787 Dreamliner

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Overview

- History of commercial air travel
  - Dan Gessner
- Design Philosophy
  - Brian Bourgeois
- New Technology
  - Porter Nelson and Kyle Papso
- Future/Conclusion
  - Seung Ri Park
History of Flight

- July 1900 – First zeppelin flight
- October 1900 – Wright Bros first glider flight
- December 1903 – Wright Bros powered flight
- May 1932: Amelia Earhart crosses Atlantic solo
- December 1935: DC-3 first successful commercial plane
- 1940’s: Major developments during war and introduction of Messerschmitt 262
First Jet Airliners

**Boeing 707**
- November 1954: First 707 flight
- Sets speed record of 612 mph speed
- Range up to 6160 miles and 150-200 passengers

**Boeing 727**
- Early 1960’s – 1984
- Best selling during its time
- Range of 1500-2500 miles and 150-200 passengers
Jet Airliners of Today

737 Family
- 1967-Present
- Short to mid range
- 110-220 passengers

747 Family
- 1969-Present
- Long range up to 8000 miles

777 Family
- First Flew in 1995
- 300-370 passengers
- Range up to 9400 miles

www.flightglobal.com
Design Philosophy

- Next generation aircraft
- Highly efficient sub-sonic passenger jet
- Decrease fuel burn by 20%
- Give mid-size jet long range capability
  - Approx. 250 passengers
  - 7,650-8,200 nautical miles

http://www.boeing.com
http://www.popsci.com
Program Overview

- **Launch:** April 2004
- **Major Assembly Begins:** June 2006
- **First Flight:** December 2009
- **Entry to Service:** September 2011

- Launch customer: All-Nippon Airways (ANA)

- Worldwide customer base
  - From six continents
  - Orders for 821 airplanes

http://www.virtualstaralliance.org
Mfg Advances

- Fewer than 10,000 holes
- Eliminates 1,500 Al panels
- Reduces over 40,000 fasteners

787 Materials:
- Composites 50%
- Aluminum 20%
- Titanium 15%
- Steel 10%
- Other 5%

777 Materials:
- 12% Composite
- 50% Aluminum
New Technology
Aerodynamics, Propulsion and Composites

- **Composite barrel fuselage**
  - Revolutionary carbon barrel, low maintenance design which reduces weight and drag

- **Quieter, more efficient engine**
  - New Rolls Royce and GE engines optimize engine and airframe integration

- **Wing Design**
  - Smooth wing technology reduces drag and fuel consumption
  - Raked wing tips allow 787 to be fastest commercial aircraft
Operational Improvement

- Heads Up Display (HUD)
  - Retractable transparent screen shows critical flight information
Passenger Experience

- Cabin Pressure
  - New pressure level will result in greater passenger comfort

- Sky Interior
  - Dynamic LED lighting (different light settings for different parts of the flight)

- Windows
  - 30% larger than conventional aircraft windows
  - Passenger controlled window dimming technology
INCREASED OXYGEN ABSORPTION
Future

- Composites – reduce weight
  - 32,000kg in the Dreamliner
- Better engines
  - Reduce noise
  - Less pollution
  - Better efficiency
Future

- 3D printing
- New designs
- Better Interior
Conclusions

- Air travel will continue to grow
  - 2.5 billion in 2009 to 3.3 billion in 2014
- Design philosophy
  - Speed vs Cost vs Capacity
- Improvements in materials and engines
- More comfortable
- Increased efficiency and less pollution
Questions?
References

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