Airplanes How They Work Essay, Research Paper

I am doing my report

Title: Airplanes How they workType: Research PaperAcademic Level: HighschoolContent: The aerodynamics of the airplaneDescription: To explain how the plane works

I am doing my report on the airplane. To understand an airplane better you have to understand the principles of flight. An airplane flies because air moving over and under its surfaces particularly its wings travels at different velocities producing a difference in air pressure low above the wing and high below it. The low pressure exerts a pulling force and the high pressure a pushing force. The lifting force, usually called lift, depends on the shape, area, and tilt of the wind, and on the speed of the aircraft. The shape of the wing causes the air streaming above and below the wing to travel at different velocities. The greater distance over which the air must travel above the curved upper surface forces that air to move faster to keep pace with the air moving along the flat lower surface. According to burnuli’s principle, it is this difference in air velocity that produces the difference in air pressure. you must also understand lift. wing area influences lift; the more of the wing that is exposed to the air, the greater the lift. The up or down tilt of the wing, usually called its angle of attack, contributes to or detracts from lift. As a wing is tilted upward, that is, as its angle of attack is increased, its lift increases. The air passing over the top of an uptilted wing must travel a greater distance and therefore produces a greater pressure differential between the upper and lower surfaces. Aircraft speed has a great influence on lift. The faster the air moves over and under the surfaces of an airplane, the greater the pressure differential and, as a result, the greater the lift. As an airplane flies on a level course, the lift contributed by the wind and other parts of the structure counterbalance the weight of the plane. Within certain limits, if the angle of attack is increased while the speed remains constant, the plane will rise. If the angle of attack is decreased, that is, the wing is tilted downward, the plane will lose lift and start to descend.

An airplane will also climb from level flight if its speed is increased, and it will dive if its speed is decreased. Lift varies directly with speed. The third factor you must understand is drag. Factors that contribute to lift in airplane flight also contribute to undesirable forces called drag. Drag is the force that tends to retared the motion of the airplane through the air. Most drag is a result of the resistance of the air to objects moving through it. This type of drag can be reduced by streamlining the aircraft. It is also reduced by placing slots in the Wing so that the boundary layer or “Wall of air” building up in front and around the wing can flow through it. One form of drag, however, known as induced drag, is a direct result of the lift produced by the wing. induced drag is the penalty extracted from lift. Great differences in the pressure of the air flowing over and under a wing can cause whirlpools or Eddies of air to billow up along the trailing edges of the wings. These whirlpools produce a breaking forced toward the rear that must be overcome by the foward thrust of the engines. As the angle of attack of an airplane is increased, the plane gains lift, but the lift is limited, as the angle of attack is increased, air turbulence spreads over the wing. Then at a certain critical point (an angel of about 14 in many airplanes) , the wing loses lift and the plane stalles, nosing over into a dive. Airplane designers try to design aircraft with high lift-to-drag ratios, that is, much more lift then drag. They are limited, however, by factors such as speed and the waight that the plane must carry. Faster planes usually have a lower lift-2-drags ratio. A subsonic modern Transport has a lift to drag ratio of about 15 and a late private plane may have a lift to drag ratio of about 25. Supersonic transports have a lift to drags ratio of about 6. The Supersonic age that aviation entered after World War 2 presented a number of problems so revolutionary that the arodynamisits found themselves resorting to experimentation as dangerous and adventuresom as any faced by early pilots.