market Forecast

Growth – airport capacity constraints

Digital & robotics

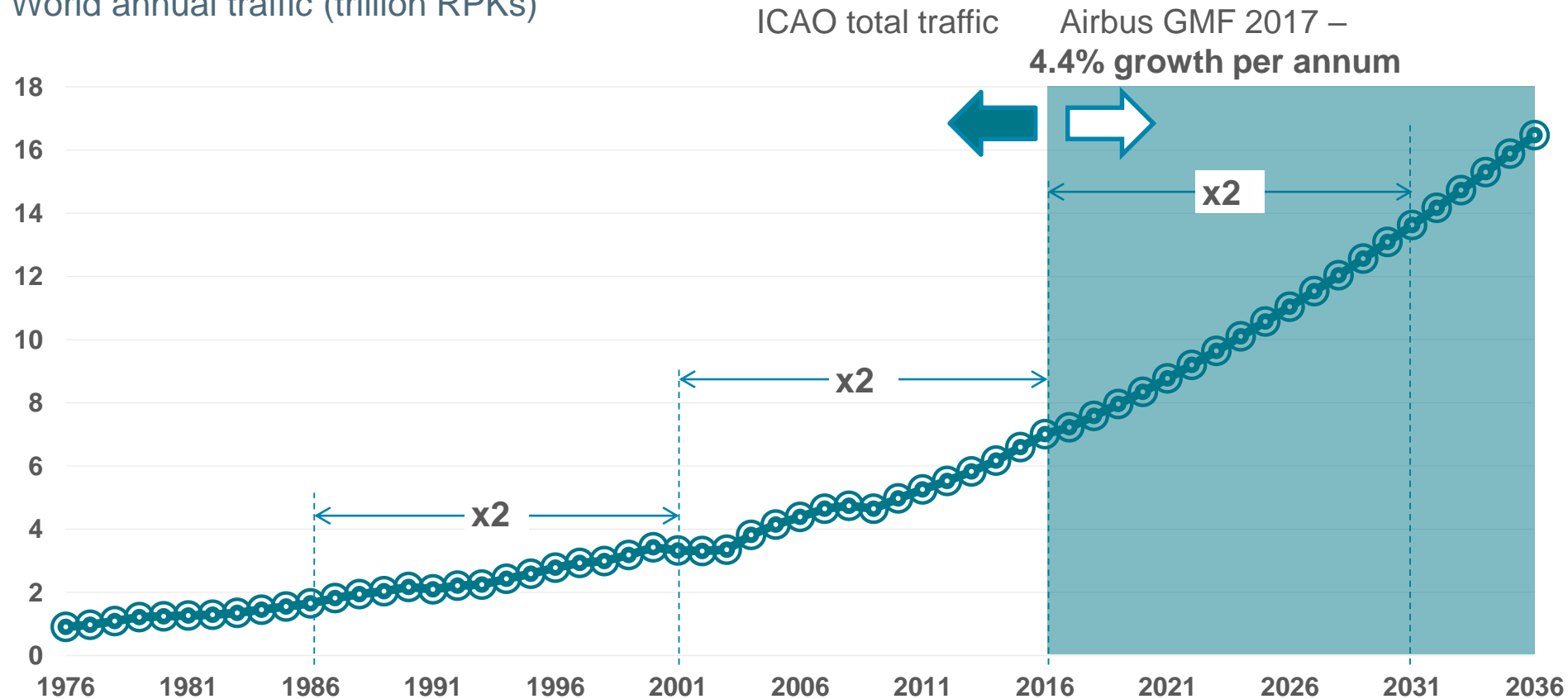
Conclusions





# Traffic doubles every 15 years

World annual traffic (trillion RPKs)



## Airport challenges

- Runway capacity
- Aircraft stands
- Terminals
- Environment

RPK = Revenue Passenger  
Kilometre

Source: ICAO, Airbus GMF

**24,807** single-aisle aircraft



**8,686** twin-aisle aircraft



**1,406** very large aircraft



20-year demand  
(34,899 aircraft)

Passenger aircraft  
(≥ 100 seats)

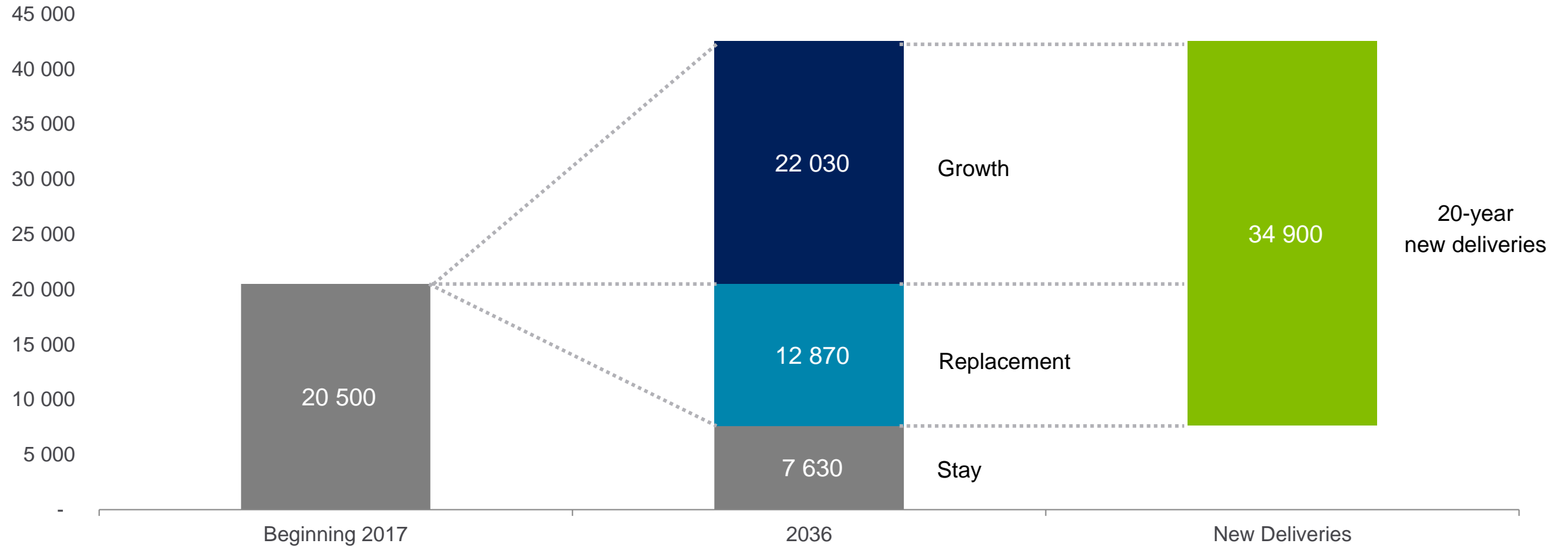
Jet freight aircraft  
(>10 tons)

Source: Airbus  
GMF 2017



# Fleet in service evolution

Number of aircraft\*



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

**AIRBUS**

## 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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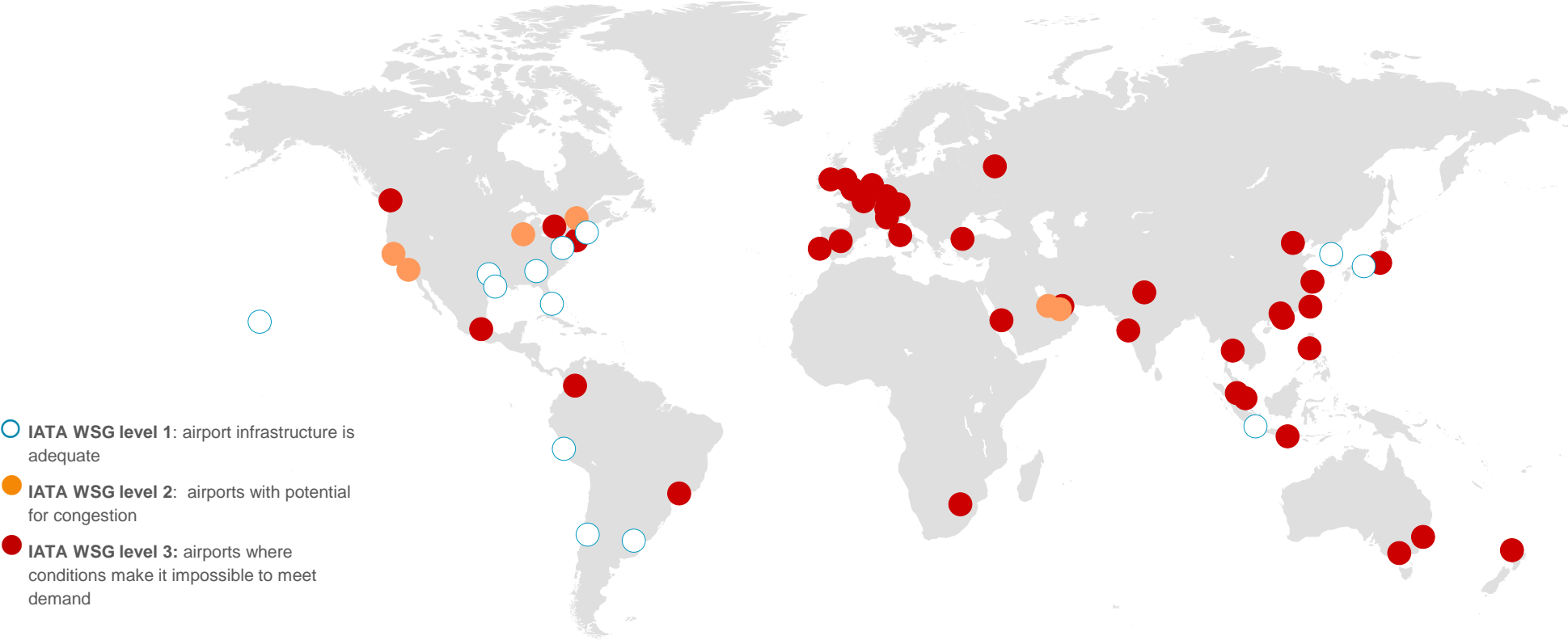
Digital & robotics

Conclusions

# There are currently 58 Aviation Mega-Cities

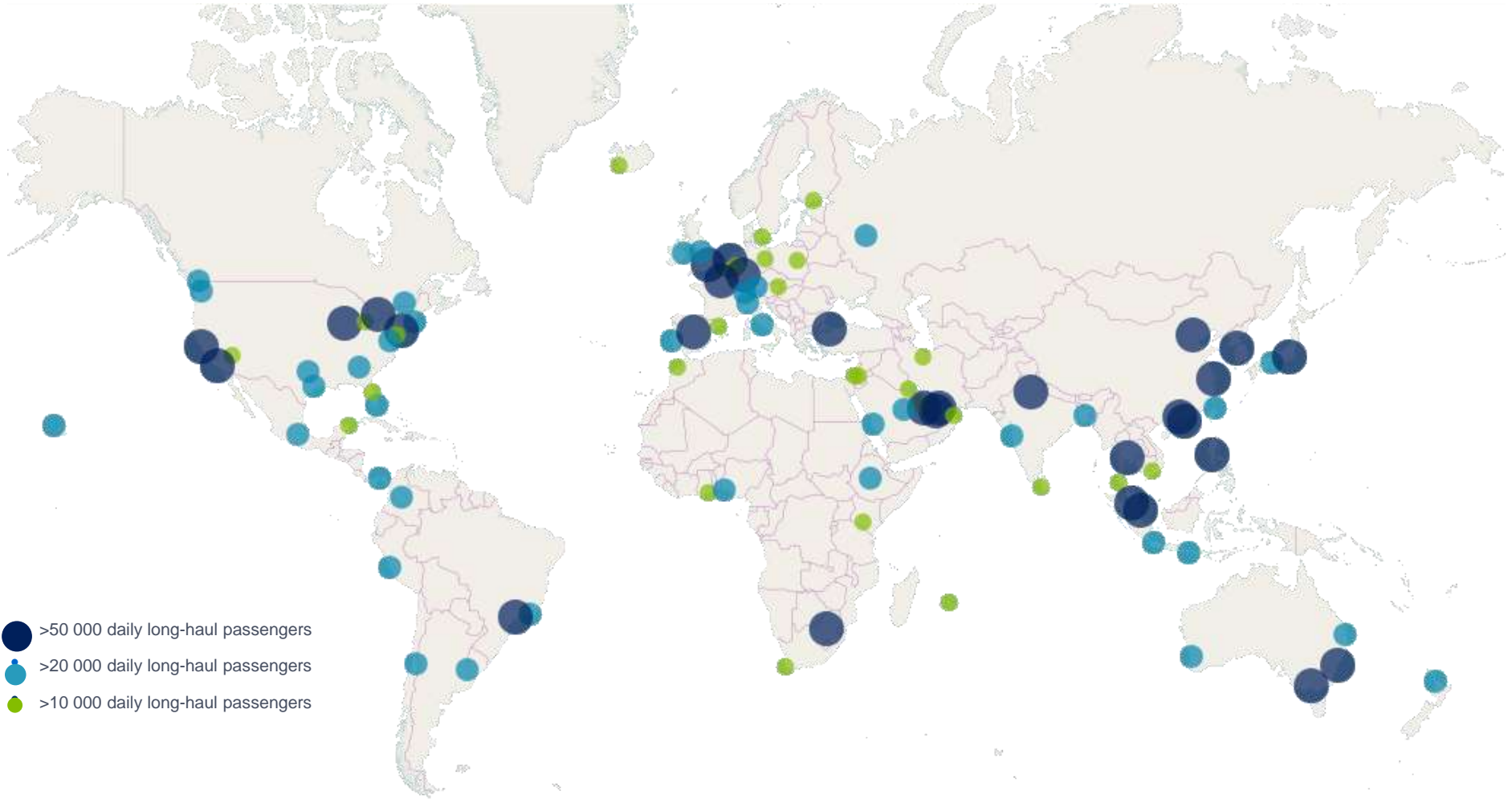
2016 Aviation Mega-Cities

45 out of 58 are schedule-constrained



# There will be 95 Aviation Mega-Cities by 2036

2036 Aviation Mega-Cities



**95**  
Aviation  
Mega-cities

+37

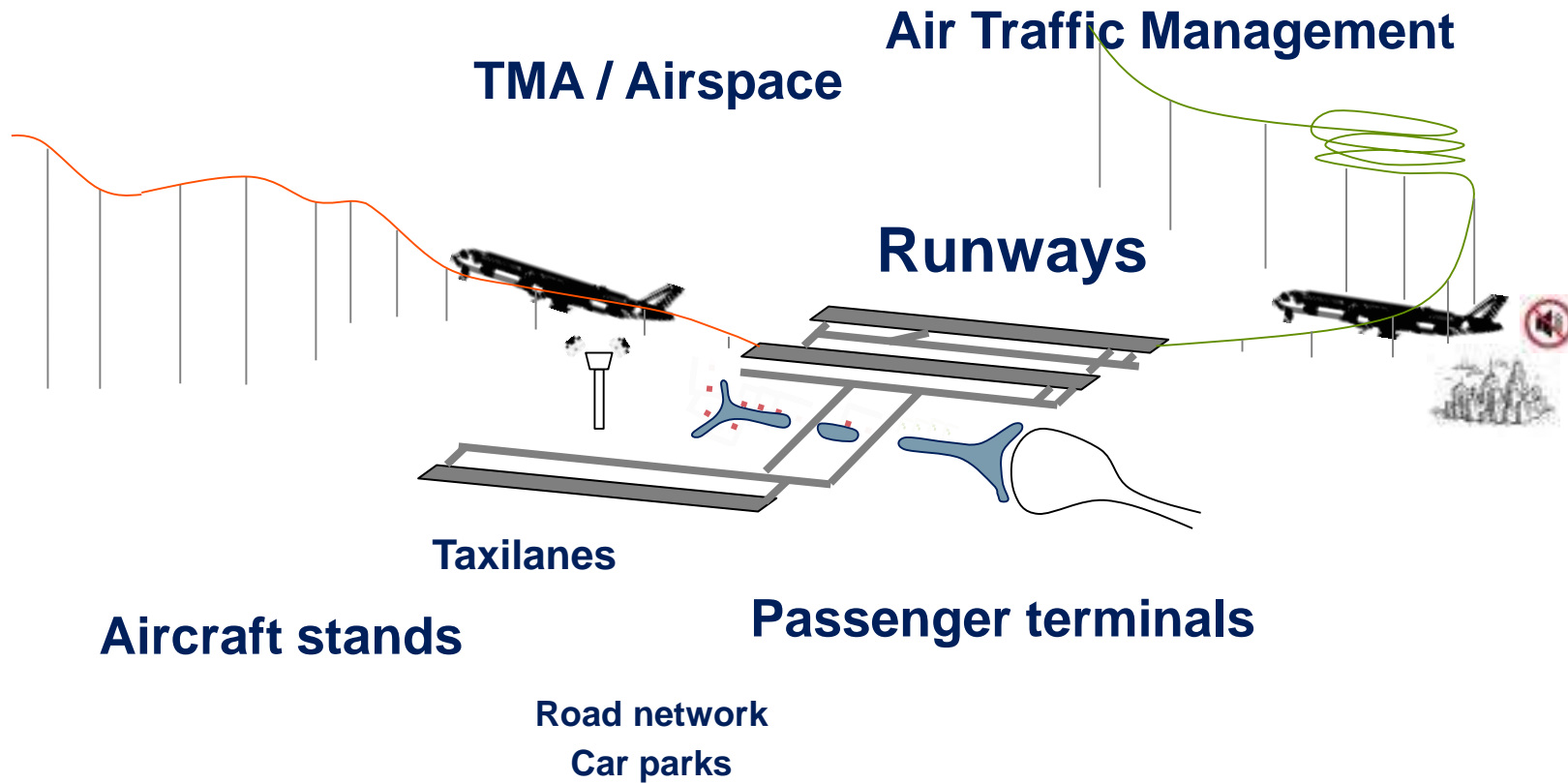
**2.7M**  
Daily Passengers:  
Long-Haul traffic to/  
from/via Mega-Cities

x 2.5

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

+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

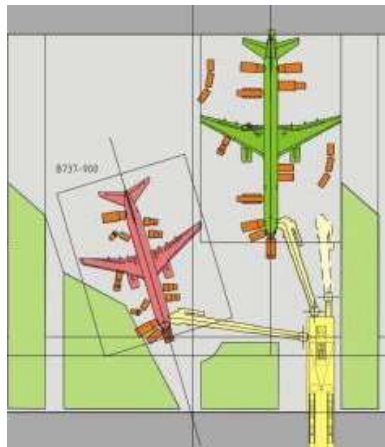
Reduce RWY Occupancy Time  
Reduce separations (radar, wake vortex)  
Eliminate curfews



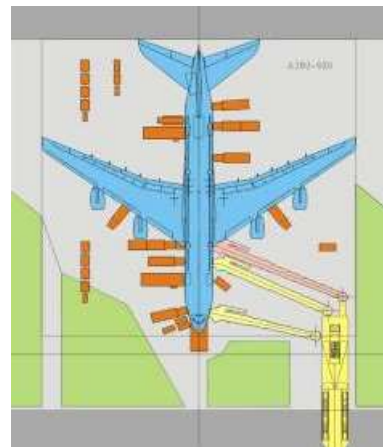
## Maximize stand capacity

Maximize aircraft size in stand

- A321 instead of A319
- MARS concept
- Reduce clearance margins



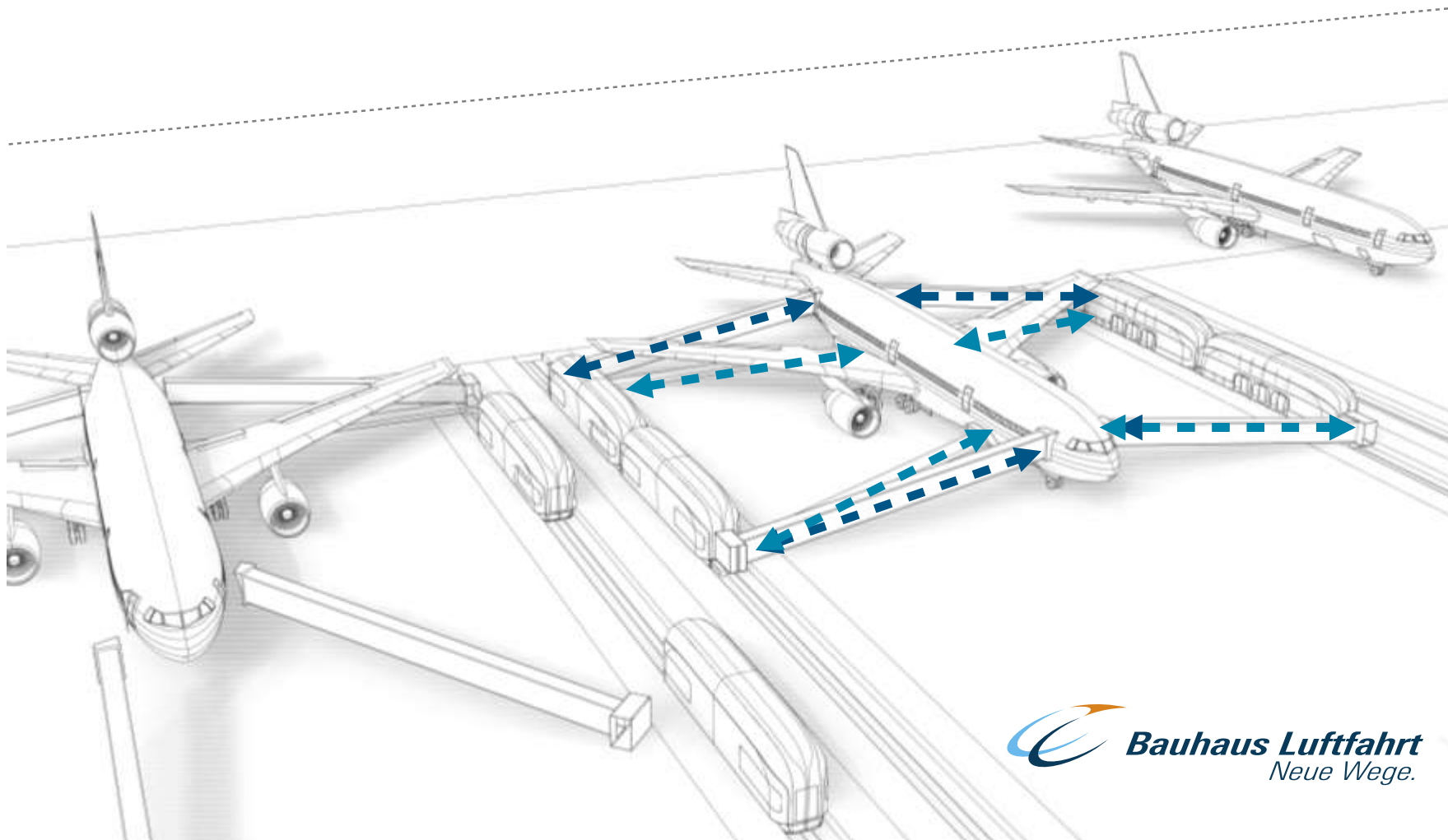
OR



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



 **Bauhaus Luftfahrt**  
*Neue Wege.*

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## Fascinations 2050 project

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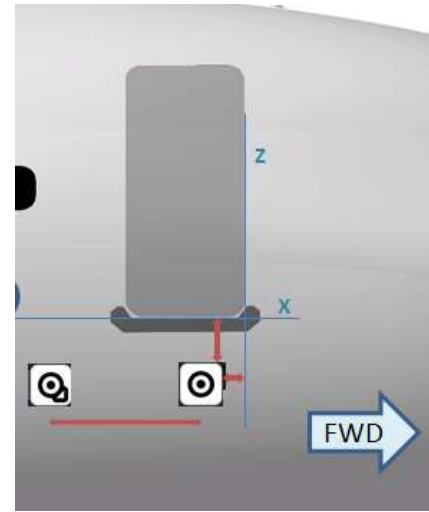
Conclusions

# Monitoring & control

Some examples



Platform to improve operational performance



Autonomous passenger stairs

# Digital & robotics



**AIRBUS**

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## Conclusions

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More and bigger aircraft

More passengers per aircraft

More technology to industrialize the process

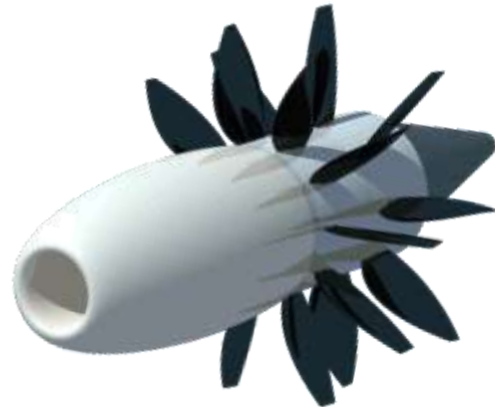
More ....

# 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.



## Future hybrid aircraft

Investigating unconventional aircraft and propulsion system concepts for future development

# New aircraft concepts

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Regulations will have to balance noise, CO<sub>2</sub> and NOx emissions requirements

All impose different requirements on aircraft design



# Preparing the future

Autonomous vehicle



Supersonic/Hypersonic aircraft



Flying wing



Electric technology

Thank you



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