Voisin Brothers
- 1908 Voisin
- Box-Kite Biplane
- Separate Mainplane & Tailplane

Louis Bleriot
- Flew English Channel
- July 25, 1909
- L. 1,000 From English Newspaper
- Monoplane
- Set Stage For 30 Years
- Radial Engine
  - 1909
  - 3 Cylinder Anzani
  - Wooden Prop.

Fundamental Ingredients
- Fixed Wing Concept
  - Cayley (1799)
- Cambered Wing Sections For Main Lifting
  - Cayley (1799), Wenham (1851), Phillips (1884)
- High Aspect Ratio Wings
  - Wenham (1866)
- Trussed Biplane Structure
  - Hargrave (1893), Chanute (1896), Wrights (1903)
- Wire Braced Monoplane Structure
  - Henson (1841), Lilienthal (1891), Bleriot (1907), Esnault-Pelterie (1907)

Fundamental Ingredients
- Longitudinal Stability (Pitch)
  - Tandem Horizontal Surfaces With Long. Dihedral
    - Cayley (1799), Fennec (1875), Lilienthal (1891)
- Directional Stability (Yaw)
  - Fixed Vertical Tail Surface
    - Cayley (1799), Fennec (1875), Lilienthal (1891)
- Lateral Stability (Roll)
  - Setting Mainplanes At Dihedral Angle
    - Cayley (1799), Fennec (1875), Lilienthal (1891)

Fundamental Ingredients
- Longitudinal Control (Pitch)
  - Rear Elevator Surfaces
    - Cayley (1789), Rumon (1901), Lilienthal (1895)
  - Front Elevator Surfaces
    - Rumon (1901), Wrights (1901)
- Directional Control (Yaw)
  - Rudder Surfaces
    - Cayley (1789), Rumon (1901)
- Lateral Control (Roll)
  - Wing Warping
    - Wrights (1901)
  - Ailerons
    - Rumon (1901), Rumon-Palter (1904), Santos-Dumont (1906)

Fundamental Ingredients
- Streamline To Reduce Drag
  - Cayley (1804)
- Practical Piloting Experience
  - Gliding
    - Lilienthal (1891), Wrights (1901)
  - Powered
    - Wrights (1903)
- Light & Powerful Engine
  - Langley (1903), Wrights (1903)
- Airscrew For Propulsion
  - Blanchard (1784), Cayley (1809)
- Undercarriage - Takeoff & Landing
  - Henson (1841), Pilcher (1896), Wrights (1903)
Military & Commercial Apps.

- World Records (1913) - Frenchmen
  - Length - Seguin (634 miles)
  - Height - Legagneaux (20,079 ft)
  - Speed - Prevost (127 mph)
- Flying Boat - Benoist (1914)
  - First Passenger Service
    - Toronto, To, St. Petersburg, (32 miles)
  - Wright-Curtiss Co.
  - Twin, Two-Engine, For Transatlantic
- Sikorsky (1914)
  - Four 100hp Mercedes Engines - 16 Passengers

World War I

- WW I - August 1914
- 200,000 Airplanes Built In Four Years
- By End Of War - 400hp Engines
- Multi-Engine Airplanes
  - Germany & France
- Construction Materials
  - Germany - Metal
  - France & England - Wood
- Cantilever Wing - Above Fuselage
  - Professor Hugo Junkers - Patent (1910)

Classic WW I Biplane

- Royal Aircraft Association
- B.E.2E (1916)
- Radial Engine
- Biplane
  - Too Stable
  - Too Slow

Inter-War Years

- Airplanes, Crew & Mechanics Available
  - Commercial Aviation - Passenger Service
- Converted Wartime Bombers
- Armstrong Whitworth Argosy (1927)
  - Biplane - Three 400 hp Jaguar Engine
  - 100 m.p.h., 3 hours, 3000 feet
  - 20 Passengers
- Three Engine Preference - Safety
  - One Engine Couldn't Maintain Altitude

London To Paris

- First Passenger Service (1919)
- Converted Bomber - Handley Page O/7
- Limited Ground Facilities

Inter-War Years

- Speed Records Were Pursued
  - Schneider Trophy Contests
  - American Curtiss R3C-2 (1925) - 232.6 mph
  - Italian Macchi M.39 (1926) - 246.5 mph
  - British Supermarine S.5 (1927) - 281.7 mph
  - British Supermarine S.6 (1929) - 328.6 mph
  - British Supermarine S.6B (1931) - 340.1 mph
    - Uncontented
  - Contest Ended
British Supermarine S.6
- Rolls-Royce Engine - 1900 hp
- Entire Surface Of Plane Used As Radiator

Modern Airliner
- Boeing 247 - 1933
  - All-Metal - Stresses Skin Principle
  - Two Engines - Each Could Maintain Altitude
  - Engine Cowlings - Cooling & Aerodynamic
  - Retractable Undercarriage
  - 155 mph
- Douglas DC-2
  - 14 Passengers
- Douglas DC-3 (1936)
  - 21 Passengers

Modern Airliner
- Douglas DC-3 (1936)
  - “Greatest Plane Ever Built !!!!!!!!”

World War II
- At Outbreak (1939)
  - Front Line Fighters & Bombers
    - Cantering, Monoplane
    - Enclosed Cockpit
    - Retractable Undercarriage
    - Approx. 1,000 hp
    - Supercharged, For Approx. 20,000 feet
- Supermarine Spitfire Mark I (1939)
  - Merlin Engine, ~ 850 hp
  - 350 mph, At 20,000 feet

World War II
- Supermarine Spitfire Mark 22 (1942)
  - Rolls-Royce Griffon Engine - 2050 hp
  - Five Bladed Airscrew
  - Supercharged
  - 457 mph At 25,000 feet

Howard Hughes
- Held Every Flight Record In World (1937)
- Tried To Sell H-1 To Government As Fighter
  - P-51 Mustang & Corsair
- Nearly Identical To Japanese Zero
Howard Hughes

- D-2 - Test Flight 1943
- D-2 Was Larger Twin Engine Fighter
- Government Adopted Lockheed P-38 Lightning

Howard Hughes

- D-5 Was Second Version Of D-2
- Government Contract From Roosevelt (1943) - XF-11
- Photo-Reconnaissance - War Ended

World War II

- Bombers - Slow Progress
  - Vickers Wellington I (1939)
    - Two 1800. hp. Engines
    - 1500. lbs. At. 195. mph. At. 10,000. feet
  - Avro Lancaster 3 (1944)
    - Four 1500. hp. Engines
    - 11,000. lbs. At. 225. mph. At. 20,000. feet
  - De Havilland Mosquito
    - Two 1700. hp. Rolls-Royce Merlin Engines
    - 5000. lbs. At. 310. mph
  - B-17, B-27, etc.