# POWER CURVES

The principle items of flight performance involve steady state flight conditions and equilibrium of the aircraft. In the previous chapter it was shown that in order for an aircraft to remain in equilibrium lift must equal weight and thrust must equal drag. This last statement states that it is the drag element that defines the thrust requirements for steady state flight.

An aircraft in steady, level flight at a given altitude and a given velocity must produce a net thrust from its powerplant(s) that is equal to drag. The output of the powerplant however is best handled in terms of power rather than thrust. Thus, it is more convenient to represent the amount of drag in terms of the amount of power required.

Power can be considered as a force times velocity. So as drag is a force (measured in Newtons), then the power required can be expressed as drag times velocity (DV).

In order for the aircraft to fly ay a certain velocity, there must be a corresponding amount of power available from the powerplant. This can be derived from the amount of thrust available times velocity (TV).

By plotting the values of DV and TV graphically a picture defining the power required to achieve equilibrium, lift equals weight at constant altitude flight at various speeds (shown as True Airspeed (TAS) can be ascertained

Total drag of an aircraft was plotted using the total drag graph (Figure 64). Power is required to overcome the drag, and can be considered as drag x velocity.

We can then plot this data on a graph to get a Power Curve

This is the drag curve plotted against power. Power refers to that needed for level flight and is also needed to gain speed and/or height.

Another graph that becomes fundamental in the analysis of climb performance; is the plot of power available (TV) from the engine(s) and power required (DV) by the airframe, against TAS.