Challenges for the Aeronautical Industry
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Content

• Business Opportunities
• Challenges and Paradigm Shifts
• Airbus Strategy
• Technologies & Future Configurations
• Development and Industrialization Process
• Boosting Innovation and Technology Development
Airbus aircraft are a familiar sight around the world

**Presence**

An Airbus takes off or lands every 2 seconds

<table>
<thead>
<tr>
<th>Aircraft sold</th>
<th>15,979+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produced monthly</td>
<td>60</td>
</tr>
<tr>
<td>Delivered</td>
<td>9,282</td>
</tr>
<tr>
<td>Daily flights</td>
<td>25,000+</td>
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</table>

September 2015
Meet the Airbus family from 100 to 500+ seats

The Airbus Family

<table>
<thead>
<tr>
<th>A320 Family</th>
<th>A330 Family</th>
<th>A350 XWB</th>
<th>A380</th>
</tr>
</thead>
<tbody>
<tr>
<td>The market leader</td>
<td>The right aircraft, right now</td>
<td>The Xtra that makes a difference</td>
<td>Own the sky</td>
</tr>
</tbody>
</table>
Aviation drives our global economy

- Air traffic doubles every 15 years

3 billion
Passengers

50 million
Tonnes of freight

$2.4 trillion
Global GDP annually

58 million
Jobs supported

Source: ATAG 2014
What are the market opportunities?

Traffic will double in the next 15 years

20-year General Market Forecast

- 22,927
- 8,108
- 1,550

32,585 new aircraft

Potential for more than 32,600 deliveries in the next 20 years

Passenger Transport Demand evolution

Air traffic has doubled every 15 years

World annual RPK (trillion)

Source: ICAO, Airbus
What are the key **challenges**?

- **Reduce Environmental impact**
- **Smart & Efficient mobility**
- **Strengthen European leadership**
New challenges or new opportunities?

More and more **Aviation Mega Cities** ....

Typical Mega City demography:
More than 10 Million people; Up to 400 Nm wide

2034 forecast

91 Mega cities

Potential new market for regional transport

Source: WWW
New challenges or new opportunities?

Customer needs are changing

A320 customers....
(totai orders)

- INDIGO: 530
- AIRASIA: 475
- LUFTANSA: 469
- EASYJET: 415
- US AIRWAYS: 261

Industrial ramp-up and maturity
What do we need to stay competitive?

Increase **Customer Value**

- Improve **performances** (aerodynamic, weight, propulsion)
- Increase **cabin productivity**

Reduce cost (RC and NRC) & Leadtime

- **Non Recurrent** Cost (development process)
- **Recurrent** cost (manufacturing)
The AIRBUS strategy

Balance between incremental and breakthrough

Efficiency

New products

Derivatives

Disruptive Concepts

Incremental Innovation

2010  2030  2050

The strategy of AIRBUS includes a balance between incremental and breakthrough innovations. Elements like Efficiency, New products, Derivatives, and Disruptive Concepts are highlighted over the timeline from 2010 to 2050.
Strategic roadmaps: Ultra efficient engines

- Advanced turbofan
- CROR
- Hybrid propulsion

Short-term | Mid-term | Long-term
Strategic roadmaps: **Aerodynamic efficiency**

- **Short-term**
  - Sharklet
  - Laminar flow
- **Mid-term**
  - Riblets
- **Long-term**
  - Future concepts
Strategic roadmaps: More efficient operations

More Efficient operations

Future ATM
Green trajectories

Innovative cockpit

Formation flight

Short-term
Mid-term
Long-term
Strategic roadmaps: Systems and avionics

➤ Systems and avionics

- E-taxi
- More Electrical Aircraft
- Integrated Modular Avionic 2nd Generation

Short-term | Mid-term | Long-term
Strategic roadmaps: Advanced materials & manufacturing

Advanced material

Composite & metallic technologies
Termoplastic Dry fibber Out of autoclave C
Electrical Network Printing

Short-term
Mid-term
Long-term
Strategic roadmaps: Innovative structures

Innovative structures

ALM

Bionic structure

Fully integrated fuselage

Short-term

Mid-term

Long-term
New Paradigm for Development and Industrialization

Virtual Product Development

Detailed Digital A/C

Digital Factory

Model based Multi-disciplinary Optimization & Component Design

Virtual Testing

Seamless Digital Development and Industrialization process
Boosting Innovation

Pull for innovative ideas

Business needs

Universities
REs
Suppliers
…

Accelerated techno maturation

Speed and ambition
Summary

• Growing global business potentials for the European Aeronautical Industry.
• Minimizing environmental impact and overcoming congestion on ground and air are key for sustaining the growth.
• Production rates beyond 50 A/C per month are changing the entire industrial system incl. supply chain.
• Airbus follows a 2 fold strategy for maximizing customer value and competitiveness of existing products while preparing the next “Game-changer”.
• New propulsion systems will open the design space for novel configurations.
• Significant increase in effort & resources are required for wider exploration and maturation of break-through technologies & novel configurations.
• A seamlessly integrated “Virtual Development and Industrialization Process” shortens development time and secures steep ramp-up of production.