SNS COLLEGE OF TECHNOLOGY
(An Autonomous Institution)

Department of Aerospace Engineering

23AST101-Fundamentals of Aerospace Engineering

UNIT-1:
History of Flight

Early airplanes by Wright brothers

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Introduction

The Wright brothers, **Orville** and **Wilbur Wright**, were American inventors and pioneers of aviation. They are credited with inventing, building, and flying the world's first successful powered and controlled airplane. Their work laid the foundation for modern aviation. Here's an overview of their contributions and early airplanes:

The First Airplane: The Wright Flyer (1903)

1. Development

- The Wright brothers began their experiments in the late 1890s, inspired by earlier aviation pioneers like Otto Lilienthal.
- They focused on solving the three critical challenges of flight:
  1. **Lift**: Achieving sufficient upward force.
  2. **Control**: Maintaining stability and steering the aircraft.
  3. **Power**: Creating forward thrust with an engine.

2. Key Features of the Wright Flyer

- **First Flight Date:** December 17, 1903, at Kitty Hawk, North Carolina.
- **Design:**
  - **Biplane Structure:** Two sets of wings provided the necessary lift.
  - **Wing Warping:** A mechanism to twist the wings for roll control, allowing the aircraft to turn.
  - **Rudder:** A movable vertical surface for yaw control.
  - **Propulsion:** A custom-built 12-horsepower internal combustion engine connected to twin wooden propellers.
  - **Material:** Wood (spruce) and fabric (muslin).
- **Performance:**
  - First flight: 12 seconds, covering 120 feet.
  - Longest flight that day: 59 seconds, covering 852 feet.

Improvements and Successors

Wright Flyer II (1904)
Built after the success of the original Flyer.
Tested in Dayton, Ohio, it achieved longer and more controlled flights.
Introduced significant improvements in stability and control.
Wright Flyer III (1905)
Considered the first practical airplane capable of sustained, controlled flight.
Enhancements:
- Larger and more powerful engine.
- More durable structure.
- Ability to turn and return to the starting point.

Achieved flights lasting over 30 minutes.

Innovations by the Wright Brothers

- **Wind Tunnel Testing:**
- The Wrights built a wind tunnel to test airfoil designs and improve lift efficiency.
- This method was groundbreaking for aviation research.
- **Three-Axis Control:**
- Combined pitch (elevator), roll (wing warping), and yaw (rudder) for full control.
- This control system remains the basis of modern airplane design.
- **Propeller Design:**
- Developed an efficient propeller shape, viewing it as a "rotating wing" rather than a simple screw.

Significance of the Wright Brothers' Work

- Marked the transition from gliders and balloons to powered, heavier-than-air flight.
- Demonstrated the importance of scientific experimentation in engineering.
- Inspired the rapid evolution of aviation technology, especially during World War I and the Golden Age of Aviation.

The Wright brothers' legacy endures as pioneers who transformed humanity's dream of flight into a reality. Their achievements set the stage for the vast aviation industry we see today.

THANK YOU!