Titanium Conference

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Boeing Commercial Airplanes
September 2011
Boeing, ANA celebrate 1st 787 Dreamliner delivery

We celebrate a significant moment in the history of flight -- first delivery of the game-changing 787 Dreamliner.
Agenda

- Current Market Outlook (CMO)
- Market trends and realities
- Boeing product strategy and development
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2011 CMO By The Numbers

5.1
The average percentage rate at which global passenger traffic will grow per year over the next 20 years (RPKs)

33,500
The number of new airplanes to be delivered to the airlines of the world between now and 2030

4.0
The value in trillions of US dollars of those 33,500 new airplanes to be delivered

7.1
The average percentage rate at which South Asia’s GDP will grow per year over the next 20 years unseating China at number 1

23
The percentage of our 2011 forecast already in backlog

410,546
The number of downloads made from the CMO web site over the past 12 months
Drivers Of Air Travel

Economic growth

Global trade

Traveler values

60-80% Travel demand

20-40% Additional travel demand
World Air Travel Has Grown 5% Per Year Since 1980

- 4 recessions
- 2 financial crises
- 2 Gulf wars
- 1 oil shock
- 1 near pandemic (SARS)
- 9/11

RPKs = Revenue Passenger Kilometers
Sources: ICAO Scheduled Traffic
Air Travel Becoming More Diverse Geographically
Airlines Will Need 33,500 New Airplanes Valued At $4.0 Trillion

Airplane deliveries: 33,500
2011 - 2030

- Regional jets: 1,980 (6%)
- Single-aisle: 23,370 (70%)
- Twin-aisle: 7,330 (22%)
- Large: 820 (2%)

Market value: $4.0T
2011 - 2030

- Regional jets: $70B (2%)
- Single-aisle: $1,950B (48%)
- Twin-aisle: $1,770B (43%)
- Large: $270B (7%)
Older, Less Efficient Airplanes Will Be Replaced By More Efficient, Newer Generation Airplanes
Forecast Summary
Market Share By Business Model

New airplanes 33,500

- Freight: 49%
- Charter and inclusive tour: 2%
- Low cost: 22%
- Intermediate network: 26%
- Broad network: 1%
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Market Forecast Drivers And Considerations

- Fuel price
- Economic growth
- Market liberalization
- Environment
- Traffic forecast
- Network development
- Airplane capabilities
- Emerging markets
- High speed rail
- Airline strategies & business models
- Infrastructure
Emerging Markets Are Driving The Economic Growth

Annual GDP growth

<table>
<thead>
<tr>
<th>Region</th>
<th>GDP Growth 2011–2030</th>
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<tbody>
<tr>
<td>South Asia</td>
<td>7.1</td>
</tr>
<tr>
<td>China</td>
<td>7.0</td>
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<tr>
<td>Asia Pacific</td>
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<tr>
<td>Europe</td>
<td>2.0</td>
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<tr>
<td>Northeast Asia</td>
<td>1.3</td>
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</table>

Source: IHS Global Insight
Air Travel Growth Has Been Met By Increased Frequencies And Nonstops
Air Travel Growth Varies By Market

2010 traffic

- Asia Pacific: 5.9%
- Within North America: 4.0%
- Within Europe: 7.5%
- Within China: 2.3%
- Europe – Asia Pacific: 3.6%
- North Atlantic: 1.9%
- Middle East – Asia Pacific: 7.2%
- Transpacific: 4.9%
- Within Latin America: 6.7%
- North America – Latin America: 5.4%
- Europe – Latin America: 4.8%
- Within / to CIS: 4.2%
- Africa – Europe: 4.6%

Added traffic 2011-2030

- World Average Growth: 5.1%

Annual growth %: 7.0%

*includes within China
Aircraft Will Continue To Be Long-lived Assets

Age at Leaving Service (5-year moving average)

<table>
<thead>
<tr>
<th>Year</th>
<th>History</th>
<th>CMO Forecast</th>
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<tbody>
<tr>
<td>1995</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td></td>
<td></td>
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<tr>
<td>2005</td>
<td></td>
<td></td>
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<tr>
<td>2010</td>
<td></td>
<td>Single-aisle pax</td>
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<tr>
<td>2015</td>
<td></td>
<td>Twin-aisle pax</td>
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<tr>
<td>2020</td>
<td></td>
<td>Regional Jet</td>
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<td>2025</td>
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<tr>
<td>2030</td>
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</table>

Source: Ascend as of 5/10/2011, CMO 2011
Western commercial jets permanently removed from services
Boeing And The Industry Are Tracking Climate Change

- Environmentally progressive products and services
- Advanced global air traffic management concepts
- Renewable fuel and energy solutions

Through innovative research and development
Market Trends And Realities Summary

- Single-aisle airplane demand stronger and more resilient than expected
- Emerging markets and business models creating a more diverse and balanced marketplace
- Passengers getting what they want-- more frequencies and nonstop service-- spurring strong demand for long-range twins
- Rising and volatile fuel prices will continue to change our industry
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Airlines Are Focusing On The Future

Investing in new technology

Enhancing the passenger experience

Buying new airplanes
Boeing Product Forecast In-line With The Realities Of The Market

Size category
- Large
- Twin-aisle
- Single-aisle
- Regional jet

Boeing forecast 2000 – 2019 22,315 units
Airplane demand 2000 – Present* 19,320 units

*Deliveries 2000 thru May 2011 plus backlog
Long Term Development Needs For Airframe Structure

- Titanium can be utilized in several ways to decrease airlines operating costs
- Maximum titanium utilization toward this goal will require reducing the cost of titanium hardware
- Titanium cost reduction/performance improvement approaches
  - Reduce buy:fly
    - Welding
    - Powder metallurgy
    - Hot stretch forming
    - Extrusions
    - SPF – SPF/DB
  - Improved machining technology – machinability
- Improved performance
  - Strength
  - Temperature capability
- Lower temperature SPF alloys
Titanium’s Value Chain Challenges

- Titanium is the highest cost of raw material options
- Titanium BTF costs are significantly higher than other raw materials
- Long lead times increase inventory level in supply chain
  - Difficult to quickly respond to market fluctuations
- Boeing hopes to utilize emergent Titanium technologies and alloys on the next generation of Boeing aircrafts to reduce cost and improve performance
All Programs Fly Weight - Ti
Demand Profile With Inventory Burn Down

Based on 3Q Firing Order

Inventory Mound

Inventory burn from reductions

Current Ti Buy

Demand

Current Burndown  Burndown with Proposal  Demand
Key Messages
Titanium Industry

- Optimized processing and machinability
- Reduced price with closed loop scrap recovery
- Superior performance
- Safer airplanes
- More affordable airplanes
- New applications for Ti
  - New Alloys
  - New products
  - New Processes
  - New Technologies

However - today new, efficient uses for Aluminum and Carbon Fiber are being incorporated which minimizes Titanium usage in commercial airplanes.