

CHAPTER 1

MAJOR COMPONENTS

List of Contents

	<i>Para.</i>		<i>Para.</i>
<i>Introduction</i>	1	<i>Flaps</i>	6
<i>Fuselage</i>	2	<i>Fin</i>	7
<i>Alighting Gear</i>	3	<i>Rudder</i>	8
<i>Main Planes</i>	4	<i>Tail Plane</i>	9
<i>Ailerons</i>	5	<i>Elevators</i>	10

Introduction

1. Before trying to understand why an aircraft flies it is helpful to know the names and functions of the major components. The structure of an aircraft without its engines or power plants is known as the airframe. For ease of construction, assembly and dismantling, the airframe is made up of a number of separate units or components.

Fuselage

2. The fuselage is the body of the aircraft to which the other components such as main planes, tail unit and alighting gear are attached. The fuselage of a large aircraft is often built up in sections such as, the nose, centre and rear fuselage. The fuselage contains the pilot's cockpit, known as the flight deck on large aircraft, and may also be fitted with fuel tanks, guns and sometimes the engines. It accommodates the aircrew and may be provided with a bomb bay or space for passengers or freight. An external fuel tank may also be fitted; this is known as a ventral tank.

Alighting Gear

3. When the aircraft is on the ground its weight is taken by the alighting gear. This consists of an undercarriage and a nose or tail wheel both being either fixed or retractable. A retractable undercarriage is divided into two identical units namely port undercarriage unit and starboard undercarriage unit. Each unit includes a strut-braced oleo leg which, together with the tyre absorbs the shock of landing. Most retractable alighting gear is hydraulically operated.

Main Planes

4. The fuselage is fitted with a port (left) main plane and a starboard (right) main plane or it may have a centre plane (centre section) bolted to the fuselage to which the main planes are attached. The primary purpose of the main planes is to support the aircraft in flight, but they may also contain the engines, fuel tanks, bomb racks, and be fitted with external (drop) fuel tanks. The main planes are commonly termed the aircraft wings.

Ailerons

5. The ailerons are control surfaces hinged to the rear of the main planes and are operated by the control wheel or column being turned or moved to the left or right. The ailerons are so interconnected that as the port aileron goes up the starboard aileron goes down, this causes the aircraft to roll to port, the reverse action causes a roll to starboard.

Flaps

6. The flaps are hinged control surfaces found on most aircraft at the rear of the main planes and inboard of the ailerons. Their purpose when lowered, is to cause the aircraft to descend more slowly and steeply when approaching to land, or climb at a greater rate on take-off. They are caused to operate hydraulically, electrically or manually by the movement of a lever, switch or hand wheel in the cockpit.

Fin

7. The fin is the vertical unit built on to or attached to the rear end of the fuselage. The fin provides directional stability that is to say holds the line of flight of the aircraft, to a straight line.

Rudder

8. The rudder is a control surface hinged at the rear of the fin and when moved in flight causes the aircraft to turn to port or starboard. It is moved by the operation of a rudder bar or pedals in the cockpit; for example left foot forward on the bar or pedals causes the aircraft to turn to port.

Tail Plane

9. The tail plane may be constructed in one piece or may be separate port and starboard planes. It is secured to the rear end of the fuselage in many instances, but the modern high speed version is secured about the top of the fin. Its purpose is to hold or steady the aircraft in flight to prevent "pitching". The angle that the tail plane makes to the airflow may either be fixed or a mechanism can be fitted to allow the angle to be varied by the pilot as and when required.

Elevators

10. The elevators are control surfaces hinged at the rear of the tail plane. Forward and backward movement of the control column causes the elevators to move downward and upwards and in flight the aircraft will dive or climb. The tail plane, elevators, fin and rudder are known as the tail unit. The tailless types of aircraft use the tips or rear portions of their swept-back wings to carry out the functions of a separate tail plane and elevators.



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