von Karman Award Lecture
International Council of Aeronautical Sciences

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Vice President, 787 Development
The Boeing Company
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Highlights
- 787 Overview
- Forming the International Team
- Global Technology Development
- Production Progress

A Flexible, Efficient Family

787-8
- 210-250 passengers (three-class)
- 7,650 – 8,200 nmi | 14,200 – 15,200 km

787-9
- 250-290 passengers (three-class)
- 8,000 – 8,500 nmi | 14,800 – 15,750 km

Firm orders: 900

Most Successful Program Launch in Commercial Aviation

Opening a New Era in Fuel Efficiency

Fuel consumption per trip

New Point-to-Point Routes Enabled

- Vancouver - Sao Paulo
- Seattle - Shanghai
- San Francisco - Manchester
- Boston - Athens
- Tel Aviv - Montreal
- Munich - Nairobi
- Geneva - Singapore
- Dubai - Taipei
- Madrid - Manila
- Auckland - Beijing

787-8 Range Capability From Anchorage

787 Maintenance Cost Advantage

Airframe maintenance costs per year

30%
An Airplane Passengers Will Enjoy

- Larger
- More comfortable
- Cleaner air
- Lower cabin altitude
- Increased humidity
- Smoother ride
- Dynamic lighting
- More convenient
- Enables more non-stop travel
- Reduces trip time

Setting New Levels of Environmental Leadership

- Less fuel used
- Lower emissions
- Quiet for communities, crews, and passengers
- Fewer hazardous materials
- Less waste in production

787 Program Schedule

<table>
<thead>
<tr>
<th>Year</th>
<th>Roll Out</th>
<th>First Flight</th>
<th>Dreamliner-ready</th>
<th>Service Entry</th>
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<tr>
<td>2004</td>
<td>2005</td>
<td>2006</td>
<td>2007</td>
<td>2008</td>
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Partners Across the Globe Bring the 787 Together

KHI

FHI

MHI
Selecting Our Global Partners

787 Partnering Model

Evolution of 7E7 Program Global Enterprise

- Strategic Sourcing Teams (SST)
- Composite Process Action Teams (CPAT)
- Sonic Cruiser Leadership Team Tour

Boeing Limited

787 Partnering Model
787 Partner Council

Launched with structures members
- Systems/structures working together focus

2004 schedule focus
- Added systems members

- Program execution focus

Working Across the Globe

The GCC (Global Collaboration Center)

Working Across the Globe

FHI Handa Plant Groundbreaking

Handa Plant (Assembly factory)

Start of Firm Configuration 787-8 First Flight

Building our Global Enterprise

Facilities

Autoclaves

Vought

Building our Global Enterprise

Fiber Placement Machines and Tape Layers

Image courtesy of aviationimages.com
FHI 787 Handa Plant Celebration

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Innovative Technologies
- Durable composites
- Smarter, more electric systems architecture
- Advanced aerodynamics
- Next-generation engines

Composites Serve as Primary Structural Material

Evaluating Alternative Fuselage Architectures
- Composite Skin Stringer
- Advanced Aluminum Alloys
- Composite Sandwich Concept
- Fiber Metal Laminates

Initial Technology Development in Seattle

Joint Spar Development

Pre-Production Horizontal Stabilizer
Side of Body Joint Strain Survey – FHI, Utsunomiya

Side of Body Joint Testing – JAXA, Tokyo

Main Landing Gear Fitting Testing – KOBELCO, Japan

Combined Multi-Axial Loading Tests – MHI, Nagasaki/Laboratory

Combined Fuselage Pressure and Mechanical Loading Tests

Wing Progress

Test Lab

Successful Section 46 Testing

- Extensive limit load testing complete
- Seven ultimate load conditions successfully run
- Loaded to 200% limit before failure
Structures Testing Ongoing

Static testing

Airframe Static Test to Verify Durability

- Second 787 airframe to be assembled in Everett
- Moved out of Final Assembly on April 25
- Testing to demonstrate structural stability even at rates 150 percent above most-extreme conditions expected in service

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Lower Skin LM Machined in the Kobe Shipyards

World’s First Commercial Composite Wing

Section 47 Layup Mandrel

Wing Ceremony

Delivery Ceremony of First Raked Wing Tip