

The Wright stuff: aviation pioneers

The Wright Brothers' 1903 Flyer solved the three fundamental requirements of powered flight: constructing a device capable of carrying a man, designing a high power-to-weight propulsion system, and, critically, controlling the craft once it was airborne

Three-axis control

The most important discovery in controlling equilibrium when in flight

1. YAW: Pilot shifts hips to pull wires operating rudders, keeping nose pointed along flight path when banking

Rudders

Propellers: Counter-rotating to cancel out unwanted yaw

2. PITCH

Elevator operated by hand – to direct nose up or down

3

Pilot:
Lies in cradle

Glued spruce and ash frame floats within muslin "pockets", making fabric cover an integral part of wing structure

Engine: 77kg four-cylinder engine – first to use aluminium alloy for light weight
Fuel tank: 0.95 litres capacity

Wingspan: 12.3m
Length: 6.4m
Weight: 274kg

3. ROLL: Wing tip "warping", twisting the surface – also operated by hips – for banking into a turn

Bank to right

Wing tips twisted upwards, giving greater lift on left wings than right

Right wing tips twisted down

Right wings twisted upwards. Modern aircraft use ailerons to achieve this lateral stability

Aerofoil wings

LIFT

Air flow travels faster over top of wing, lowering pressure on that surface to create lift

Bank to left

Left wing tips twisted down