



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore – 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with ‘A++ Grade
Approved by AICTE , New Delhi and Affiliated to Anna University , Chennai.

DEPARTMENT OF AEROSPACE ENGINEERING

19ASO301 BASICS OF AERONAUTICAL ENGINEERING

UNIT 1 –HISTORY OF FLIGHT





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



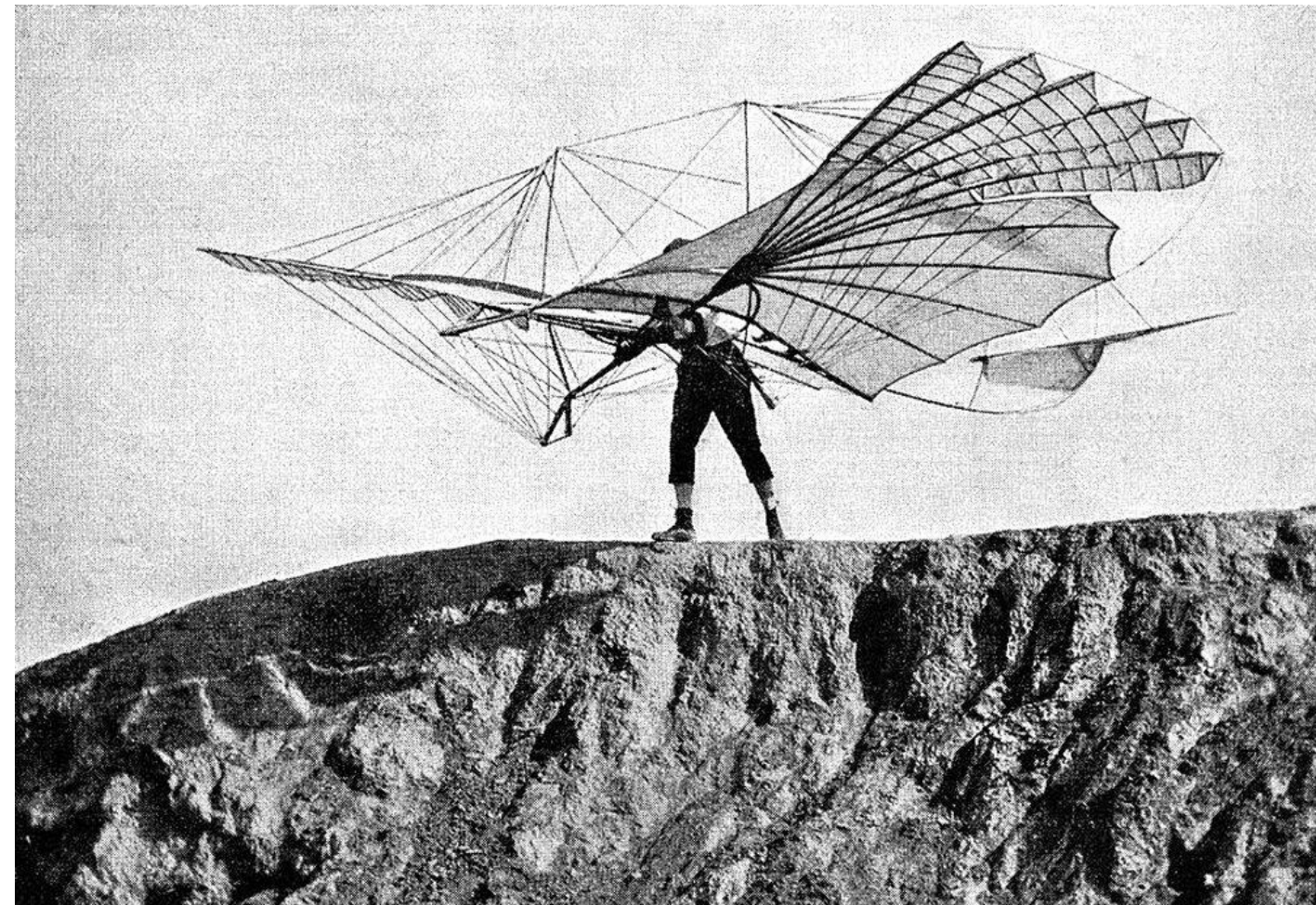
- *Otto Lilienthal (1848-1896)*
- *The Glider Man. He flew the first & successful controlled Gliders*
- *He was a man of Aeronautical stature and comparable to Sir George Cayley & Wright Brothers*
- *He concluded that, to learn practical aerodynamics, he had to get up in the air & experiment*
- *Insight into practice of flying only by actual flying experiments*



DEVELOPMENT IN 18TH & 19TH CENTURY



• *Otto Lilienthal*



Glider



DEVELOPMENT IN 18TH & 19TH CENTURY



- *Otto Lilienthal (1848-1896)*
- *He designed a Glider in 1889 & 1890*
- *1891-First successful Glider flew from a natural hill at Derwitz, Germany*
- *He later built an artificial hill, 50 ft in height in suburb of Berlin*
- *It was a conical shaped hill and glider flights made through the wind, irrespective of the wind direction.*
- *He made 2000 successful glider flights*



DEVELOPMENT IN 18TH & 19TH CENTURY



- *Otto Lilienthal (1848-1896)*
- *09 Aug 1896, Lilienthal was gliding from Gollenberg*
- *1891-First successful Glider flew from a natural hill at Derwitz, Germany*
- *He later built an artificial hill, 50 ft in height in the suburb of Berlin*
- *A temporary gust of wind brought his monoplane glider to a standstill. He stalled & crashed.*
- *He had broken his spine and died the very next day. He remarked “ Sacrifices must be Made”*



DEVELOPMENT IN 18TH & 19TH CENTURY



- *Percy Pilcher (1867-1899)*
- *He was a Scot, who lived in Glasgow*
- *He was ready to build the first Glider, under Lilienthal guidance. He made several glides from the artificial hill*
- *His most noted machine was Hawk, built in 1896*
- *Most distinguished aeronautical Engineer since George Cayley*



DEVELOPMENT IN 18TH & 19TH CENTURY



- *Percy Pilcher (1867-1899)*
- *In 1897, he calculated that an engine with 4 hp weighing not more than 40 lb, driving a 5 feet diameter propeller*
- *He was killed while demonstrating the Hawk*



DEVELOPMENT IN 18TH & 19TH CENTURY



• *Percy Pilcher*



Hang Glider, The Hawk, 1896



DEVELOPMENT IN 18TH & 19TH CENTURY



- *Samuel Pierpont Langley (1834-1906)*
- *American aviation pioneer, Astronomer & Physicist*
- *He attempted to make a working piloted heavier-than-air aircraft*
- *His models flew, but his two attempts at piloted flight were not successful*
- *He began experimenting rubber-band powered models & gliders*
- *He built a rotating arm that functioned as wind tunnel*



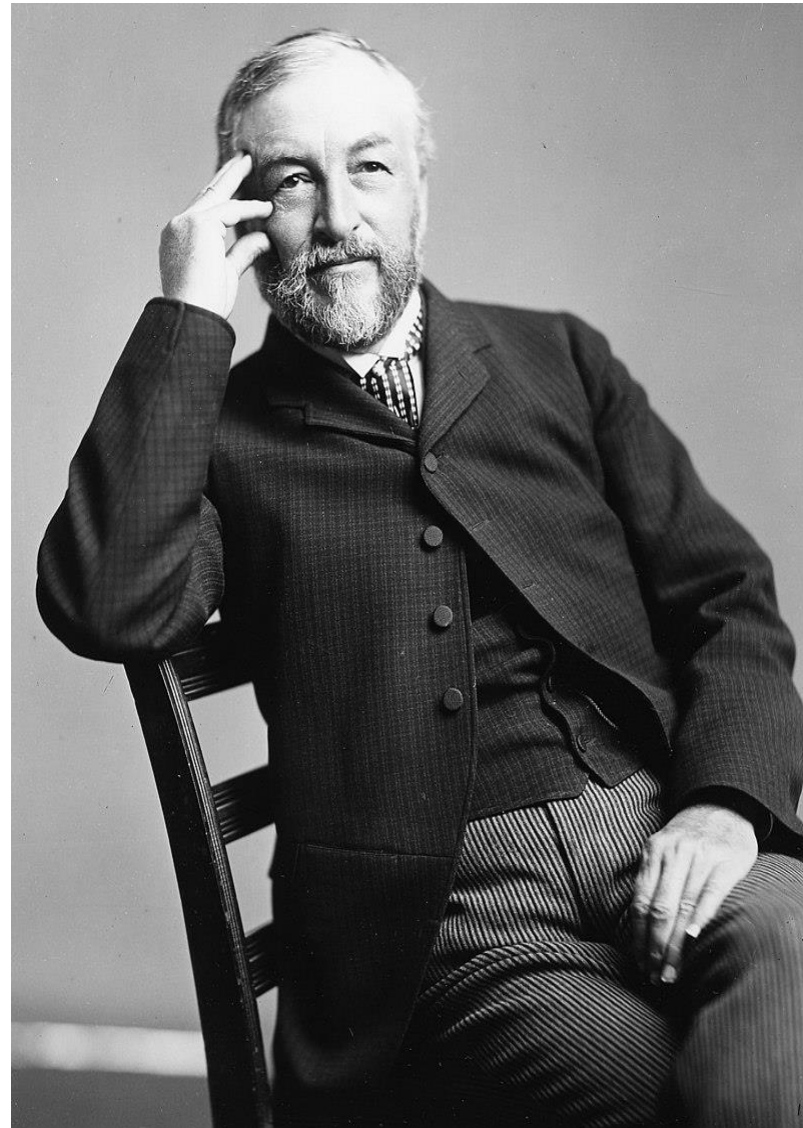
DEVELOPMENT IN 18TH & 19TH CENTURY



- *Samuel Pierpont Langley (1834-1906)*
- *He understood that, aircraft needs **Thrust** to overcome **Drag** from forward speed*
- *His first success came in May 1896, when his unpowered model no.5 (11 kg) made two flights 2300 ft (700 m) & 3300 ft (1000 m)*
- *It was a catapult launch from a boat on the Potomac river*
- *The distance was 10 times longer than any previous experiment with heavier-than-air flying machine. Model no.6 flew more than 5000 ft (1500 m)*



DEVELOPMENT IN 18TH & 19TH CENTURY



• *Samuel Pierpont Langley*



Langley's Aërodrome No. 5 in Flight, May 6, 1896
From instantaneous photograph by Alexander Graham Bell

Model no 5 flight