

Aircraft Design

1-2
HOURS



Materials

- › Paper
- › Pens and pencils



Activity Plan

- › List the key differences in design between the four listed aircraft.
- › Try to explain why each aircraft is designed that way.
- › Can you link the reasoning back to the operational purpose of the aircraft?

				
	Hawk T2	H145	Voyager	AW139
Purpose	Military Fast Jet	Air Ambulance	Military Refuelling	Search & Rescue
Pilots	2	1 or 2	3	1 or 2
Passengers	0	Up to 9	291	15
Length	12.43 m	13.03 m	58.8 m	16.7 m
Wingspan	9.94 m	11 m (Rotor)	60.3 m	13.8 m (Rotor)
Height	3.98 m	3.45 m	17.4 m	4.98 m
Max Weight	9,100 kg	3,585 kg	233,000 kg	6,400 kg
Thrust	29,000 N	1,100 kW	640,000 N	1,142 kW
Max Speed	921 mph	167 mph	547 mph	193 mph
Range	1,565 miles	426 miles	9,200 miles	660 miles

Further Activity

Using what they have learned from the first activity, could you design an aircraft that would meet the design brief below? You will need to come up with some information regarding how many engines it will have, how big it will be, any key design features, a sketch of what you think it will look like and a small paragraph of why you think the design meets the requirements. Share your designs with us on LinkedIn using #BabcockSTEM.

Design Brief

Design an aircraft that can be used in search and rescue. The aircraft must be able to get into tight places and must be able to search large areas for a missing person, but it can take any form. Please provide a brief description for the design, ensuring there is a link back to its desired purpose.



Learning Objectives

- › Understand how the design of an aircraft will affect how it can perform its operational role.
- › Understand which design elements you can change on an aircraft and how they have an effect on its performance.

How does an aircraft's operational purpose affect its design?

Babcock operate a wide range of fixed wing (aeroplanes) and rotary wing (helicopters) aircraft, which perform a variety of roles – ranging from fast jet training, to air ambulance services, to aerial firefighting.

Our customers include the military, governments and air ambulance charities, each of which have different specifications and requirements.

Each aircraft is designed differently to optimise performance in its operational role. For example, fast jet trainer aircraft are small, lightweight and powerful to enhance speed and agility, whereas refueling aircraft have a huge range and fuel capacity.



Our search and rescue teams have to be able scan large areas to find the location of individual/s. Once they are found, the rescuers must leave the aircraft to check that the individual/s are okay and then return to the aircraft with the individual/s. To achieve this, we will identify an aircraft suitable for operating in the customers' specified landscape (such as mountains and oceans) and then fit it with the appropriate equipment such as heat cameras, bright lights and winches (as seen above).

Our role is to find the aircraft that best meets our customers' specifications. This involves evaluating the performance of each aircraft and conducting analysis into how each aircraft will enable us to meet our requirements.