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EMBRAER OVERVIEW

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EMBRAER TITANIUM OUTLOOK
OUR COMMITMENT

OUR COMMITMENT IS ABOUT CREATING VALUE FOR OUR SHAREHOLDERS, CLIENTS, EMPLOYEES AND SOCIETY IN GENERAL. WE ARE ETHICALLY, socIALLY AND ENVIRONMENTALLY CONSCIOUS, ALWAYS ADHERING TO THE HIGHEST STANDARDS OF CORPORATE GOVERNANCE AND THE EMBRAER VALUES. THESE ARE WHAT MAKE EMBRAER STRONG AND GUIDE US AS WE STRIVE FOR LONG-TERM FUTURE SUCCESS.
EMBRAER VALUES

OUR PEOPLE ARE WHAT MAKE US FLY

WE ARE HERE TO SERVE OUR CUSTOMERS

WE BUILD A SUSTAINABLE FUTURE

WE STRIVE FOR COMPANY EXCELLENCE

GLOBAL PRESENCE IS OUR FRONTIER

BOLDNESS AND INNOVATION ARE OUR HALLMARKS

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WE OPERATE IN FOUR BUSINESS AREAS:

- COMMERCIAL AVIATION
- EXECUTIVE AVIATION
- EMBRAER DEFENSE & SECURITY
- EMBRAER SYSTEMS
WHERE WE OPERATE

USA
- Nashville
- Fort Lauderdale
- Melbourne
- Mesa
- Windsor Locks
- Jacksonville

BRAZIL
- São José dos Campos
- Gavião Peixoto
- Botucatu
- Taubaté
- Brasília
- Belo Horizonte
- São Paulo
- Rio de Janeiro
- Sorocaba
- Campinas

NETHERLANDS
- Amsterdam

IRELAND
- Dublin

PORTUGAL
- Évora
- Alverca - OGMA

UNITED KINGDOM
- Farnborough

FRANCE
- Villepinte
- Le Bourget

UAE
- Dubai

CHINA
- Beijing
- Harbin – HEAI

SINGAPORE
- Singapore
DIVERSITY IS WEALTH

19
THOUSAND

MORE THAN 19,000 EMPLOYEES FROM OVER 20 COUNTRIES

2.3
THOUSAND

MORE THAN 2,300 EMPLOYEES IN JOINT VENTURES AND AFFILIATES
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* E-Jets families and ERJ only; scheduled and non-scheduled airlines.
EXECUTIVE JETS PRODUCT PORTFOLIO

- **Ultra-large**
- **Large**
- **Super-Midsize**
- **Midsize**
- **Midlight**
- **Light**
- **Entry**
EXECUTIVE AVIATION

CLIENTS

JETS DELIVERED

900 +

COUNTRIES

60

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DEFENSE & SECURITY

Intelligence, Surveillance and Reconnaissance (ISR) Systems
EMB ISR AEW&C / MP / Multi-Intel

Light Attack and Advanced Training
A-29 Super Tucano

Tactical Military Transport
KC-390

Transport of Authorities

Aircraft Modernization

Unmanned Air Vehicle (UAV)
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AIRCRAFT MARKET FORECAST
Commercial Aviation Market Forecast (2015-2034)

- Replacement of old/inefficient jets
- Right-sizing of narrow-body operations
- Hub feeder and point-point operation in low and mid-density markets
- Regional aviation development

Around 6,350 jet deliveries (70-130 seats) in the next 20 years (US$ 300 BI)

For more information: http://www.embraermarketoutlook.com

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Executive Jets Market Forecast (2015-2024)

NORTH AMERICA
4,620 a/c (50%)
US$ 120 Bi (45%)

EUROPE, MIDDLE EAST & AFRICA
2,360 a/c (26%)
US$ 77 Bi (29%)

ASIA PACIFIC
570 a/c (6%)
US$ 19 Bi (7%)

LATIN AMERICA
850 a/c (9%)
US$ 16 Bi (6%)

CHINA
835 a/c (9%)
US$ 33 Bi (12%)

9,250 JETS WORLDWIDE IN THE NEXT 10 YEARS (US$ 265 Bi)
Executive Jets Market Forecast (2015-2024)

9,250 JETS WORLDWIDE IN THE NEXT 10 YEARS (US$ 265 Bi)

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Defense & Security: Super Tucano

- FIRM ORDERS: MORE THAN 220 AIRCRAFT
- OVER 190 AIRCRAFT DELIVERED

300 AIRCRAFT BY 2020 (US$ 3.5 Bi)
Defense & Security: KC-390

- A new tactical military transport and tanker aircraft
- Technical partnership with Boeing to increase KC-390 sales in certain markets
- Six countries letters of intent, totalizing 60 aircraft
- FAB and Embraer signed the series production contract for 28 KC-390
- First flight in February 2015

Addressable market until 2025: 700 aircraft

Countries:
- Brazil: 28
- Argentina: 6
- Chile: 6
- Colombia: 12
- Czech Rep.: 2
- Portugal: 6
STRUCTURAL MATERIALS IN EMBRAER PROGRAMS
Titanium is a good choice for specific structural applications.
Titanium Performance

- Structural Efficiency:
  - TITANIUM
  - STEEL
  - ALUMINUM
  - NICKEL

- High Temperature Application:
  - 100°C: ALUMINUM
  - 200°C: TITANIUM
  - 300°C: STEEL
  - 400°C: NICKEL

TITANIUM OFFERS AN EXCELLENT TECHNICAL TRADE-OFF

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Evolution of Ti Usage in Embraer Programs

Ti AND COMPOSITES APPLICATIONS TEND TO INCREASE IN NEW PROGRAMS
Floor & Doors
Tracks, Stop Doors, Shafts
- Corrosion resistance improvement
- High strength
- Weight reduction

Wing
Spar, Rib, Caps
Fasteners: Stringers/Skins/Ribs/Spars joints
- High strength
- Weight reduction
- Environmental compliance

Landing Gear
Trailing Arm
- Corrosion resistance improvement
- Weight reduction

Pylon
Frames, Fittings, Spars, Skins, Links
- High specific strength
- High temperature resistance

Tail Cone
Fire wall
- Weight reduction
- High temperature resistance
**Wing**
Fasteners: Stringers/Skins/Ribs/Spars joints
- High strength
- Weight reduction
- Environmental compliance

**Empennage**
Spars, Ribs, Fittings
- High specific strength
- Composites compatibility

**Landing Gear**
Trailing Arm, Torque Link
- Corrosion resistance improvement
- Weight reduction

**Pylon**
Frames, Fittings, Pre Cooler Box
- High specific strength
- High temperature resistance

**Fuselage**
Main Brace, Hop Damper
- High strength
- Weight reduction
Landing Gear Ti Evolution

Titanium Structural Parts

TI6AL4V REPLACES 300M STEEL
Titanium Fasteners

**Titanium Fasteners % of Aircraft Structural Weight**

- E1: 1%
- KC-390: 3%
- E2: 2%

**Fasteners**
- Weight reduction
- Compatibility with carbon fiber structures
- Environmentally friendly (REACH compliant)

**THE USE OF TI FASTENERS HAS INCREASED IN NEW PROGRAMS**
TITANIUM PURCHASING PROFILE
Embraer Titanium Purchasing Profile ($)

- **SHEETS**: 3%
- **PLATES/BARS**: 19%
- **FORGINGS**: 36%
- **FASTENERS**: 41%
- **TUBES**: 1%

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Embraer Ti Projected Demand Increase – All Programs

Ti DEMAND HAS A POSITIVE TREND, ALIGNED WITH THE MARKET FORECAST

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FUTURE PERSPECTIVES
More than **5,900** people dedicated to Research and Development

Nearly **US$ 277 million** invested in R&D in 2014 (4.4 % of revenue)

**46%** of net income derives from innovations implemented between 2010 and 2014

**271** international patents applied for between 2010 and 2014

**FINEP** innovation prize

**Innova** program

Fostering innovations and making them viable
Consolidated Technology: Near-net Shape Castings

14kg Ti Raw Material + 40 HOURS machining = Final Part (1.5kg) + 12.5kg Ti Scrap

BUY-TO-FLY REDUCED BY A FACTOR OF NINE, LEADING TO A MORE COMPETITIVE TI COST

2kg Ti AS-CAST + 30 MINUTES machining = Final Part (1.5kg) + Minimum Ti Scrap

Buy-to-fly ≈ 9

Buy-to-fly ≈ 1
Next Generation Technology: Additive Manufacturing

<table>
<thead>
<tr>
<th>Manufacturing Process</th>
<th>Buy-to-Fly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional Milling</td>
<td>16.0</td>
</tr>
<tr>
<td>Laser Additive Manufacturing</td>
<td>1.5</td>
</tr>
</tbody>
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BUY-TO-FLY REDUCED BY A FACTOR OF TEN, LEADING TO A MORE COMPETITIVE Ti COST
CONCLUSION
Conclusion

Titanium has become the material of choice for numerous aerospace applications.

However, new manufacturing processes are essential to enhance Ti cost competitiveness.