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Aerodynamic Optimization of Aircraft Wing

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It is crucial that an aircraft be aerodynamic in form to overcome the forces of gravity and drag while in flight. The proper lift and thrust enable the aircraft to move optimally. Fuel consumption is directly proportional to aerodynamic drag. Thus, inefficient aircrafts that are subject to large drag forces are often costly. The wing of an aircraft can be designed to maximize lift and minimize drag. For a set of operating conditions including vehicle altitude and speed, the lift to drag ratio can be maximized to ensure the most efficient operation. The lift to drag ratio is dependent, in part on the geometry of the aircraft wing. The most optimal wing shape is unique for a set of operating conditions. This paper explores the ideal wing geometry of an aircraft travelling at a low speed, in the range of forty to sixty miles per hour. The ideal wing of this aircraft will seek to maximize lift, which is a function of the given aircraft velocity. The final design of the optimal aircraft wing, presented as a Solidworks model, accounts for the ideal lift to drag ratio at the given speed, the attack angle and its impact on drag, and the local air pressure.

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