Commercial Air Wars: Strategies That Changed Commercial Aviation

Introduction

Jim Rauf
Introduction

- Airbus and Boeing – Large Commercial Aircraft Duopoly
- Their founding/founders
- Current products
- Current market shares
- Average prices
- Aircraft development times
- Aircraft programs cumulative cash flows
- Aircraft development costs estimates
- Some subjects to be considered
Large Commercial Aircraft Manufacturers 2022

• **Airbus** is a leader in designing, manufacturing and delivering aerospace products, services and solutions to customers on a worldwide scale

![Airbus Logo]

• **Boeing** develops, manufactures and services commercial airplanes, defense products and space systems for customers in more than 150 countries

![Boeing Logo]
William E. Boeing was born in Detroit to Wilhelm and Marie Ortmann Boeing (Böing) in 1881.

His father, who arrived in the United States in 1868, had come from an old and well-to-do family in Hohenlimburg, Germany.

He emigrated to the U.S. when he was 20 years old.

Wilhelm started work as a farm laborer but soon joined forces with Karl Ortmann, a lumberman and, ultimately, his father-in-law.

Young Wilhelm Boeing bought timberland, with its mineral rights, in the Mesabi Range.

He also bought land in Washington State and timberland in the redwood forest in California.

Wilhelm did not live to see the development of those mining rights.
The Boeing Company  Founders

1910

- Boeing bought the Heath Shipyards on the Duwamish River to build a yacht, named the Taconite
- He attended an aviation meet in 1910 in Los Angeles, where he tried to get a ride on one of the boxy biplanes but had no success

1915

Thomas Hamilton, later founder of Hamilton Metalplane Co. (acquired by Boeing in 1929), introduced Boeing to U.S. Navy Lieutenant George Conrad Westervelt

- Westervelt was a graduate of the United States Naval Academy and Massachusetts Institute of Technology in naval engineering
The Boeing Company Founders

- **June 15, 1916** William Boeing takes *Bluebill*, the first *B & W Model 1*, on its maiden 900 foot flight
  - *B&W* – Boeing and Westervelt

- **This was the beginning of the Boeing Company**

- Pilot **Herb Munter** takes *Mallard*, the second plane on its first flight

- The *B & W* was made of wood, with wire bracing, and was linen-covered
The Boeing Company  Founders

• June 15, 1916  William Boeing takes Bluebill, the first B & W Model 1, on its maiden 900 foot flight
  • B&W –Boeing and Westerveldt

• This was the beginning of the Boeing Company

• Pilot Herb Munter takes Mallard, the second plane on its first flight

• The B & W was made of wood, with wire bracing, and was linen-covered

• First flight June 15, 1916
• Model number 1 (B&W)
• Span 52 feet
• Length 27 feet 6 inches
• Gross weight 2,800 pounds
• Top speed 75 mph
• Cruising speed 67 mph
• Range 320 miles
• Power 125-horsepower Hall-Scott A-5 engine
• Accommodation Two crew

• It was similar to the Martin trainer aircraft that Boeing owned, but had better pontoons and a more powerful engine

• The two B & Ws were offered to the United States Navy. When the Navy did not buy them, they were sold to the New Zealand Flying School and became the company's first international sale

• Boeing paid for a wind tunnel at the University of Washington in exchange for establishment of a curriculum in the new science of aeronautics

OLLI Fall 2016
Airbus Beginnings and Founders

- Today's Airbus SE is the product of international consolidation in the European aerospace industry tracing back to the formation of the Airbus Industrie GIE consortium in 1970

- In 2000, the European Aeronautic Defence and Space Company (EADS) NV was established

- In addition to other subsidiaries pertaining to security and space activities, EADS owned 100% of the pre-existing Eurocopter SA, established in 1992, as well as 80% of Airbus Industrie GIE

- In 2001, Airbus Industrie GIE was reorganized as Airbus SAS, a simplified joint-stock company

- In 2006, EADS acquired BAE Systems' remaining 20% of Airbus

- EADS NV was renamed Airbus Group NV and SE in 2014, and 2015, respectively

- Due to the dominance of the Airbus SAS division within Airbus Group SE, these parent and subsidiary companies were merged in January 2017, keeping the name of the parent company

- The company was given its present name in April 2017

- The founders of Airbus SE are:

  - Franz Josef Strauss
  - Henri Ziegler
  - Felix Kracht
  - Roger Béteille
Airbus Beginnings and Founders

• **Franz Josef Strauss** was a German politician. He was the long-time chairman of the Christian Social Union in Bavaria (CSU)

• aerospace conglomerate Airbus

• As an aerospace enthusiast, Strauss was a key player in the creation of Airbus conglomerate in the 1970s

• He served as chairman of Airbus in the late 1980s, until his death in 1988

• **Henri Ziegler** was an engineer, as well as a French air force officer and test pilot

• He was a founding father of Airbus Industrie and became its first CEO

• He was the driving force behind the development of the Airbus A300B, the original Airbus aircraft
Airbus Beginnings and Founders

• **Felix Kracht** was a German engineer

• After the World War II, he went on to work in France with **Nord Aviation** before moving back to Germany to head **Deutsche Airbus GmbH**

• He was Airbus' first production director on the **A300** program

• He became the Senior Vice President and was responsible for production at the **Toulouse** site until his retirement in 1981

• **Roger Béteille** was a French aeronautical engineer and businessman

• He was one of the founding fathers of **Airbus**

• He is known for his contributions to **Airbus**

• His contributions include the "**Airbus fuselage**" – the 222-in fuselage cross section with the ability to carry two **LD-3** freight containers and the basic work-share agreement of the various partners in **Airbus**
Airbus Commercial Aircraft
Airbus

- Airbus is a leader in designing, manufacturing and delivering aerospace products, services and solutions to customers on a worldwide scale.

- With over 130,000 employees and as the largest aeronautics and space company in Europe and a worldwide leader, Airbus is at the forefront of the aviation industry.

- We build the most innovative commercial aircraft and consistently capture about half of all commercial airliner orders.

- Thanks to our deep understanding of changing market needs, customer focus and technological innovation, we offer products that connect people and places via air and space.
Boeing

• As a leading global aerospace company, Boeing develops, manufactures and services commercial airplanes, defense products and space systems for customers in more than 150 countries

• As a top U.S. exporter, the company leverages the talents of a global supplier base to advance economic opportunity, sustainability and community impact

• Boeing’s diverse team is committed to innovating for the future, leading with sustainability, and cultivating a culture based on the company’s core values of safety, quality and integrity
Market Share 2\textsuperscript{nd} Quarter 2021
Market Share 2nd Quarter 2021

BOEING Orders and Deliveries
ORDERS / ENCOMENDAS:

- 79 Total Deliveries
- 317 Orders
- 143 Cancellations
- 4,166 Backlog

AIRBUS Orders and Deliveries | Commercial Aircraft
ORDERS / ENCOMENDAS | 2Q2021

- 1 A220-300
- 1 A319neo
- 14 A320neo
- 104 A321neo
- 5 A330-300
- 5 A350-900 XWB

TOTAL DELIVERIES
TOTAL ENCOMENDAS
172
126
27
6,925

TOTAL ENCOMENDAS
CANCELAMENTOS
Backlog
Pedidos
## Commercial Aircraft Estimated Prices

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>List Price ($m)</th>
<th>Market Value ($m)</th>
<th>Discount</th>
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<tbody>
<tr>
<td>A380</td>
<td>432.6</td>
<td>236.5</td>
<td>45%</td>
</tr>
<tr>
<td>B777-300ER</td>
<td>339.6</td>
<td>154.8</td>
<td>54%</td>
</tr>
<tr>
<td>A350-900</td>
<td>308.1</td>
<td>150</td>
<td>51%</td>
</tr>
<tr>
<td>B787-9</td>
<td>264.6</td>
<td>142.6</td>
<td>46%</td>
</tr>
<tr>
<td>B787-8</td>
<td>224.6</td>
<td>117.1</td>
<td>48%</td>
</tr>
<tr>
<td>A330-300</td>
<td>256.4</td>
<td>109.5</td>
<td>57%</td>
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<tr>
<td>A330-200</td>
<td>231.5</td>
<td>86.6</td>
<td>63%</td>
</tr>
<tr>
<td>A321</td>
<td>114.9</td>
<td>52.5</td>
<td>54%</td>
</tr>
<tr>
<td>A320neo</td>
<td>107.3</td>
<td>48.5</td>
<td>55%</td>
</tr>
<tr>
<td>B737-900ER</td>
<td>101.9</td>
<td>48.1</td>
<td>53%</td>
</tr>
<tr>
<td>B737-800</td>
<td>96</td>
<td>46.5</td>
<td>52%</td>
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<tr>
<td>A320</td>
<td>98</td>
<td>44.4</td>
<td>55%</td>
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<tr>
<td>A319</td>
<td>89.6</td>
<td>37.3</td>
<td>58%</td>
</tr>
<tr>
<td>B737-700</td>
<td>80.6</td>
<td>35.3</td>
<td>56%</td>
</tr>
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Aircraft Programs Cumulative Cash Flows
# Aircraft Development Cost Estimates

<table>
<thead>
<tr>
<th>Aircraft</th>
<th>Year of First Service</th>
<th>Development Costs (USD) Constant 2004 Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Douglas DC-3</td>
<td>1936</td>
<td>4.3 Million</td>
</tr>
<tr>
<td>Douglas DC-6</td>
<td>1946</td>
<td>144 Million</td>
</tr>
<tr>
<td>Boeing 707</td>
<td>1958</td>
<td>1.3 Billion</td>
</tr>
<tr>
<td>Boeing 747</td>
<td>1970</td>
<td>3.7 Billion</td>
</tr>
<tr>
<td>Boeing 777</td>
<td>1995</td>
<td>7.0 Billion</td>
</tr>
<tr>
<td>Airbus A380</td>
<td>2007</td>
<td>14.4 Billion</td>
</tr>
<tr>
<td>Boeing 787</td>
<td>2012</td>
<td>13.4 Billion</td>
</tr>
</tbody>
</table>

Fig. 2. Boeing and Airbus Group representative models and development cycle timeframe
Some Subjects To Be Considered

- Commercial aircraft duopoly
- Some commercial aviation history
- Commercial aircraft manufacturers
  - American and European
  - Some of their aircraft
- Growth of air travel with improved aircraft
- Bigger and faster aircraft
- Invention of the jet engine
- Post war aircraft
- Aircraft of the jet age
- American manufacturers dominate
- Boeing- history
- Douglas- history
- Lockheed-history
- Introduction of the wide bodies
  - Boeing 747
  - Douglas DC-10
  - Lockheed L-1011
- European manufacturers join to counter the Americans
- Beginning of Airbus
- Airbus organization issues
- The first Airbus aircraft the A300 wide body twin
- Breaking into the North American market
- Douglas merges with McDonnell
  - Problems with DC-9 production
- MDC fails to build a wide body twin
- Lockheed drops out of commercial market
- Airbus expands its offerings- A320 a new aircraft
- Challenging Boeing
Some Subjects To Be Considered

• The Airbus Boeing narrow body battles
• Boeing merges with McDonnell Douglas MDC
• MDC management changes Boeing
• The four engine wide bodies (747) sales decline
• ETOPS
• Two crew cockpits
• Big twins take over long haul routes
• Boeing 777
• Boeing 787- composite airframe
  • Production problems
• Airbus A330
• Airbus A350XWB – responds to 787 – goes composite
• Airbus A380 double decker
• Boeing 777X

• Boeing 737 – multiple derivative models
  • Why the 737 MAX
• MDC and ex GE management at Boeing – no new narrow body aircraft
• Focus on profits and investors
• Airbus expands market share
• Boeing problems with 787
  • EIS three years late
  • Battery fires - 787 grounded
• Boeing 737 MAX accidents
  • MAX grounded
• Airbus problems with A380
  • EIS delayed
• New aircraft from Airbus or Boeing?
  • Need new engines
• Who is winning the battle?