Commercial Aerospace Demand

Titanium 2011
October 2-5
San Diego, California
Delivery History

Aircraft Deliveries by OEM

Sources: Aircraft Monitor, company announcements, estimates
Boeing Fleet Forecast

Fleet developments
Over half of new deliveries are for growth

Source: Boeing Current Market Outlook 2011
### New airplanes
Deliveries by region

<table>
<thead>
<tr>
<th>Region</th>
<th>New airplanes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia Pacific</td>
<td>11,450</td>
</tr>
<tr>
<td>Europe</td>
<td>7,550</td>
</tr>
<tr>
<td>North America</td>
<td>7,530</td>
</tr>
<tr>
<td>Latin America</td>
<td>2,570</td>
</tr>
<tr>
<td>Middle East</td>
<td>2,520</td>
</tr>
<tr>
<td>CIS</td>
<td>1,080</td>
</tr>
<tr>
<td>Africa</td>
<td>800</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33,500</strong></td>
</tr>
</tbody>
</table>

#### Delivery units
- 34% Asia Pacific
- 23% Europe
- 22% North America
- 8% Latin America
- 8% Middle East
- 3% CIS
- 2% Africa

**2011 to 2030**
New airplanes 33,500

*Source: Boeing Current Market Outlook 2011*
Airline Fuel Costs

Source: Bureau of Transportation Statistics, Airline Fuel Cost and Consumption (US Carriers – Scheduled)
Aged Parked Aircraft

Parked Fleet

Source: Jet Information Services
Coming Changes - Boeing

• 737NG – Rate increase to 42/mo in 1H14
• 737 MAX – New engine, EIS 2017
• 777 – Rate increase to 8.3/mo in 1Q13
• 787 – EIS 2011, ramp to 10/mo in 2013
Boeing Delivery Forecast

Sources: Airline Monitor, company announcements, estimates
Boeing Titanium per Airframe

Titanium Content per Airframe (MTs)

Sources: Boeing, Teal Group, estimates
Boeing Titanium Demand

Adjusted Boeing Demand (MTs)

Sources: Airline Monitor, company announcements, estimates
Coming Changes - Airbus

- A320 – Rate increase to 42/mo in 4Q12
- A320NEO – New engines, EIS 2016
- A380 – Production ramp to 3/mo in 2012
- A350 – -800 EIS 2013, -1000 EIS 2017
Airbus Delivery Forecast

Airbus Aircraft Deliveries

Sources: Airline Monitor, company announcements, estimates
Airbus Content per Airframe

Titanium Content per Airframe (MTs)

- A300/310
- A320
- A330
- A340
- A350
- A380

Sources: Airbus, Teal Group, estimates
Airbus Titanium Demand

Sources: Airline Monitor, company announcements, estimates
Coming Changes - Others

- Bombardier – CSeries
- Embraer – Large single-aisle
- Russia – Sukhoi SSJ
- China - ARJ21, C919
- Japan – Mitsubishi Regional Jet
Aircraft Deliveries by OEM

Sources: Airline Monitor, company announcements, estimates
Delivery Forecast by Type

Aircraft Deliveries by Type

Sources: Airline Monitor, company announcements, estimates
Comm Aero Titanium Demand

Titanium Demand by OEM (MTs)

Sources: Airline Monitor, company announcements, estimates
Comm Aero Titanium Demand

Sources: Airline Monitor, company announcements, estimates

Titanium Demand by Type (MTs)

- Single-Aisles
- Twin-Aisles
- Regionals

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• Commercial airframe technology has changed dramatically in the past several years
• Carbon Fiber Composites have become very common in twin aisle aircraft, leading to increased demand for titanium
• Rarely has the industry had so many new aircraft introduced in such a short time
• The result is a very dynamic industry sector that is creating a significant increase in demand for titanium mill products