SNS COLLEGE OF TECHNOLOGY

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Coimbatore – 35

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DEPARTMENT OF AEROSPACE ENGINEERING

19ASO301 BASICS OF AERONAUTICAL ENGINEERING

UNIT 1 –HISTORY OF FLIGHT

Dr. D K Karthik , Professor &Head-CCE/SNSCT

HISTORY OF FLIGHT

- *History of Flights*
- *Ornithopters*
- *Hot Air Balloon*
- *Development of Flight - 18th & 19th century*
- *Development of Flight - 20th century*
- *Summary*

TEXT BOOK

- ***Anderson. J D, "Introduction to Flight", McGraw-Hill, 1995***

- ***Richard S. Shevel, "fundamentals of Flight", Prentice Hall, 2010***

DEVELOPMENT IN 18TH & 19TH CENTURY

- ***Sir George Cayley (1773-1857)***

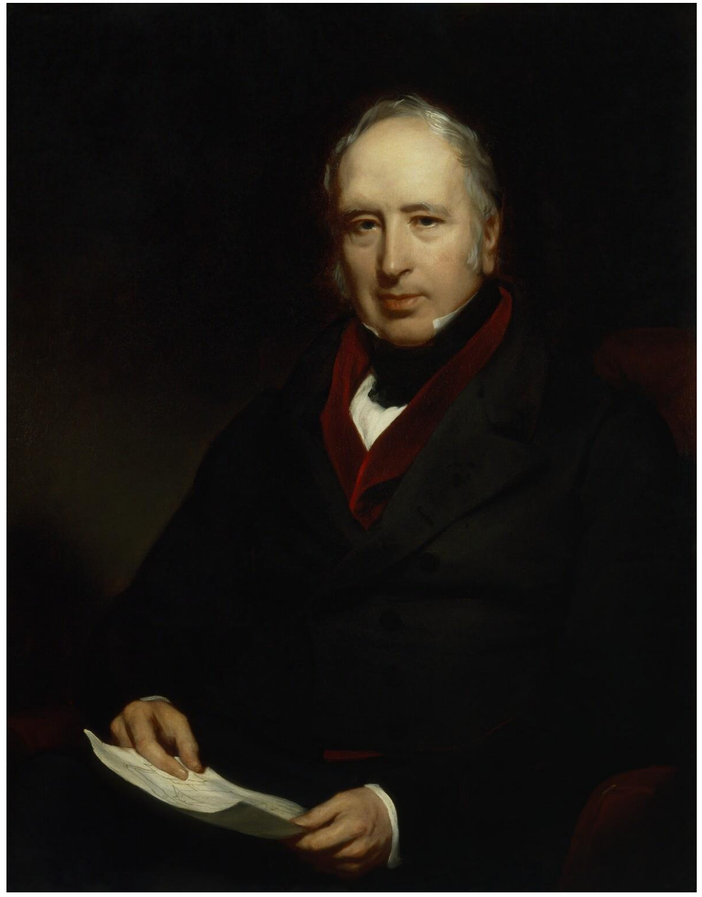
- ***He was the person primarily responsible for breaking the unsuccessful line of thought – Flapping of Wings***
- ***He separated the concept of Lift & Propulsion***
- ***Lift – Fixed Wing***
- ***Propulsion – Separate Mechanism***
- ***He is the parent of modern aviation and the first to introduce the basic configuration of modern airplane***

DEVELOPMENT IN 18TH & 19TH CENTURY

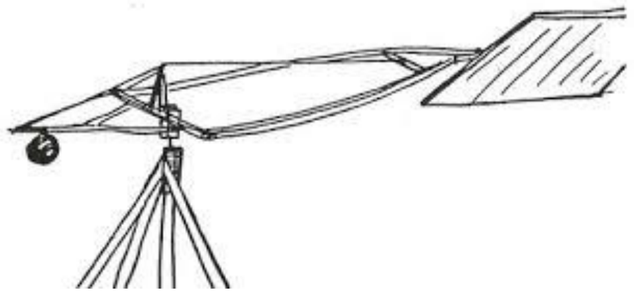
- ***Sir George Cayley (1773-1857)***

- ***He engraved his revolutionary fixed-wing concept on a silver disk in 1799***
- ***One side – concept of fixed wing***
- ***Other side – Aerodynamic forces resolved into Lift & Drag components***
- ***The disk is still in London Museum***
- ***In 1804, he built a whirling-arm apparatus for testing airfoils***

DEVELOPMENT IN 18TH & 19TH CENTURY



Sir George Cayley



Silver Disk & Wirling-arm

DEVELOPMENT IN 18TH & 19TH CENTURY

- ***Sir George Cayley (1773-1857)***

- ***It was simply a lifting surface (airfoil) mounted on the end of a long rod, which was rotated***

- ***Btw 1796-1804, he extensively worked on Aerodynamics***

- ***He also designed, built & flew small Gliders***

- ***It may sound trivial today, but in 1804, it represented first modern-configuration airplane with a fixed wing and horizontal & vertical tail, that could be adjusted***

DEVELOPMENT IN 18TH & 19TH CENTURY

- ***Sir George Cayley (1773-1857)***

- ***Basic principle of flying machine "Is to make a surface support a given weight by the application of power to the resistance of air"***

- ***He also stated that, surface inclined at some angle to the direction of motion will generate lift***

- ***Curved (Cambered) surface will do efficiently than a flat surface***

- ***In 1849, he built & tested a full-size airplane. During test flights, 10 year old boy was lift and carried along***

DEVELOPMENT IN 18TH & 19TH CENTURY

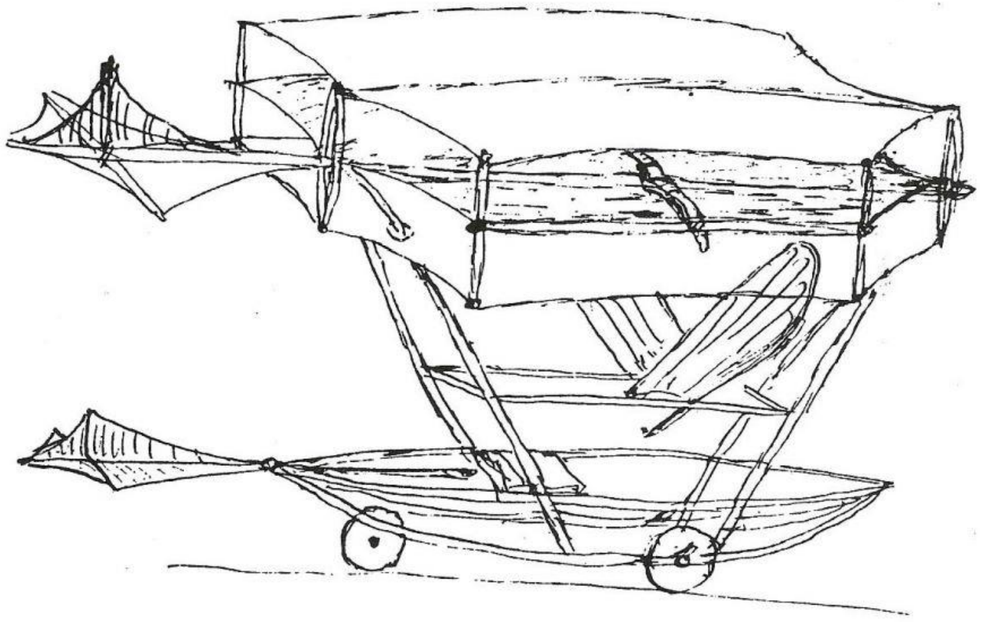
- ***Sir George Cayley (1773-1857)***

- ***Because of structural failure of Monoplane, Biplane (2 wings) & Triplane (3 wings), wings mounted on top of one another were designed***

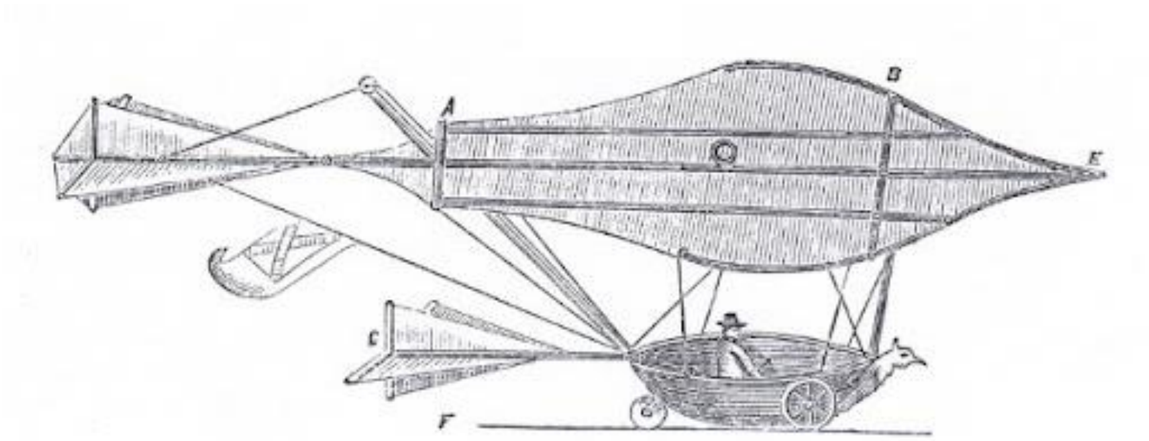
- ***Unfortunately, for reasons unknown, his name retreated back soon after his death. His works became obscure to virtually all later aviation enthusiasts in 19th century***

- ***British aviation historian, Charles H Gibbs-Smith state that, successful powered flights could have come in 1890's, if aviation specialists had taken his work forward***

DEVELOPMENT IN 18TH & 19TH CENTURY



Triplane



Human Carrying Glider

DEVELOPMENT IN 18TH & 19TH CENTURY

- ***William Samuel Henson (1812-1888)***

- ***He was a contemporary of Sir George Cayley***

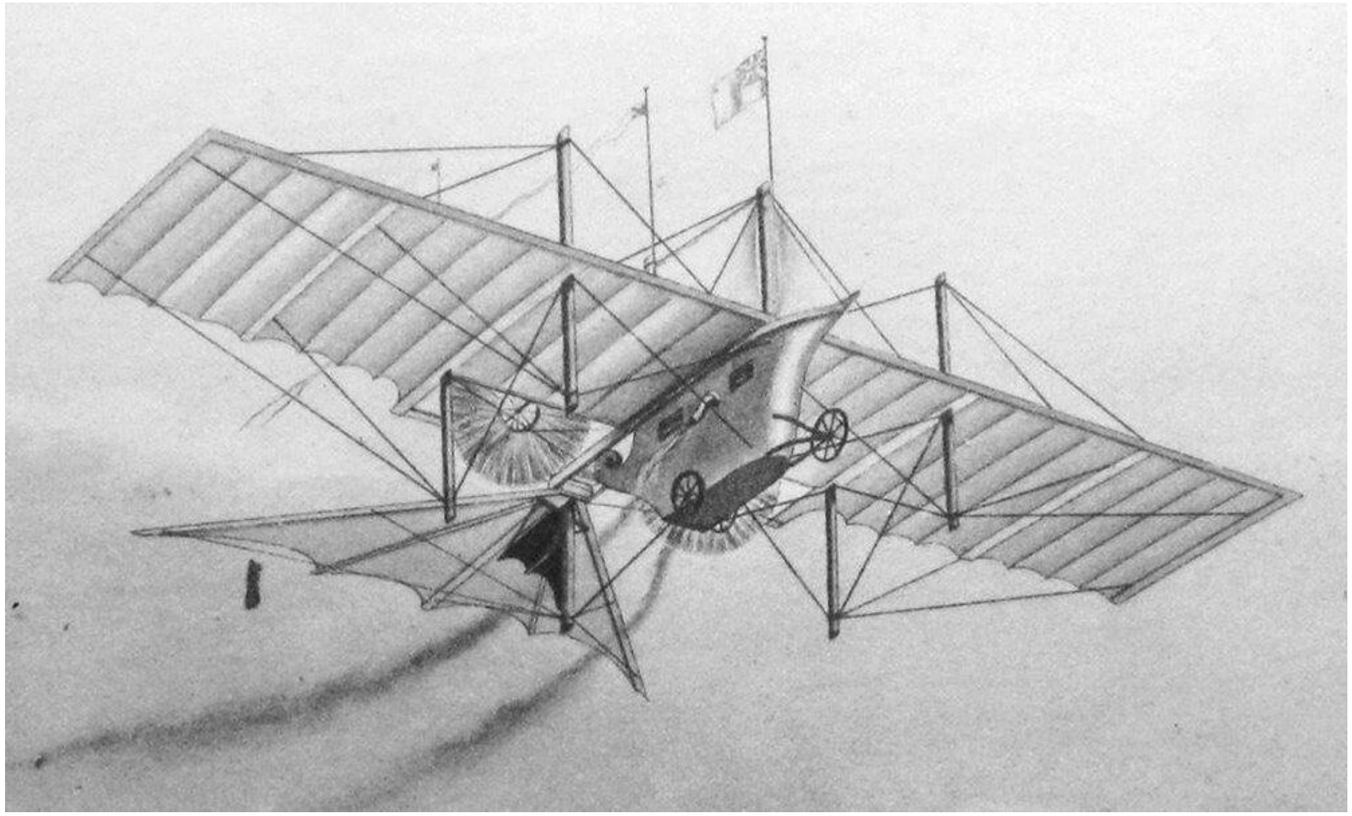
- ***In Apr 1843 – He published the design of fixed –wing airplane powered by a steam engine driving two propellers***

- ***It was called as Aerial Steam Carraige. This design received wide publicity in the 19th century***

- ***His design was a direct product of George Cayley's ideas & research***

DEVELOPMENT IN 18TH & 19TH CENTURY

William Samuel Henson



Aerial Steam Carriage

DEVELOPMENT IN 18TH & 19TH CENTURY

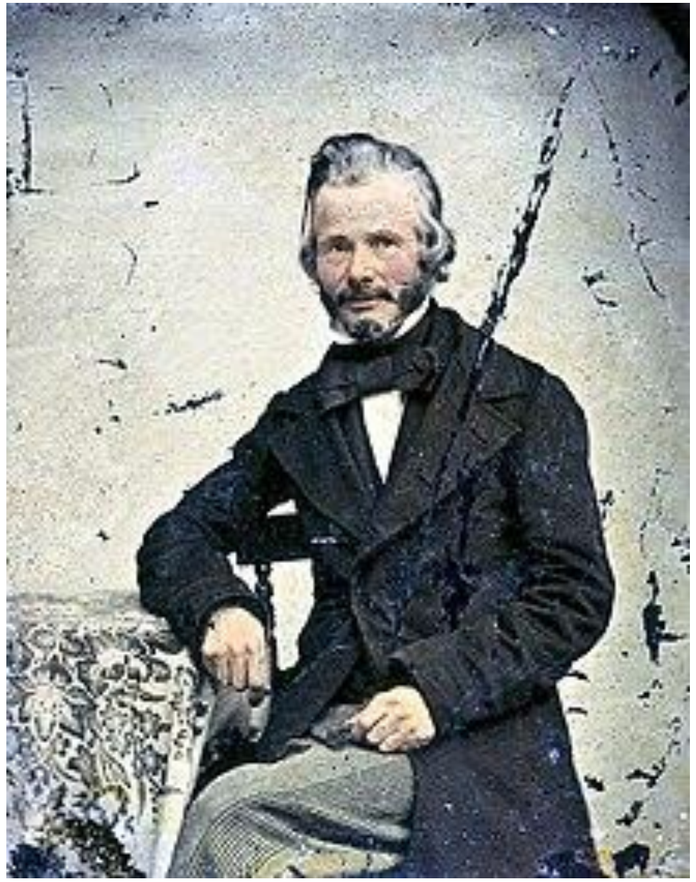
- ***John Stringfellow (1799-1883)***

- ***John Stringfellow, a friend of Henson, made several efforts to bring Henson's design to fruition. He built several small steam engines***

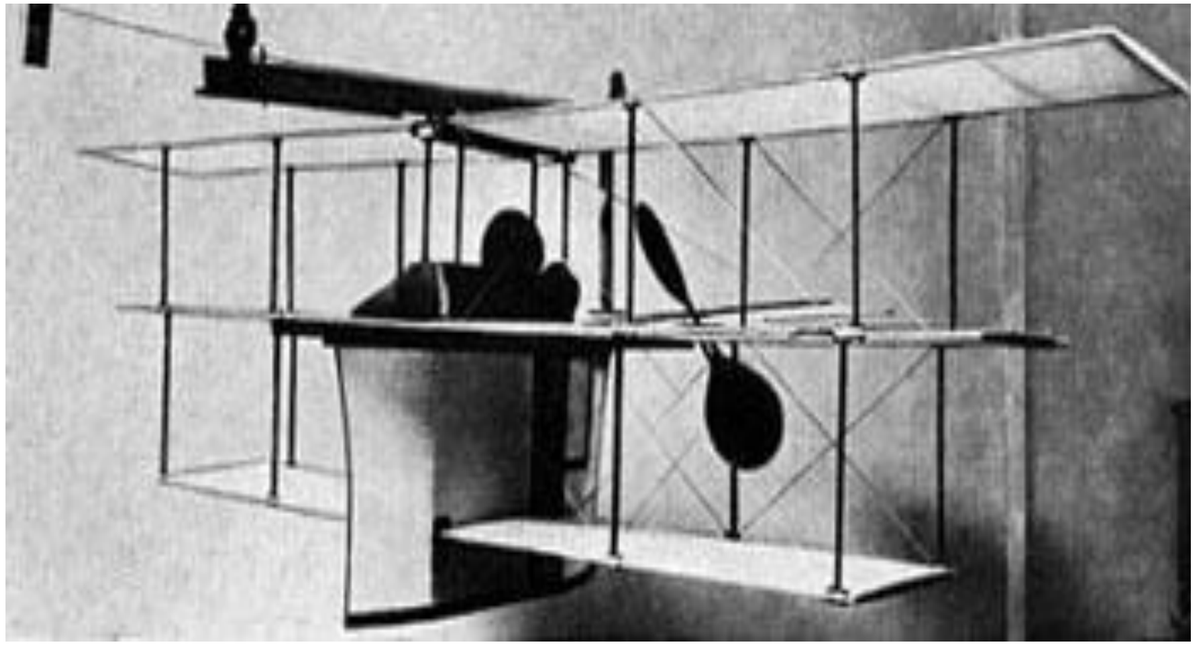
- ***He also attempted to power some model monoplanes off the ground. He was close to unsuccessful***

- ***His most recognized work appeared in the form of steam-powered triplane (1868) however, it was also unsuccessful***

DEVELOPMENT IN 18TH & 19TH CENTURY



John Stringfellow



John Stringfellow - Model Triplane

DEVELOPMENT IN 18TH & 19TH CENTURY

- ***Felix Du Temple (1823-1890)***

- ***French Naval Officer & Engineer – In 1874, flew the first successful powered monoplane in history***

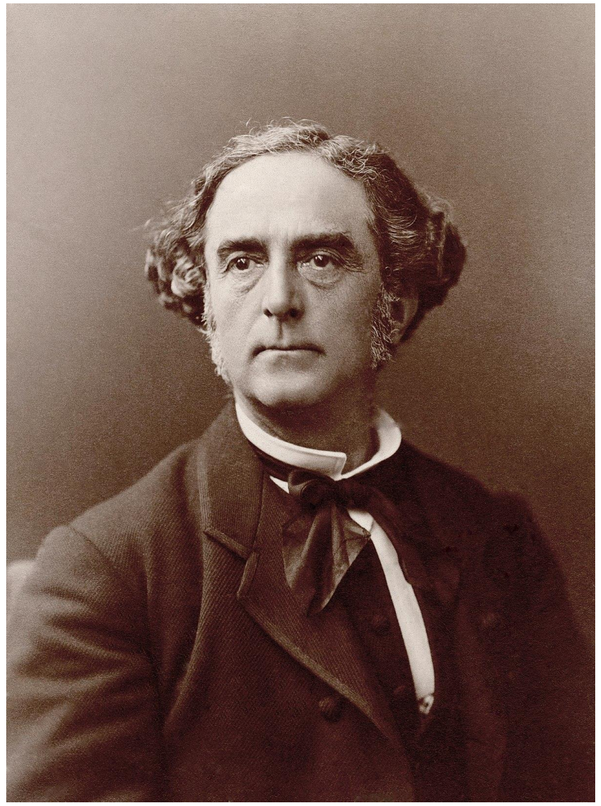
- ***First powered takeoff by a piloted, full-size airplane***

- ***Airplane had swept-forward wings powered by some-type of hot air engine***

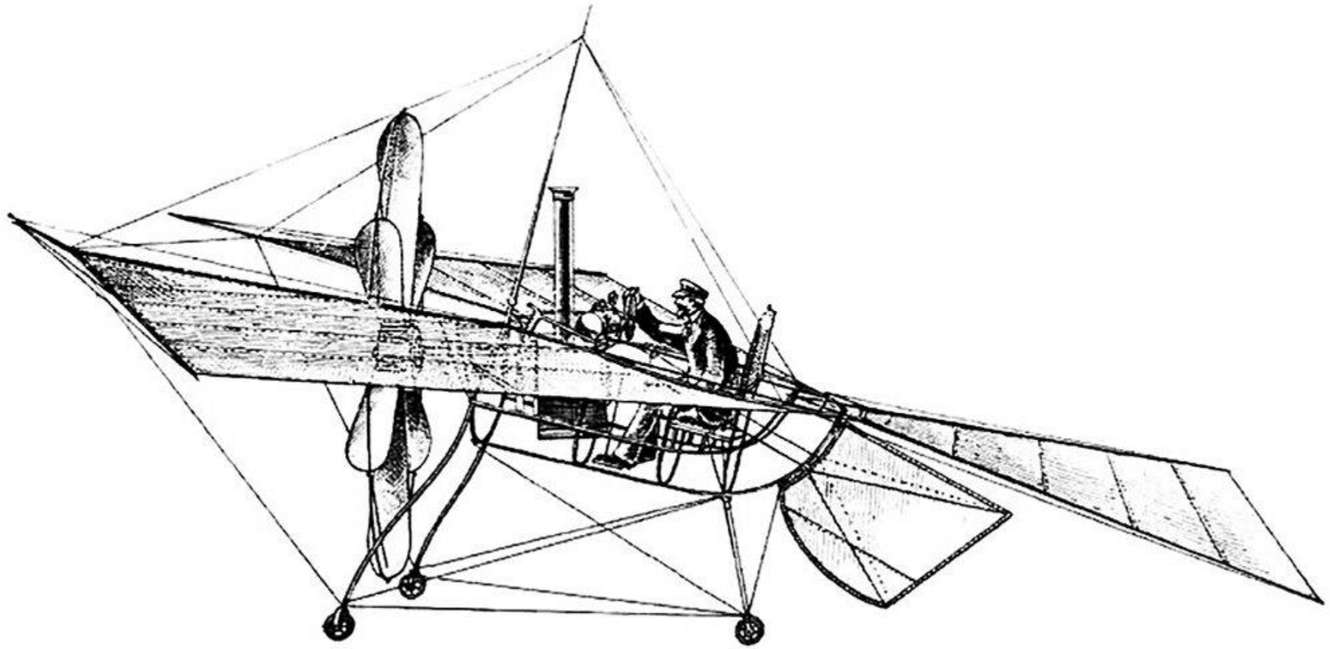
- ***It was piloted by a sailor, launched down an inclined plane at Brest, France***

- ***It left the ground for a moment, but did not sustain***

DEVELOPMENT IN 18TH & 19TH CENTURY



Felix Du Temple



Felix Du Temple – Powered Monoplane

DEVELOPMENT IN 18TH & 19TH CENTURY

- ***Alexander F. Mozhayskiy (1825-1890)***

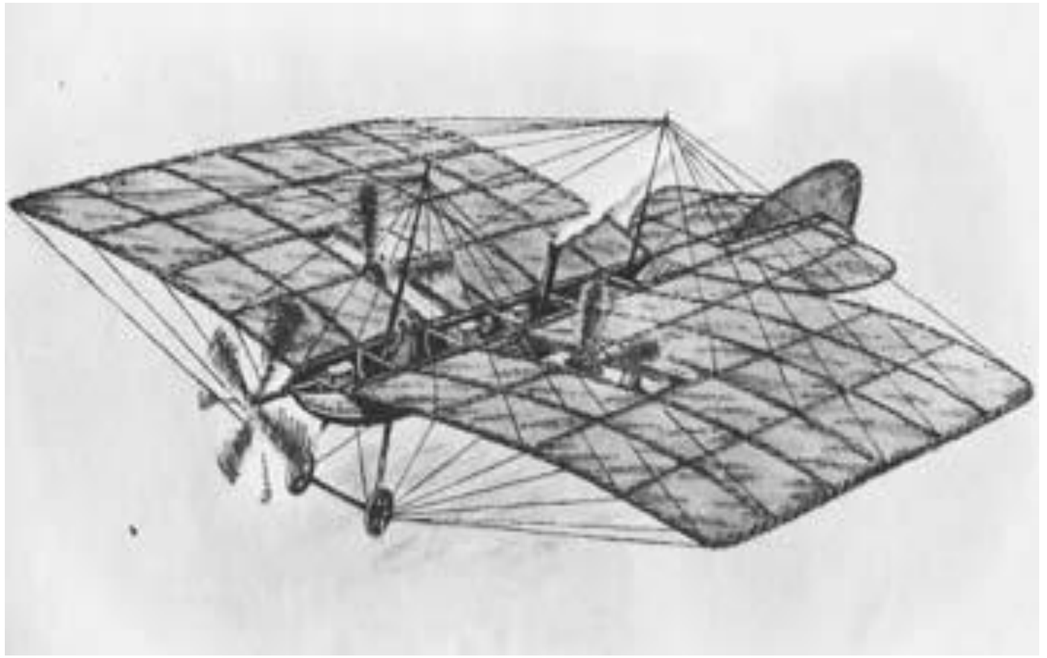
- ***Second powered airplane with a pilot left the ground near St. Petersburg, Russia in 1884***

- ***Designed by Alexander F. Mozhayskiy. It was a steam powered monoplane***

- ***No sustained flight was achieved***

DEVELOPMENT IN 18TH & 19TH CENTURY

- *Alexander F. Mozhayskiy*



Powered Monoplane